Aug. 8, 1933. L. W. MELCHER 1,921,257

AIR CONDITIONING APPARATUS

Filed July 18, 1931 4 Sheets-Sheet 1

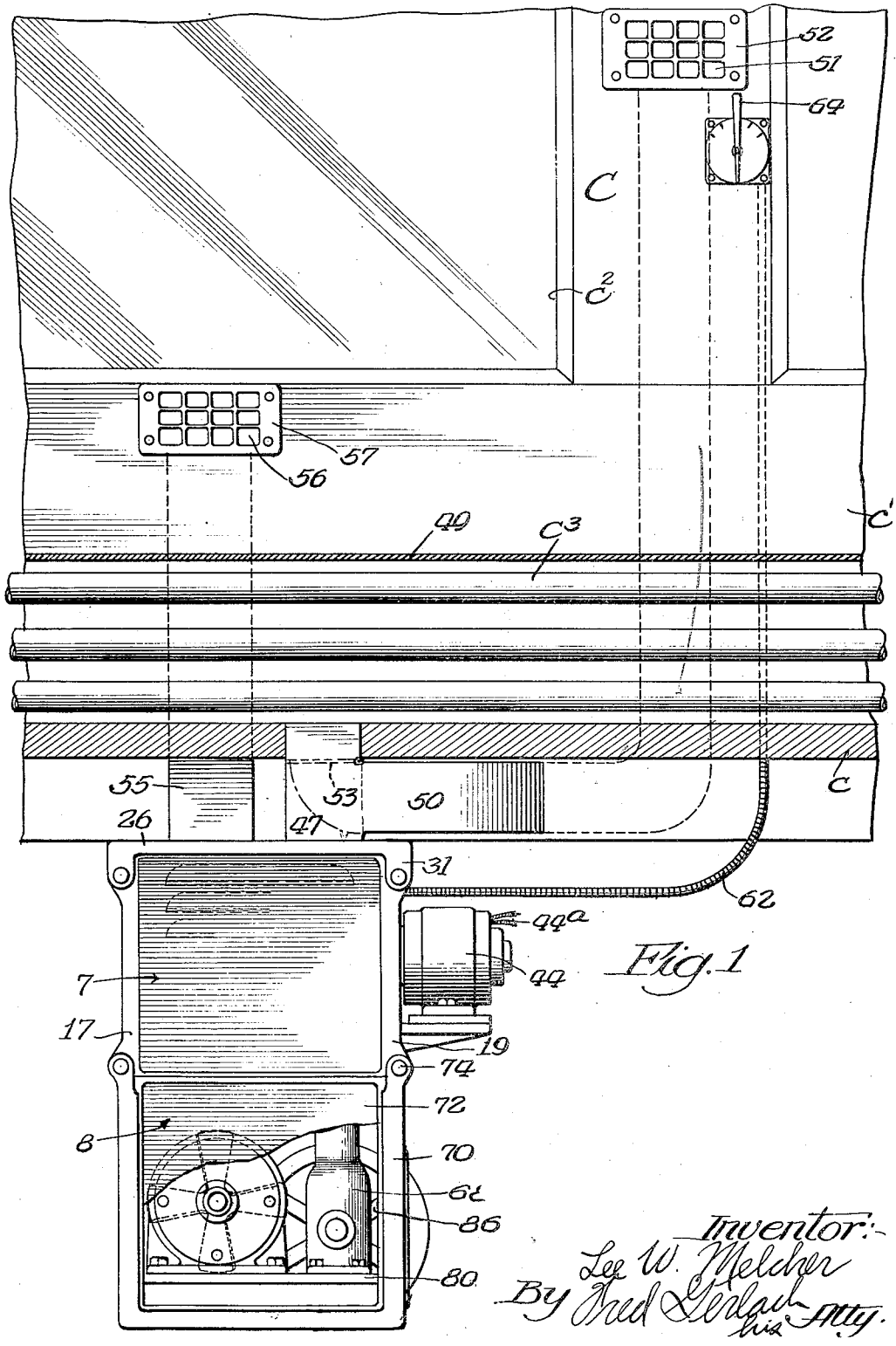


Fig. 1

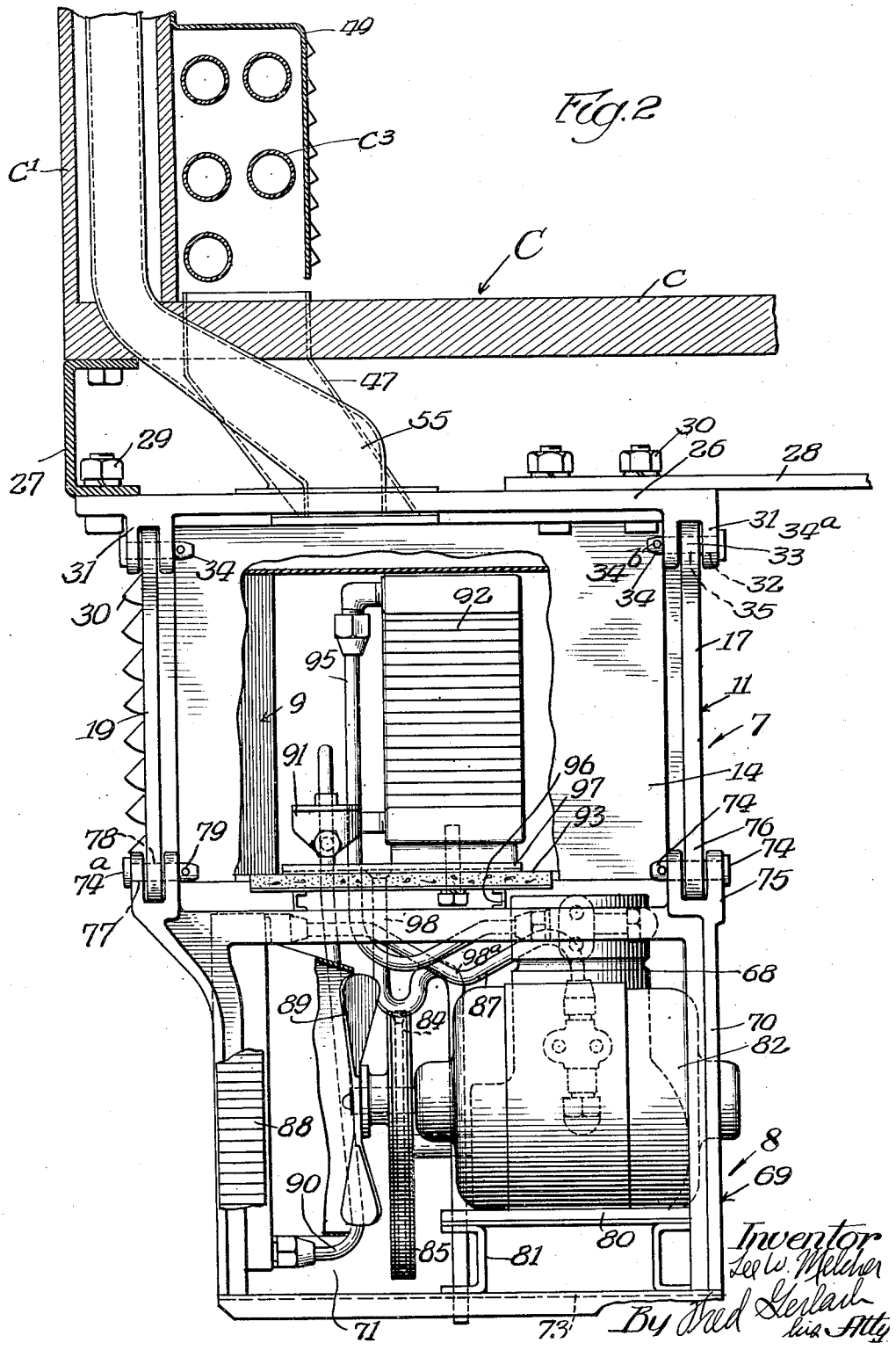
Inventor:
Lee W. Melcher
By Fred Gerlach his Atty.

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AIR CONDITIONING APPARATUS

Filed July 18, 1931 4 Sheets-Sheet 2

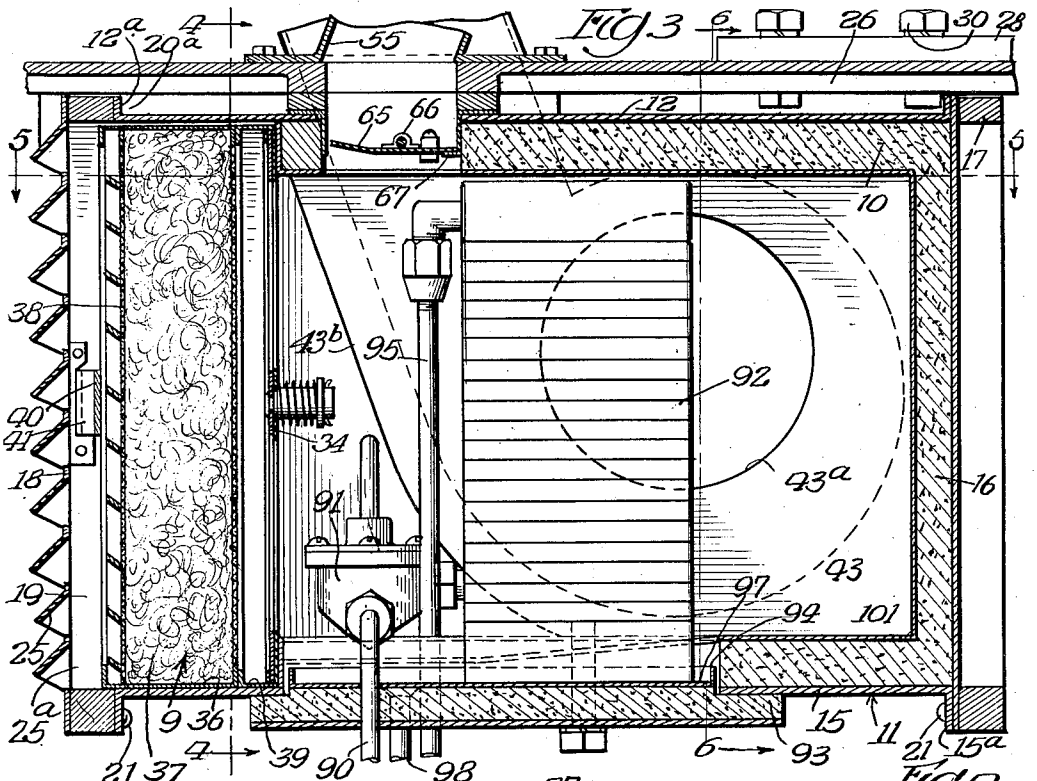
Fig. 2

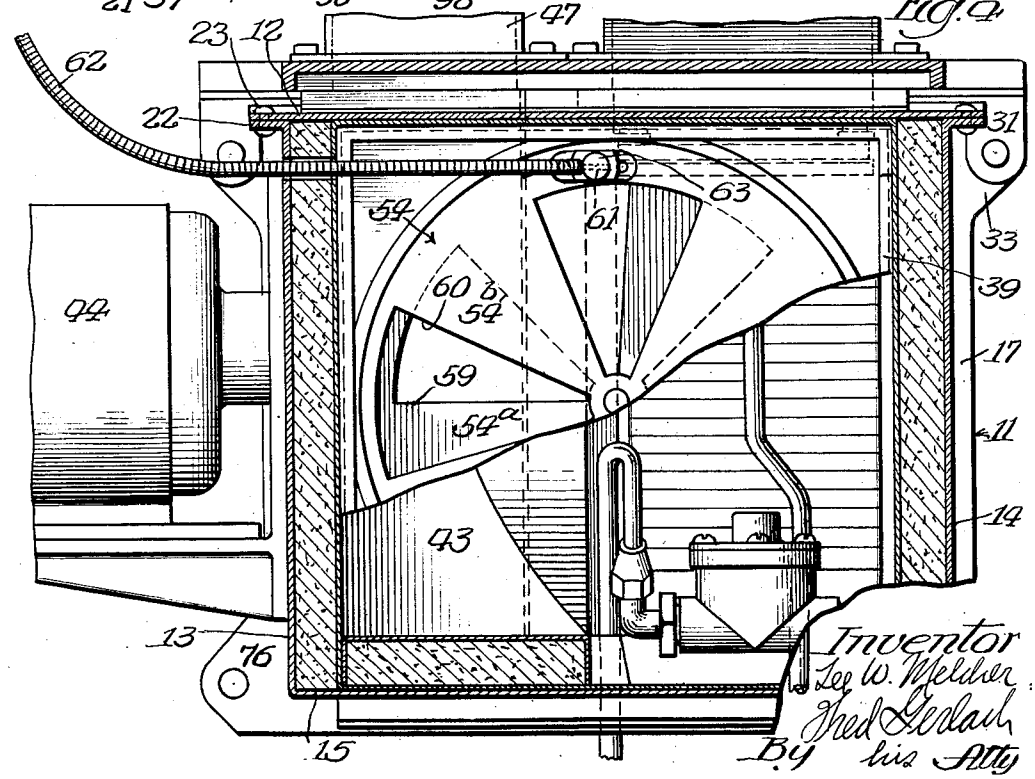


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AIR CONDITIONING APPARATUS

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AIR CONDITIONING APPARATUS

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Fig 5

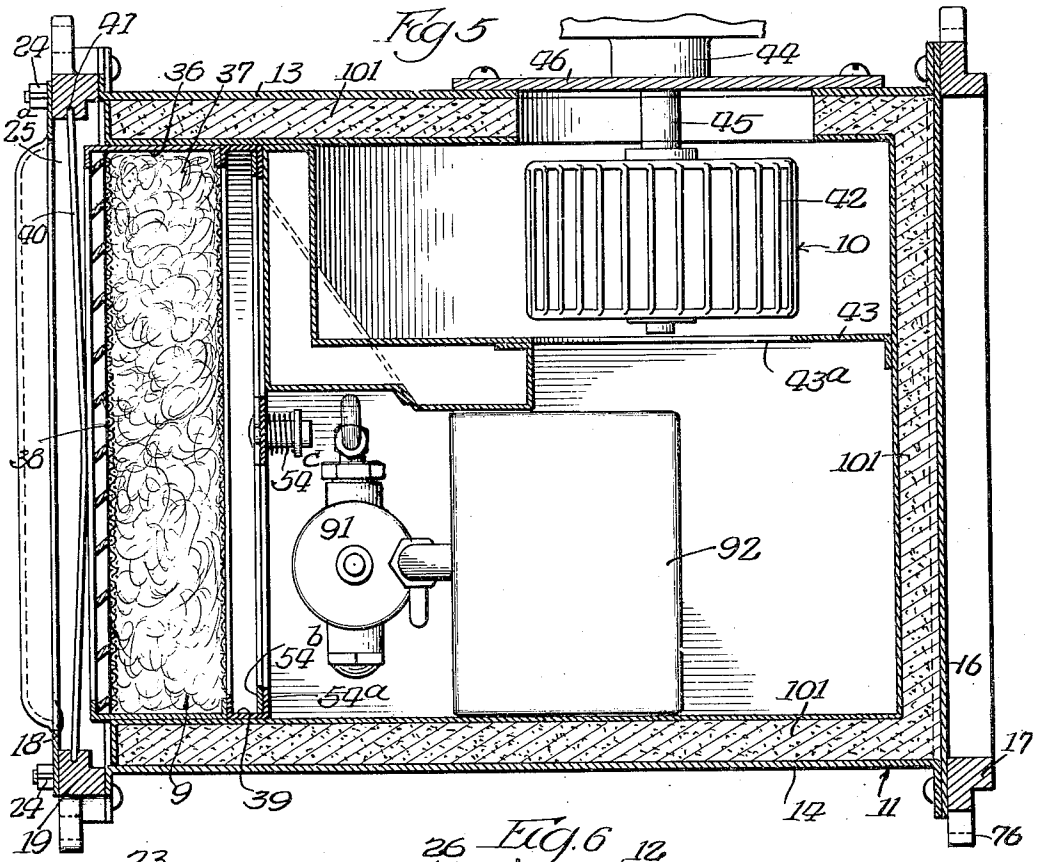
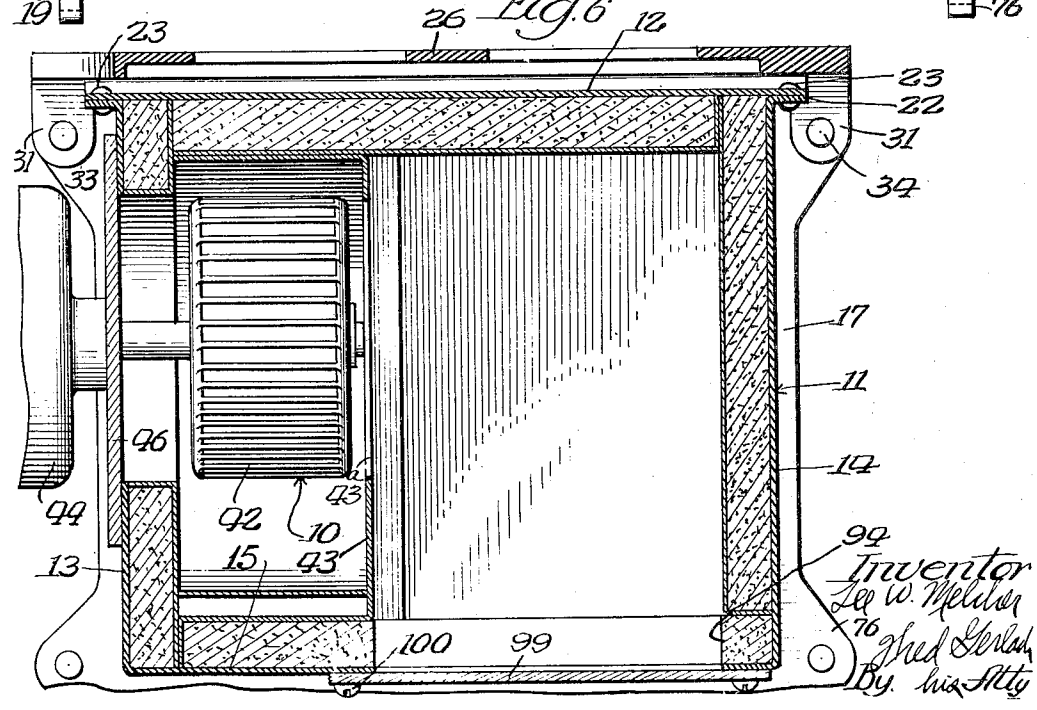


Fig 6



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Patented Aug. 8, 1933

1,921,257

UNITED STATES PATENT OFFICE

1,921,257

AIR CONDITIONING APPARATUS

Lee W. Melcher, Winnetka, Ill.

Application July 18, 1931. Serial No. 551,696

12 Claims. (Cl. 62—117)

The invention relates generally to air conditioning apparatus. More particularly the invention relates to that type of apparatus which is designed primarily to condition the air in a railway car and comprises a housing under the car-body having an inlet for air from the interior of the car and a valve-controlled inlet for air from outside of the car, an air filter under the car-body, a motor-driven fan for drawing air into the housing by way of the inlets and then through the filter and delivering the filtered air through the bottom of the car-body into the interior of the car, and a separately controllable refrigerating unit for cooling the filtered air prior to delivery by the fan into the car.

One object of the invention is to provide an air conditioning apparatus of this type in which the housing for the air filter is secured removably to the bottom of the car, encases the motor-driven fan and embodies an opening in the bottom thereof for the refrigerant coil of the refrigerating unit.

Another object of the invention is to provide an air conditioning apparatus of the type under consideration in which the various parts of the refrigerating unit, with the exception of the refrigerant coil, are encased in a housing which is secured by readily detachable means to the bottom of the housing for the air filter and fan.

A further object of the invention is to provide an apparatus of the aforementioned character in which the inlet for air from the interior of the car is equipped with a balanced valve which is adapted automatically, and in response to suction created by the motor-driven fan, to open when the valve for the inlet for air from the outside of the car is closed or the air filter becomes clogged as the result of the accumulation of dust particles thereon.

A still further object of the invention is to provide an air conditioning apparatus for a railway car, which is generally of new and improved construction, may be manufactured as an attachment and at a comparatively low cost and is an improvement upon that exhibited in an application for Letters Patent of the United States filed by me September 2, 1930, Serial No. 479,227.

Other objects of the invention and the various advantages and characteristics of the present construction will be apparent from a consideration of the following detailed description.

The invention consists in the several novel features which are hereinafter set forth and are more particularly defined by the claims at the conclusion hereof.

In the drawings which accompany and form a part of this specification or disclosure and in which like numerals of reference denote corresponding parts throughout the several views:

Fig. 1 is a view, partly in side elevation and partly in section, showing an air conditioning apparatus embodying the invention in connected relation with respect to a railway car;

Fig. 2 is a vertical transverse sectional view exhibiting in detail the manner in which the housing for the air filter and motor-driven fan is secured removably to the bottom of the car and is connected detachably to the housing for the refrigerating unit;

Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 2, showing the construction and arrangement of the balanced valve which is associated with the inlet for air from the interior of the car;

Fig. 4 is a vertical longitudinal section on the line 4—4 of Fig. 3 illustrating in detail the arrangement of the refrigerant coil of the refrigerating unit within the housing for the air filter and fan, and the construction of the valve for controlling the inlet for air from outside of the car;

Fig. 5 is a horizontal section on the line 5—5 of Fig. 3 exhibiting in detail the construction of the air filter, showing the manner in which the latter is held in place so that it may be readily removed for cleaning or replacement purposes; and

Fig. 6 is a vertical transverse section on the line 6—6 of Fig. 3.

The air conditioning apparatus which forms the subject matter of the invention is designed primarily for use in connection with a railway car of standard construction and serves to supply either warm or cool filtered air into the interior of the car. The car which is illustrated in Figs. 1 and 2 of the drawings is designated by the letter C and comprises a bottom c and a hollow side c'. The latter is formed by a pair of laterally spaced walls and has a window c^2 therein. Pipes c^3 are located adjacent the lower portion of the innermost side-forming wall. During cold weather, steam or any other suitable heating medium is supplied to these pipes in order to heat the interior of the car, as well understood in the art.

The apparatus comprises an air filtering unit 7 and a refrigerating unit 8 and is in the nature of an attachment which is designed to be applied to the railway car C without reconstructing the latter. The air filtering unit 7 embodies an air filter 9, a fan 10 and a housing 11. The

housing 11 encases the filter and fan, as hereinafter described, and consists of a top 12, a pair of end walls 13 and 14, a bottom 15, an inner side wall 16, an inner side frame 17, an outer side wall 18 and an outer side frame 19. The inner and outer side frames 17 and 19 are formed of cast metal and are rectangular in conformation. The top, bottom and end and side walls are formed of plate metal and in conjunction with the side frames 17 and 19 render the housing of a unitary and rigid character. The top 12 is provided at the side margins thereof with upturned flanges 12^a which are secured to the upper cross members of the frames 17 and 19 by screws or any similar attaching device. The bottom 15 is located directly beneath the top 12 and embodies down-turned side flanges 15^a. The latter are secured to the lower cross members of the cast metal side frames 17 and 19 by means of screws 21. The end walls 13 and 14 are disposed one opposite the other and embody out-turned flanges 22 at the upper margins thereof. These flanges fit against the under faces of the end margins of the top 12 and are secured fixedly in place by rivets 23. The lower margins of the end walls are secured in any suitable manner to the end margins of the bottom 15. The inner side wall 16 is coextensive with the inner side frame 17 and is secured between the frame and the flanges on the top 12 and bottom 15 by means of the screws 20 and 21. The outer side wall 18 is removably secured to the outer face of the outer end frame 19 by bolts 24 and is horizontally slit and deflected, as at 25, to form an inlet 25^a whereby air from the outside of the railway car is admitted into the housing 11. The housing 11 is located under the car-body and is suspended by means of a cast metal plate 26. This plate is supported from the bottom *c* of the car by means of a channel iron strip 27 and a bar 28. The channel iron strip 27 is secured in any suitable manner to the bottom *c* beneath the side *c'* and is connected to the plate 26 by means of bolts 29. The bar 28 is located beneath the central portion of the bottom *c* of the car and is connected to the inner side margin of the plate 26 by bolts 30. The plate 26 is rectangular and embodies pairs of depending lugs 31 at the corners thereof. These pairs of lugs have aligned openings 32 therein and receive ears 33 on the side frames 17 and 19. Pins 34 are carried in the openings 32, extend through openings 35 in the ears 33 and form detachable connections between the ears and the corners of the plate 26. When it is desired to remove the housing 11 from the plate 26, the pins 34 are driven out of the openings 32 and 35. The pins are preferably provided with heads 34^a and are held in place against displacement by means of cotter pins 34^b. The pairs of lugs 32, together with the ears 33 and the pins 34, exemplify simple and improved means for detachably suspending the housing 11 from the bottom *c* of the railway car C.

The filter 9 is disposed in the outer side portion of the housing 11 and comprises a rectangular frame 36, a mass of filter material 37 and a pair of sheets 38. The frame 36 fits slidably within the housing and serves to hold the sheets 38 in spaced relation. It is held against a frame 39 in the housing by means of a spring bar 40. The frame 39 is located in the outer end portion of the housing and forms an abutment for the inner face of the frame, as indicated in Figs. 3 and 5 of the drawings. The spring bar 40 is removably supported at the ends thereof by a pair of brackets 41 on the side members of the outer end frame 19 and is arranged so that the central portion thereof bears against the outer face of the filter and forces the filter into clamped relation with respect to the frame 39. Upon removal of the outer end wall 18, the spring bar 40 may be disconnected from the brackets 41 so as to permit the filter to be removed bodily from the housing for repair or replacement purposes. The filter material 37 is formed of wire, metal filings, hair or any other suitable substance, and is confined between the sheets 38. It operates, during use of the unit 7, to arrest and filter out all dust particles from the air that is drawn into the housing through the filter. The sheets 38 are formed of expanded metal lath or wire screen and are secured in any suitable manner to the edges of the rectangular frame 36. The filter, before disposition in the housing, is preferably dipped in light oil so that the filter material 37 receives a coating which tends to cause the dust particles to adhere thereto. When the filter becomes clogged with dust particles, it may be removed from the housing, cleansed in a solution of soda and water or any other mixture and then dipped in light oil and replaced in the housing.

The fan 10 operates to draw air through the inlet 25^a and the filter and to discharge the filtered air into the car. It comprises a fan-wheel 42 and a casing 43 and is driven by an electric motor 44. The casing 43 is positioned in one end of the housing and embodies an inlet 43^a and an upwardly extending outlet 43^b. The inlet 43^a is circular and is formed in a wall of the casing which extends transversely of the housing and between the frame 39 and the inner side wall. The motor 44 for driving the fan is supported in any suitable manner on the outside of the housing and is supplied with current through a pair of conductors 44^a. It is controlled by a switch (not shown) in the car and embodies an armature shaft 45 which extends into the casing by way of an opening in a plate 46 on the side wall 13 of the housing. The fan-wheel 42 is fixed to the portion of the armature shaft which projects into the casing and operates, during drive of the motor, to draw the filtered air through the inlet 43^a and to discharge the filtered air under pressure upwardly through the outlet 43^b. From the outlet 43^b, the filtered air is forced upwardly by the fan through a conduit 47 into the interior of the railway car C. The conduit 47 is secured to the plate 26 and communicates with the outlet 43^b via an opening in the top 12 of the housing 11. The upper end of the conduit 47 extends through an opening in the bottom *c* of the railway car and leads to the series of heating pipes c^3 so as to cause the filtered air to be discharged around the pipes c^3 and receive heat from the latter when steam is applied thereto. A sheet metal shield 49 extends around the pipes c^3 at the point where the conduit 47 discharges the filtered air into the car. This shield has open ends and causes the filtered air to pass lengthwise of the pipes prior to discharge into the interior of the car. A branch conduit 50 is connected to the central portion of the conduit 47. This branch conduit extends upwardly through the space between the laterally spaced walls of the sides *c'* of the car and leads to a discharge opening 51. The latter is equipped with a grating 52 and is located above the pipes c^3 so that the air passing into the interior of the car by way of the conduit 50 is discharged at a sufficient height above the bottom of the car to effect an efficient circulation. The

discharge of filtered air through the branch conduit 50 is controlled by a damper 53. The latter, as illustrated in Fig. 1 of the drawings, is located at the mouth of the branch conduit and is arranged so that it may be used to cut off the supply of air through the branch conduit or through the conduit 47. When the damper is in an intermediate position, a portion of the filtered air that is discharged upwardly by the fan, passes around the pipes c^3, and a portion passes into the interior of the car through the discharge opening 51. During cold weather, when steam is applied to the pipes c^3, the air delivered via the conduit 47 is heated by the pipes c^3 prior to discharge into the interior of the car. In some instances, for example, in cold weather, it is desirable to draw air from the interior of the car instead of through the inlet 25^a. With this in view, a valve 54 and a vertically extending inlet pipe 55 are provided. The inlet pipe 55 extends between the walls of the car-sides c' and has the upper end thereof connected to an inlet opening 56. The latter is associated with a grating 57 and is formed in the inner wall of the side c' beneath one of the windows c^2 and directly over the shield 49 for the heating pipes c^3. The lower end of the inlet pipe 55 is secured to the plate 26 and communicates with the interior of the housing 11 via an opening 58 in the top 12. The opening 58 is located inwardly of the filter 9 and is positioned at one side of the fan casing 43.

The valve 54 is associated with the frame 39 and operates to cut off the passage of air through the inlet 25^a and the filter. It comprises a stationary part 54^a and a rotatable part 54^b. The stationary part is formed integrally with the frame 39 and embodies an annular series of sector-shaped openings 59. The rotatable part 54^b is supported on a spindle 54^c and embodies an annular series of sector-shaped openings 60. The latter are adapted upon rotation of the part 54^b to be brought into registry with the openings 59 so as to permit air to be drawn through the inlet 25^a and filter 9 into the housing. When the openings 60 are shifted out of registry with the openings 59, the valve 54 is closed and precludes the passage of air into the housing by way of the inlet 25^a and the filter 9. Rotation of the rotatable part of the valve relatively to the stationary part is effected by means of a wire 61. The latter is encased in a flexible sheath 62 and has one end thereof connected to a stud 63 on the rotatable part 54^b. The other end of the wire is connected to an actuating lever 64 on the inner wall of the car side c'. When the lever 64 is shifted in one direction, the wire is moved in the sheath 62 so as to cause rotation in one direction of the rotatable part of the valve. When the lever 64 is shifted in the opposite direction, the wire is moved so as to effect reverse rotation of the valve part 54^b. The passage of air into the housing through the inlet pipe 55 is controlled by a valve 65. This valve is of the balanced variety and is located in the opening 58 in the top 12 of the housing. It is pivoted on a rod 66 and is weighted so that it is normally held in its closed position against an abutment or stop 67. When the valve 54 for the housing inlet 25^a is closed or the filter 9 becomes clogged as the result of a heavy accumulation of dust particles on the filter material 37, the valve 65 is swung into its open position by virtue of the suction created within the housing and opens the inlet pipe 55 for the passage of air from the interior of the car. When the valve 54 is partially closed, the fan, during operation thereof, creates a partial vacuum in the housing and causes the valve 64 to swing part-way open and to permit of a limited flow of air through the inlet pipe 55. By controlling the valve 39 by means of the actuating lever 64, the fan may be made to draw all of the air through the inlet 25^a or all of the air through the inlet pipe 55, or it may be made to draw some air from the outside of the car and some air from the interior of the car. The valve 65 is weighted so that when the valve 54 is fully opened, it remains closed and obstructs or precludes passage of air from the interior of the car through the inlet pipe 55. By utilizing a balanced valve to control the inlet pipe 55, no separate controls are necessary and means is provided whereby air is automatically admitted or introduced into the housing in the event that the filter material 37 of the filter 9 becomes too clogged with dust particles to permit air to pass therethrough.

The refrigerating unit 8 comprises a compressor 68 and a housing 69 and operates, as hereinafter described, to cool the air prior to discharge by the fan into the car. The housing 69 comprises a cast metal box-like framework 70, a pair of end walls 71, an inner side wall 72 and a bottom 73. The end walls are removably secured to the end portions of the framework 70 and serve as closures for the ends of the housing 69. They are formed of plate metal. The inner side wall 72 and the bottom 73 are formed also of plate metal and are secured respectively to the inner side and bottom portions of the framework 70. The housing 69 is removably suspended from the housing 11 by means of pins 74. The latter are carried by pairs of upwardly extending lugs 75 on the upper corners of the framework 70. The pairs of lugs 75 extend upwardly and are arranged to straddle ears 76 on the lower ends of the side members of the cast metal side frames 17 and 19. The pins 74 are carried in aligned openings 77 in the lugs 75 and extend through openings 78 in the ears 76. When it is desired to remove the refrigerating unit, the pins 74 are driven out of the openings 77 and 78. Upon removal of the pins from the openings, the refrigerating unit is free so that it may be lowered out of connected relation with respect to the air filtering unit 7. The pins 74 are preferably provided with heads 74^a and are held against displacement relatively to the lugs 75 and ears 76 by cotter pins 79. The lugs and ears, together with the pins 74, exemplify simple means for removably or detachably suspending the housing for the refrigerating unit from the housing for the air filtering unit.

The compressor 68 is mounted in the inner side portion of the housing 69 and is mounted on a plate 80. The latter is supported on a pair of channel members 81 which are secured to the bottom members of the cast metal framework 69. An electric motor 82 operates to drive the compressor. This motor is mounted on the plate 80 and is supplied with current by way of a pair of conductors (not shown) which embody a control switch in the railway car C. The compressor is driven from the motor by means of a pulley 84 which is keyed to the armature shaft of the motor and drives a belt 85. The latter extends around a pulley 86 on the crank shaft of the compressor. A pipe 87 is connected to receive refrigerant from the high pressure side of the compressor. This pipe conducts the refrigerant to a condenser 88 which is of the radiator type and is mounted in and fills the outer side of the housing 69. A fan 89 on the armature shaft of the

electric motor 82 serves to draw air through the condensing coil for cooling purposes. A pipe 90 delivers the refrigerant from the condenser 88 to an expansion valve 91. The latter is located above the housing 69 and delivers the expanded refrigerant into an expansion coil 92 of the radiator type. The expansion coil is mounted on a pad 93 of cork and extends through an opening 94 in the bottom 15 of the housing 11 into the interior of the housing, where it serves, during operation of the compressor, to cool the air prior to delivery by the fan into the interior of the car. A pipe 95 conducts the refrigerant from the expansion coil 92 to the low pressure side of the compressor 68. The cork pad 93 is supported on a pair of channel members 96 (see Figure 2) on the top members of the cast metal framework 70 and is arranged so that it is jammed against the under-face of the bottom 15 and closes the opening 94 when the refrigerating unit is in its operative position. The expansion coil 92 is supported by the cork pad 93 so that it is located inwardly of the balanced valve 65 and at one side of the fan-casing 43. Drippings from the expansion coil 92 are caught by a sheet metal basin 97. The latter is mounted on the cork pad 93 and is associated with a drain pipe 98 which extends downwardly through the housing 69 and embodies a goose neck 98^a. Whenever it is desired to dispense with refrigerating unit 8, the pins 74 are driven out of the lugs 75 and the ears 76, as previously pointed out, and the housing 69 is lowered so as to effect removal of the expansion valve 91 and the expansion coil 92 from the interior of the housing for the air filtering unit 7. Upon removal of the refrigerating unit from the air filtering unit, the opening 94 is closed by a plate 99 as shown in Figure 6. The latter fits against the under-face of the bottom 15 of the housing 11 and is secured removably in place by means of screws 100. In order to insulate the interior of the housing 11, heat insulating material 101 is applied to the top, end walls, bottom and inner side wall of the housing 11.

The operation of the apparatus is as follows: When the air in the railway car C is too warm for the comfort of the passengers, the conductor or the attendant for the car will close the switches for the electric motors 44 and 82 and will manipulate the actuating lever 64 so as to open fully the valve 54. Upon closing of the motor switches, air is introduced into the housing 11 through the inlet 25^a and is drawn through the filter 9 by the fan 10. The latter draws the filtered air around the expansion coil 92, then forces the air upwardly into the interior of the car through the outlet 43^b and the conduit 47. From the conduit 47 the filtered air passes upwardly around the pipes c^3 and then into the interior of the car, or is made to flow through the branch conduit 50 by shifting the damper 53 into a position wherein it closes the discharge end of the conduit 47. If the damper is positioned in an intermediate position, part of the filtered air is introduced into the car through the conduit 47 and part through the branch conduit 50 and the discharge opening 51. As the air is drawn through the filter by the fan, it is cooled by the expansion coil 92. If it is desired to recirculate a portion of the air in the car C, the actuating lever 64 is shifted so as to partially close the valve 54. When the valve 54 is partially closed, the valve 65 in the inlet pipe 55 is caused to swing into a partially opened position by virtue of the partial suction created in the housing by the fan, and permits air to be drawn into the housing by way of the inlet pipe 55. In cold weather, the refrigerating unit may be shut off or dispensed with by removing it from the housing 11. During such weather, however, the air filtering unit may be used to supply fresh warm air into the car or may be used to recirculate the air within the car by closing the valve 54 and permitting the fan to draw air from the interior of the car through the pipe 55 and to force the air so drawn around the pipes c^3 and into the car. In the event that it is desired to repair or replace the refrigerating unit, the pins 74 are driven out of the lugs 75 and the ears 76. This frees the housing 69 so that the refrigerating unit may be lowered from the housing of the air filtering unit.

The herein described air conditioning apparatus operates efficiently to supply filtered cool or warm air into the car. By virtue of the fact that the air filtering unit and the refrigerating unit are encased in separate housings, the apparatus as a whole is of a simplified character and may be readily dismantled.

Whereas the apparatus has been described as being designed primarily for use in connection with a railway car, it is to be understood that it may be used with other types of vehicles or wherever it has utility. It is also to be understood that the invention is not to be restricted to the details set forth, since these may be modified within the scope of the appended claims, without departing from the spirit and scope of the invention.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:

1. In an air conditioning apparatus of the character described, the combination of a housing having an air inlet, an air filter in the housing, a motor-driven fan arranged in the housing to draw air through the inlet and to force the air through the filter and then out of the housing, and a refrigerating unit comprising a housing connected detachably to the first mentioned housing, a motor-driven compressor in the second mentioned housing, and a refrigerant line connected to the compressor, extending through an opening in said first mentioned housing into an operative position wherein it serves to cool the air forced by the fan through the filter and removable from its operative position through the opening upon detachment of the refrigerating unit from the housing for the filter and fan.

2. In an air conditioning apparatus of the character described, the combination of a housing having an air inlet, an air filter in the housing disposed adjacent to the inlet, a motor-driven fan in the housing operative to draw air through the inlet and filter and to discharge the filtered air under pressure out of the housing, and a refrigerating unit comprising a housing connected detachably to the first mentioned housing, a motor-driven compressor mounted in and encased by the second mentioned housing, and a refrigerant line connected to the compressor and extending through an opening in said first mentioned housing into an operative position wherein it is disposed between the filter and the fan and serves to cool the filtered air prior to discharge by the fan, said refrigerant line being removable from its operative position through the opening upon detachment of the refrigerating unit from the housing for the filter and fan.

3. In an air conditioning apparatus of the character described, the combination of a hous-

ing having an air inlet in one side thereof and an opening in its bottom, an air filter in the housing, a motor-driven fan in the housing arranged to draw air through the inlet and to force air through the filter and then out of said housing, and a refrigerating unit comprising a housing suspended from the first mentioned housing by quickly detachable means, a motor-driven compressor mounted in and encased by the second mentioned housing, and a refrigerant line connected to the compressor and carried by the housing so that it extends through the aforesaid opening into an operative position wherein it is disposed between the filter and the fan and serves to cool the filtered air prior to discharge by the fan, said refrigerant line being removable from its operative position through the opening upon release of the quickly detachable means and lowering of the housing of the refrigerating unit from the housing for the air filter and the fan.

4. In an air conditioning apparatus of the character described, the combination of a box-like housing having an air inlet in one of the sides thereof and an opening in its bottom, an air filter in the housing, a motor-driven fan in the housing arranged to draw air through the inlet and to force the air through the filter and then out of said housing, and a refrigerating unit comprising a box-like housing having means at the upper corner portions thereof whereby it is connected detachably to the lower corner portions of the first mentioned housing, a compressor mounted in and housed by the second mentioned housing, and a refrigerant line connected to the compressor and carried by said second mentioned housing so that it extends through the aforesaid opening into an operative position wherein it serves to cool the air forced by the fan through the filter, said refrigerant line being removable from its operative position through the opening upon detachment and lowering of the housing of the refrigerating unit from the housing for the filter and fan.

5. In an air conditioning apparatus of the character described, the combination of a housing having an air inlet in one of the walls thereof and an opening in another of its walls and lined interiorly with heat insulating material, a filter in the housing disposed adjacent to the inlet, a motor-driven fan in the housing operative to draw air through the inlet and filter and to discharge the filtered air under pressure out of said housing, and a refrigerating unit comprising a housing connected detachably to the first mentioned housing, a motor-driven compressor mounted and encased by the second mentioned housing, and a refrigerant line connected to the compressor and extending through the aforesaid opening into an operative position wherein it is disposed between the filter and the fan and serves to cool the filtered air prior to discharge by the fan, said refrigerant line being removable from its operative position upon detachment of the housing of the refrigerating unit from the housing for the filter and fan.

6. In an air conditioning apparatus of the character described, the combination of a housing having an air inlet in one of the walls thereof and an opening in another of its walls, an air filter in the housing, a motor-driven fan in the housing arranged to draw air through the inlet and to force the air through the filter and then out of said housing, and a refrigerating unit comprising a housing connected detachably to the first mentioned housing, a motor-driven compressor mounted in and encased by the second mentioned housing, a refrigerant line connected to the compressor and extending through the aforesaid opening into an operative position wherein it serves to cool the air forced by the fan through the filter, and a pad of resilient material supported by said second mentioned housing so that it seals the opening in the first mentioned housing when the refrigerant line is in its operative position, said refrigerant line being removable from its operative position through the opening upon the detachment of the housing of the refrigerating unit from the housing for the filter and fan.

7. In an air conditioning apparatus of the character described, the combination of a housing having an air inlet in one of the side walls thereof and an opening in its bottom, an air filter in the housing, a motor-driven fan in the housing arranged to draw air through the inlet and to force the air through the filter and then out of said housing, and a refrigerating unit comprising a housing suspended by quickly detachable means from the bottom of the first mentioned housing, a motor-driven compressor mounted in and encased by the second mentioned housing, a refrigerant line connected to the compressor and extending upwardly through the aforesaid opening into an operative position wherein it serves to cool the air that is forced through the filter by the fan, a horizontally extending pan supported by the second mentioned housing beneath the refrigerant line and arranged to catch the drippings from said refrigerant line, and a drain pipe connected to the pan and extending through said second mentioned housing, said refrigerant line being removable from its operative position through said opening upon detachment and lowering of the housing of the refrigerating unit from the housing for the filter and fan.

8. In an air conditioning apparatus of the character described, the combination of a supporting structure, an air filter supported on the structure, a motor-driven fan also supported on said structure and operative to force air through the filter and to discharge such air under pressure, and a refrigerating unit comprising a box-like housing connected detachably to the supporting structure, a compressor mounted in and encased by the housing, a condenser of the radiator type for refrigerant connected to the high pressure side of the compressor and disposed in one of the walls of the housing, a motor for driving the compressor, a fan driven by the motor and operative to draw air through the condenser into the housing, and an expansion coil connected to receive the refrigerant from the condenser and supported by the outside of the housing in an operative position wherein it serves to cool the air forced through the filter by the fan, said expansion coil being removable from its operative position upon detachment of the housing from the supporting structure.

9. In an air conditioning apparatus of the character described, the combination of a housing having an air inlet, a frame mounted in the housing slightly inwardly of the inlet, means associated with the frame forming a valve for the inlet, an air filter mounted removably in the housing and clamped against the frame, a motor-driven fan in the housing operative to draw air through the inlet and filter and to discharge the filtered air under pressure from the housing, and a re-

frigerating unit associated with the housing and comprising a refrigerant line extending into the housing and between the frame and the fan and operative to cool the filtered air prior to discharge by the fan from the housing.

10. In an air conditioning apparatus of the character described, the combination of a housing having a pair of air inlets, an air filter mounted in the housing adjacent to one of the inlets, a motor-driven fan in the housing operative to draw air through said one inlet and the filter and to discharge the filtered air under pressure out of the housing, an automatic valve associated with the other inlet operative, during operation of the fan, to permit air to enter the housing via said other inlet when the filter is clogged due to the accumulation of dust particles thereon, and a refrigerating unit associated with the housing and comprising a refrigerant line extending into the housing and operative to cool the filtered air prior to discharge from the housing by the fan.

11. The combination with a railway car of a plate mounted under the bottom of the car and provided with pairs of depending apertured lugs, a housing embodying ears straddled by the pairs of lugs and embodying pins mounted removably in the apertures and forming a quickly detachable connection between the housing and the plate, means forming an air inlet in the housing, an air filter mounted in the housing adjacent to the inlet, a motor-driven fan mounted in the housing and connected to draw air through the inlet and the filter and to discharge the filtered air under pressure into the car, and a refrigerating unit comprising a housing positioned beneath and connected removably to the first mentioned housing, a motor-driven compressor mounted in and encased by the second mentioned housing, and a refrigerant line connected to the compressor and arranged so that it extends through an opening in the bottom of the first mentioned housing into an operative position wherein it serves to cool the filtered air prior to discharge by the fan into the car.

12. The combination with a railway car of a rectangular plate mounted under the bottom of the car and provided at the corners thereof with depending apertured lugs, a box-like housing under the car-body, supporting means for the housing comprising ears on the upper corners of the housing straddled by the pairs of lugs, and pins extending through the ears and mounted removably in the apertures of the lugs.

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