

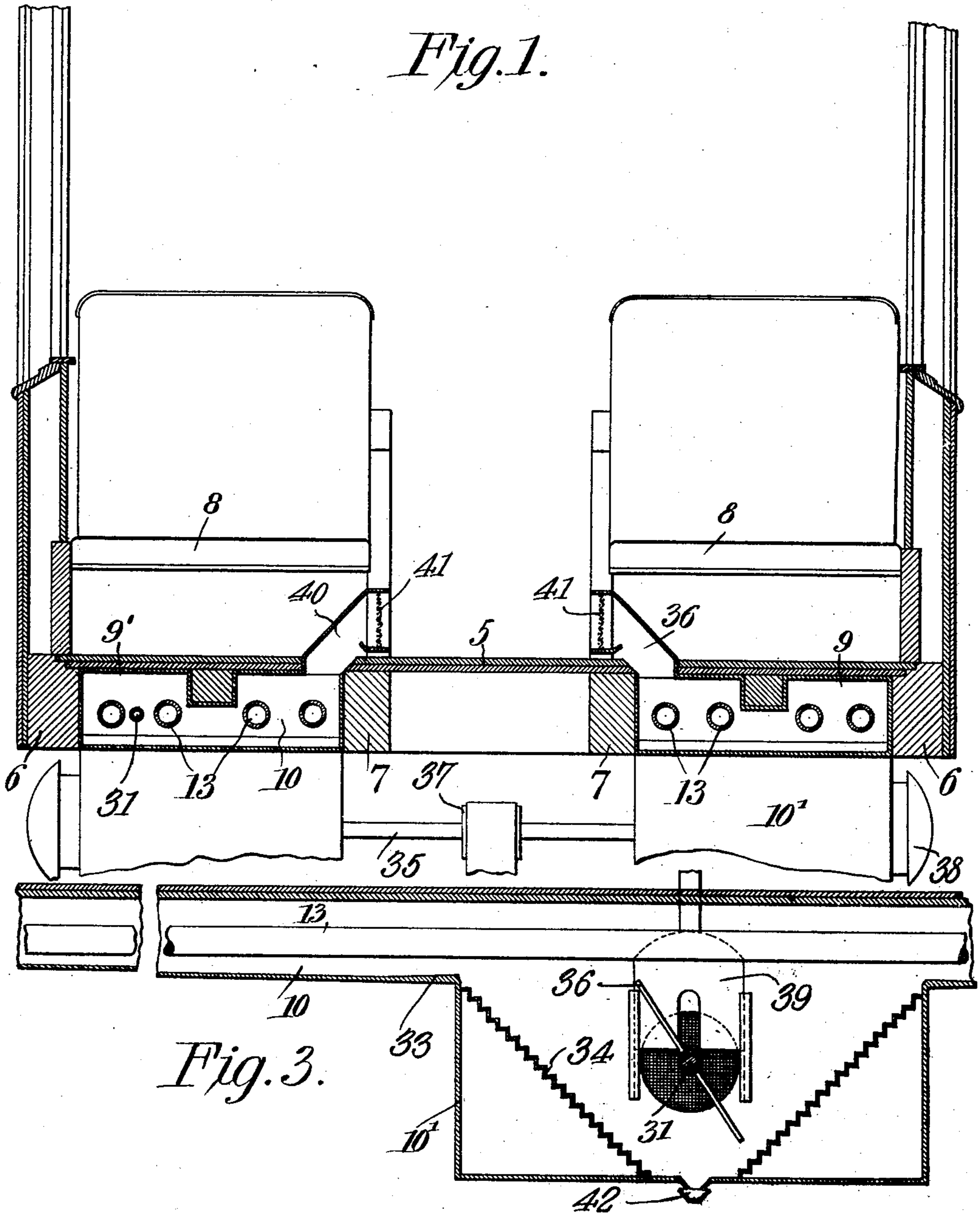
No. 859,380.

PATENTED JULY 9, 1907.

J. B. GIBSON.
HEATING AND VENTILATING SYSTEM.

APPLICATION FILED DEC. 31, 1906.

3 SHEETS--SHEET 1.



WITNESSES:

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John B. Gibson INVENTOR

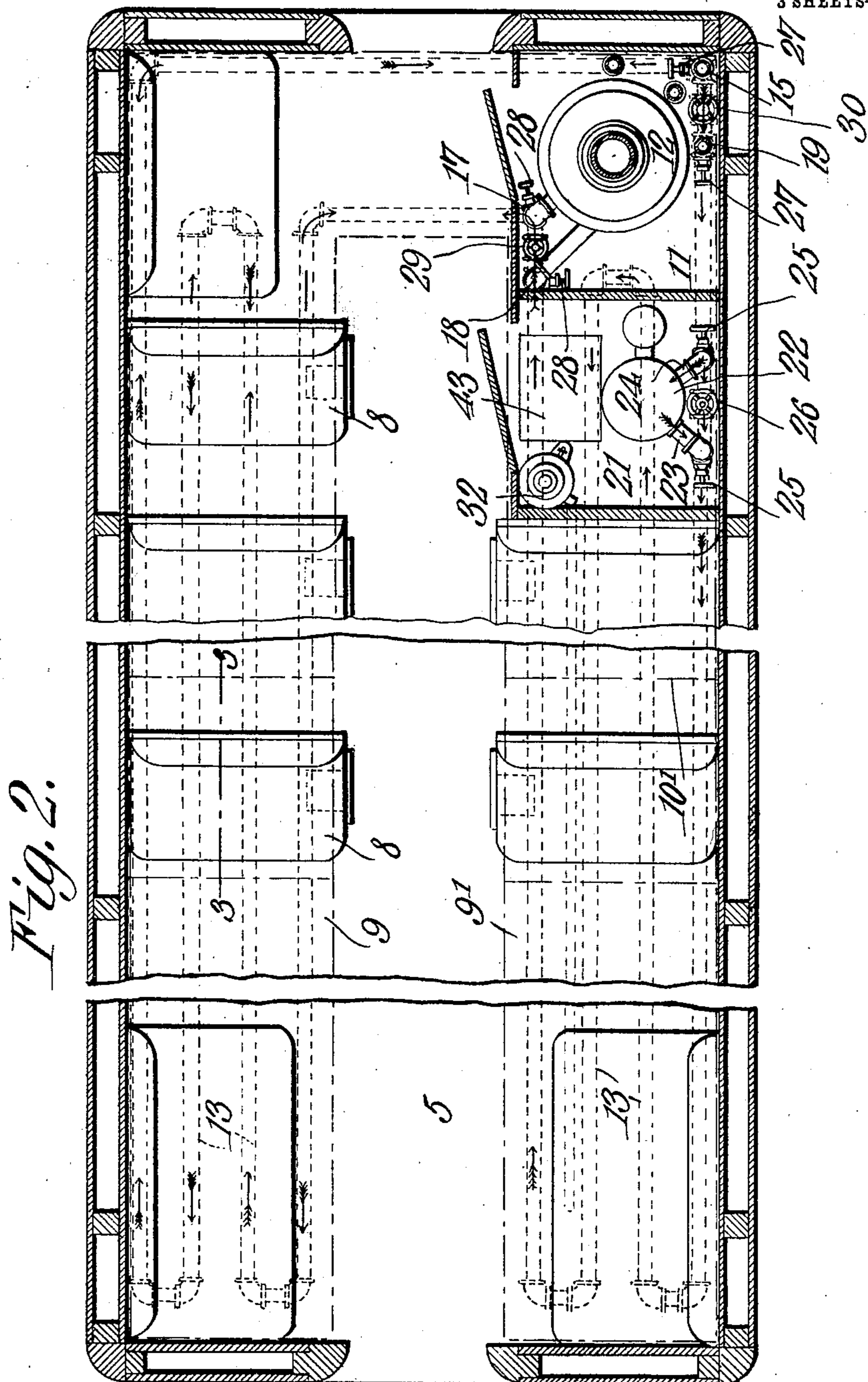
By *C. A. Snow & Co.*
ATTORNEYS.

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3 SHEETS—SHEET 2.



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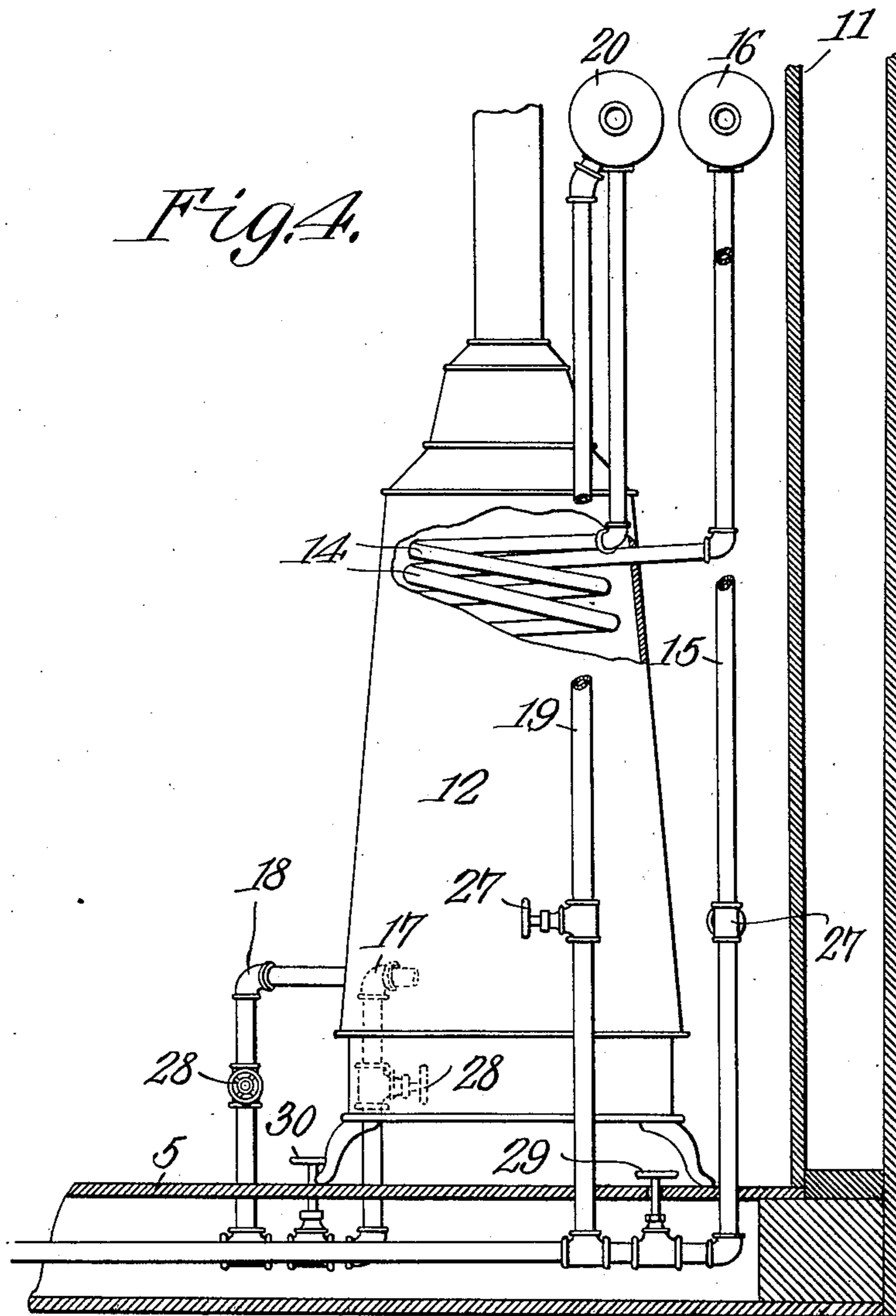
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOHN BANNISTER GIBSON, OF WEBSTER GROVES, MISSOURI.

HEATING AND VENTILATING SYSTEM.

No. 859,380.

Specification of Letters Patent.

Patented July 9, 1907.

Application filed December 31, 1906. Serial No. 350,169.

To all whom it may concern:

Be it known that I, JOHN BANNISTER GIBSON, a citizen of the United States, residing at Webster Groves, in the county of St. Louis and State of Missouri, have invented a new and useful Heating and Ventilating System, of which the following is a specification.

This invention relates to systems for heating, cooling and ventilating passenger cars, sleeping-cars and other rail-way rolling stock and has for its object to provide means whereby the interior of the car may be heated and thoroughly ventilated in winter and maintained at a uniform cool temperature in summer.

A further object of the invention is to provide a plurality of air-passages or conduits extending the entire length of the car and communicating with the interior of the latter by means of suitable passages or tubes opening through the walls of the several seats or berths whereby the air is discharged at the floor of the car and thus permitted to circulate within the latter and thoroughly ventilate the car.

A further object is to provide means for purifying the air preparatory to its admission to the interior of the car, and means for controlling the supply of air to said car.

A still further object is to provide a combined heating and refrigerating apparatus operatively connected through the medium of suitable connecting pipes and valves so that by manipulating the several pipes either apparatus may be used when desired.

Further objects and advantages will appear in the following description, it being understood that various changes in form, proportions and minor details of construction may be resorted to within the scope of the appended claims.

In the accompanying drawings forming a part of this specification: Figure 1 is a vertical sectional view of the lower portion of a car constructed in accordance with my invention. Fig. 2 is a longitudinal sectional view of the same. Fig. 3 is a similar view taken on the line 3—3 of Fig. 2. Fig. 4 is a side elevation partly in section showing the construction of the heater and the arrangement of the connecting pipes and controlling valves.

Similar numerals of reference indicate corresponding parts in all of the figures of the drawings.

The improved heating and cooling system is principally designed for installation in passenger cars or in Pullman and similar sleeping cars and by way of illustration is shown in connection with a passenger car of the ordinary construction in which 5 designates the floor of the car supported by the outer and intermediate longitudinal sills 6 and 7, and 8 the seats of any approved construction.

Arranged beneath the floor of the car and interposed between the adjacent outside and intermediate longitudinal

sills are troughs or conduits 9 and 9' preferably rectangular in cross-section and extending the entire length of the car, as shown. The conduits 9 and 9' are formed of metal or other suitable material and are each provided with an air chamber or compartment 10 which is intersected by a fan-box or casing 10' preferably disposed at the center of the car, as indicated by dotted lines in Fig. 2 of the drawings.

Arranged in a suitable compartment or locker 11 at one end of the car is the stove or furnace 12 of an ordinary "Baker" car heating system, the heating pipes 13 of which extend within the chambers 10 of the conduits and are connected with the usual heating coils or worms 14 of the stove, thus thoroughly heating the interior of the car in winter. One terminal of the heating pipe within the conduit 9 is connected to a vertical pipe 15 communicating with one of the expansion drums 16 of the heating system while the opposite terminal of the heating pipe is connected to a similar pipe 17 leading to the adjacent coil or worm of the stove. The terminals of the heating pipes within the conduit 9' are connected to vertical pipes 18 and 19 leading to the opposite coil or worm of the stove and the adjacent expansion drum 20, respectively, thus permitting free circulation of the heating medium through the stove and heating pipes of each conduit.

Arranged within a compartment or locker 21 is a refrigerating apparatus 22 of any approved construction and adapted to be operatively connected with the heating pipes whereby the latter may be used for containing a refrigerant when it is desired to cool or reduce the temperature of the car, as will be more fully explained hereinafter.

The refrigerating apparatus is connected to the heating pipes within the conduit 9' by means of branch pipes 23 and 24 each provided with a valve 25 whereby communication between the refrigerating apparatus and the heating pipes 13 may be cut off, there being a main valve 26 arranged in the heating pipe between the valves 25 for controlling the flow of brine or other refrigerant in said pipes when the refrigerating apparatus is in operation.

The pipes 15 and 19 are also provided with suitable valves 27 while the pipes 17 and 18 are provided with similar valves 28 so that the coils or worms 14 may be disconnected from the heating pipes in the conduits when it is desired to use the refrigerating apparatus.

Communication between the heating pipes in the conduits 9 and 9' is normally cut off by means of suitable valves 29 and 30 preferably disposed between the pipes 17 and 18 and the pipes 15 and 19, as best shown in Fig. 2 of the drawing, so that the water or other heating medium in the pipes 13 of each con-

duit is free to circulate independently of the heating medium in the opposite conduit.

When it is desired to use the heating apparatus the valves 25, 29 and 30 are closed and the valves 26, 27 and 28 moved to open position thus permitting the heating medium in the pipes of each conduit to flow from the expansion drum through the conduit and thence through the adjacent worm or coil 14 back to the expansion drum, as indicated by plain arrows in Fig. 2 of the drawing.

In order to use the refrigerating apparatus the valves 26, 27 and 28 are closed and the valves 25, 29 and 30 moved to open position thus permitting the refrigerant to flow through the branch pipe 23, valve 25 and the pipes 13 in the conduit 9' to the valve 30 and thence through the pipes 13 in the conduit 9 to the valve 29 and back through the valve 25 in the branch pipe 24 to the refrigerating apparatus, as indicated by the feathered arrows in Fig. 2 of the drawing.

It will thus be seen that by manipulating the several valves the refrigerating and heating apparatus may be connected to and disconnected from the pipes 13 thus permitting either the heating or cooling apparatus to be used, as desired.

The pipe 31 is preferably arranged within the conduit 9' and connected at one end by a suitable valve to a storage or supply tank, the opposite end of the pipe being disposed between two of the heating or cooling pipes in the adjacent conduit and operatively connected with a water cooler 32 provided with a suitable faucet whereby the water in the cooler may be kept cool in summer by reason of the proximity of the pipe 31 to the refrigerating coils, or warm, in winter by reason of the heating medium flowing through said coils.

The lower walls of the conduits 9 and 9' are preferably inclined towards the chambers or casings 10' so as to cause the water of condensation from the pipes 13, when the latter are used for refrigerating purposes to flow towards the fan casing, said walls being slightly elevated or inclined upwardly, as indicated at 33 to form a dam on each side of the fan casing and thus retard the flow of water.

The casing 10' extends below the longitudinal plane of the adjacent conduit and arranged within the casing are inclined plates corrugated transversely to form a series of steps 34 which tend to retard and spread the water as the latter flows over the dams into the bottom of the fan-box. Mounted for rotation within each fan-box is a shaft 35 carrying a fan 36, the latter being rotated by a pulley 37 secured to the shaft 35 and operatively connected with the axle of the car through the medium of a belt, chain or similar device whereby motion may be imparted simultaneously to both fans.

Communicating with the interior of the fan-boxes or casings are suitable globe ventilators 38 through which air is admitted to the fans, the quantity of air admitted to said fans being regulated by a suitable slide valve or gate 39, as shown.

Extending through the side walls of the car-seats 8 and communicating with the interior of the conduits 9 and 9' are suitable pipes or tubes 40 through which the air from the chambers 10 is discharged into the interior of the car, there being suitable screens 41 ar-

anged at the mouth of each pipe to prevent the entrance of dust or other foreign matter within the compartments.

It will thus be seen that when the refrigerating apparatus is operatively connected with the pipes in the conduits 9 and 9' and the fan 36 rotated the blast of air from the fan, coming in contact with the water of condensation flowing through the length of the conduits and over the dams and corrugated plates 34, will partially cool the air while at the same time relieve the air from any foreign particles or other impurities, the air being further cooled by coming in contact with the frost incrustated pipes so that cool fresh air will be discharged through the pipes 40 into the car at the bottom of the latter and thus circulate through out the same and thoroughly ventilate the car.

When the refrigerating apparatus is disconnected from the heating apparatus and the latter used for heating the interior of the car, the fan 36 will accelerate the natural flow of hot air from the conduits 9 and 9' into the interior of the car and thus thoroughly heat the same, as will be readily understood. If desired, however, the fan may be used when neither the heating or refrigerating apparatus is in use, in order to promote the circulation of air within the car.

The fan boxes or casings 10 are preferably provided with suitable drip openings 42 to permit the escape of the water of condensation when the refrigerating apparatus is employed.

The conduits 9 and 9' are of sufficient width and height to accommodate any electric light and power wires, battery boxes, gas and water pipes and other fixtures used in connection with the car, there being a trap door 43 in the floor of the car in order to obtain access to all water pipes, valves, electric cut out switches, gas valves, battery boxes and the like so that the same may be readily controlled or repaired when out of order by accident or otherwise.

It will of course be understood that a similar door may be arranged on both sides of the car if necessary in order that access may be obtained to the conduit 9'.

From the foregoing description it is thought that the construction and operation of the device will be readily understood by those skilled in the art and further description thereof is deemed unnecessary.

Having thus described the invention what is claimed is:

1. In a heating and ventilating system for cars, a refrigerating apparatus, a heating apparatus, a conductor connecting the two for maintaining a free circulation of the heating or cooling medium through either apparatus, and means for cutting off communication between either apparatus and the conductor.
2. In a heating and ventilating system for cars, a refrigerating apparatus, a heating apparatus, a conductor connecting the two and extending beneath the floor of the car to permit a free circulation of the heating or cooling medium through either apparatus, and valves for cutting off communication between either apparatus and the conductor.
3. In a heating and ventilating system for cars, a refrigerating apparatus, a heating apparatus, a plurality of pipes disposed one on each side of the car and operatively connected with the heating and refrigerating apparatus, said pipes forming a conductor for both the heating and cooling medium thereby to permit a constant circulation through either apparatus and means for cutting off communication between the pipes and either apparatus.
4. In a heating and ventilating system for cars, a re-

- frigerating apparatus, a heating apparatus, a conduit arranged beneath the car, conducting pipes disposed within the conduit and connecting the heating and refrigerating apparatus and forming a conductor for both the heating and cooling medium, and valves for cutting off communication between either apparatus and the conducting pipes. 55
5. In a heating and ventilating system for cars, a refrigerating apparatus, a heating apparatus, a conduit disposed beneath the car, pipes arranged within the conduit and communicating with the heating and refrigerating apparatus, respectively, and forming a conductor for both the heating and cooling medium means for cutting off communication between either apparatus and the conducting pipes, and means for creating a current of air within the conduits. 60
10. In a heating and ventilating system for cars, a refrigerating apparatus, a heating apparatus, a conduit disposed beneath the car, pipes arranged within the conduit and connected with the heating and refrigerating apparatus, respectively, and forming a conductor for both the heating and cooling medium valves for cutting off communication between either apparatus and the conducting pipes, tubes arranged within the car and communicating with the conduits, and a fan mounted for rotation within the conduit. 65
15. In a heating and ventilating system for cars, a refrigerating apparatus, a heating apparatus, a conduit disposed beneath the floor of the car and communicating with the interior of the latter, conducting pipes arranged within the conduit and connected with the heating and refrigerating apparatus, respectively, and forming a conductor for both the heating and cooling medium means for discharging a blast of air into the car, and means for purifying the air, and means for cutting off communication between either apparatus and the conducting pipes. 70
20. In a heating and ventilating system for cars, a refrigerating apparatus, a heating apparatus, a conduit disposed beneath the car, a fan-casing depending from the conduit, conducting pipes arranged within the conduit and communicating with the heating and refrigerating apparatus, respectively, valves for cutting off communication between either apparatus and the conducting pipes, a fan mounted for rotation in the fan-casing and baffle plates disposed one on each side of the fan. 75
25. In a heating and ventilating system for cars, a refrigerating apparatus, a heating apparatus, a plurality of conduits disposed beneath the car and communicating with the interior of the latter, fan-casings depending from the conduits, the bottom of the conduits being inclined towards the fan-casing and provided with raised portions at said fan-casing and constituting dams, corrugated plates inclined downwardly from the dams to the bottom of the fan-casings, a vent opening disposed between the corrugated plates, conducting coils arranged within the conduits and communicating with the heating and refrigerating apparatus, respectively, valves for cutting off communication between either apparatus and the conducting coils, fans mounted for rotation in the casings and operatively connected with the axle of the car for simultaneously rotating both fans, and a door formed in the bottom of the car above the conduits. 80
30. In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses. 85
35. JOHN BANNISTER GIBSON. 90
40. Witnesses: 95
45. S. J. BROOKS,
50. W. H. LIPSCOMB.