

**J.C.ALLEN.**

PATENTED JUL 11 1871

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*Car Heating and Ventilating App<sup>ts</sup>.*

Fig 1

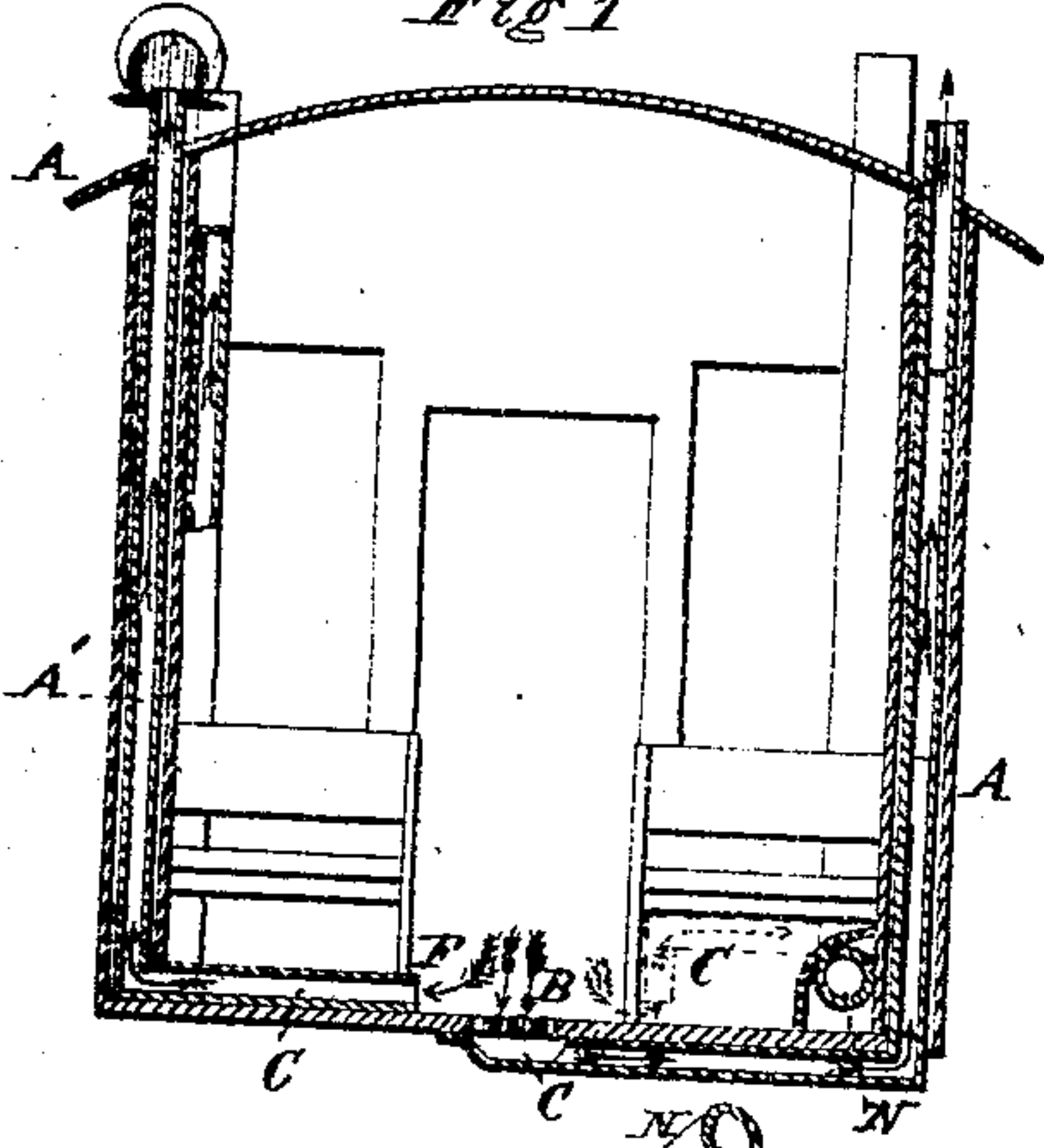


Fig 2

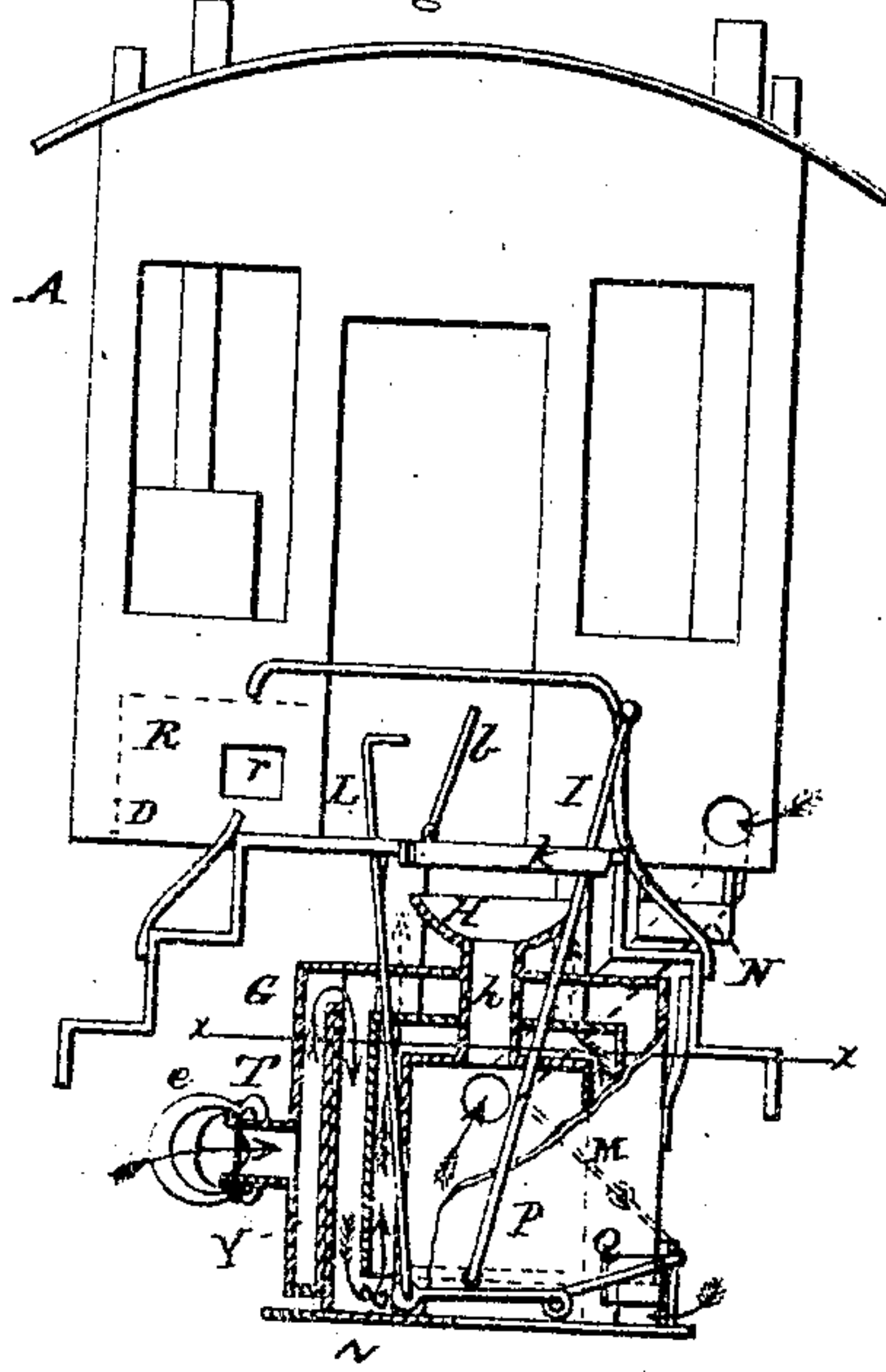


Fig 3

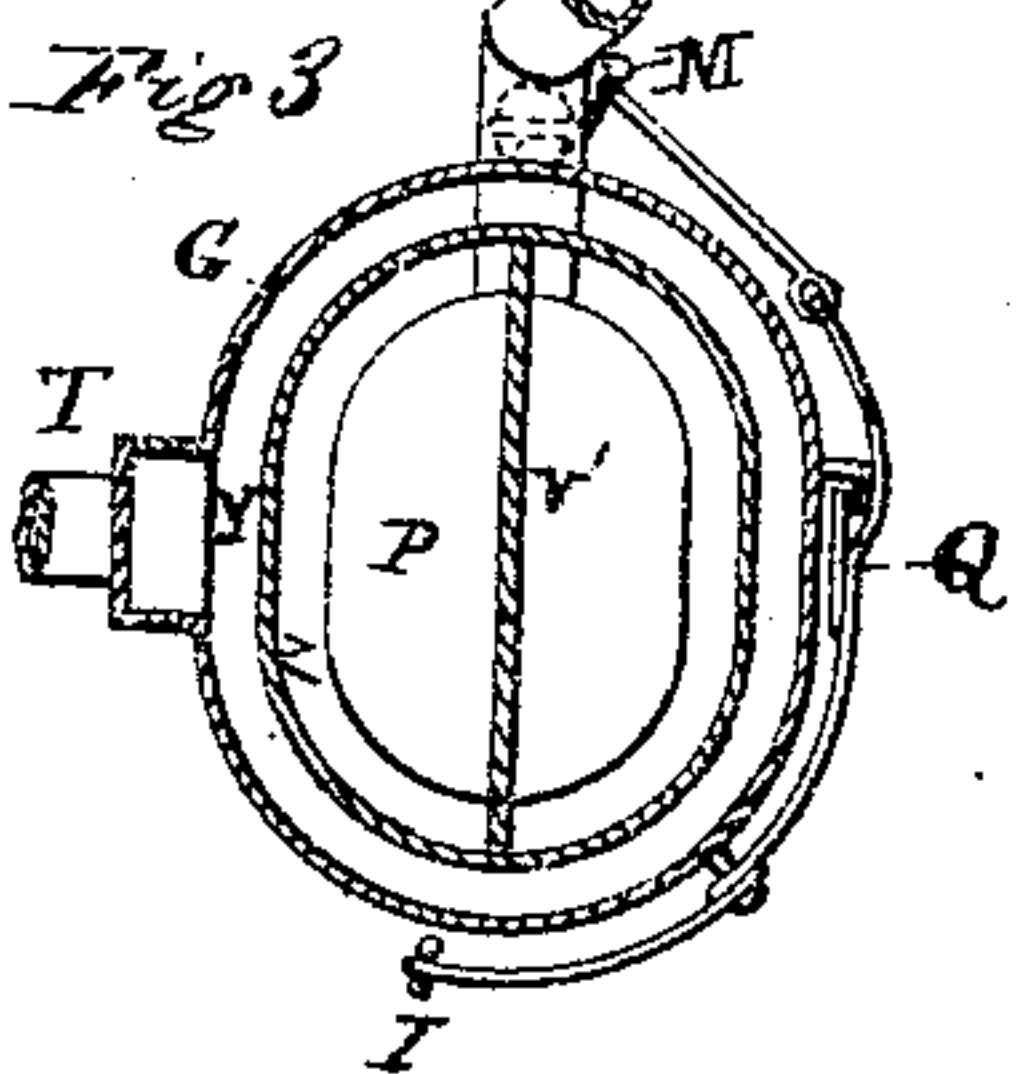
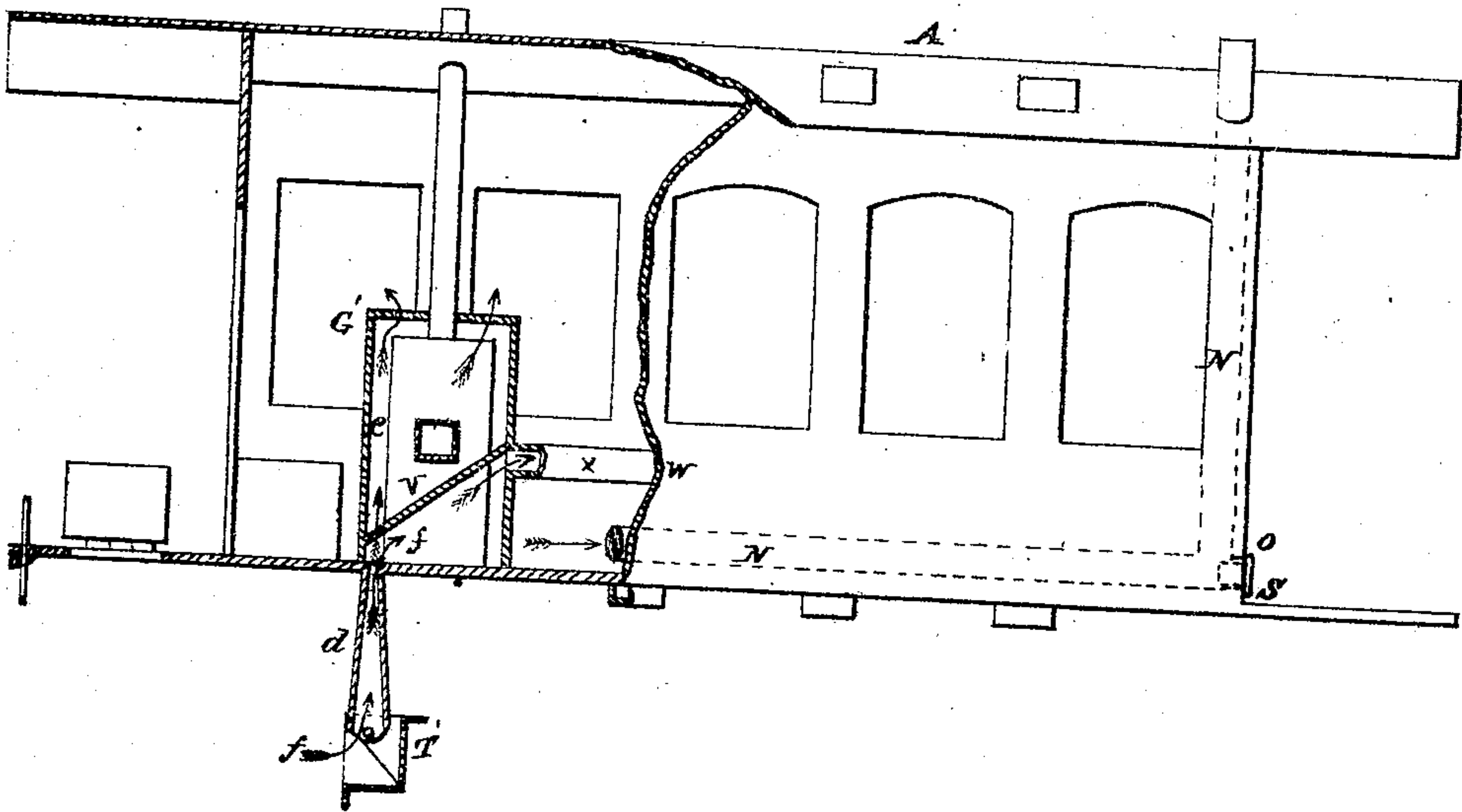


Fig 4



Witnesses.

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# UNITED STATES PATENT OFFICE.

JOSHUA G. ALLEN, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN RAILROAD-CAR HEATERS.

Specification forming part of Letters Patent No. 116,914, dated July 11, 1871.

*To all whom it may concern:*

Be it known that I, JOSHUA G. ALLEN, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Heating and Ventilating Railway Cars, of which the following is a specification, reference being had to the accompanying drawing.

My invention relates to heating and ventilating cars; and consists in the use and employment of the air-spaces in the walls and floors for air-flues, or in the insertion of flues therein for the purposes of ventilation; also, in the novel construction and arrangement of the heating apparatus and the parts connected therewith, as hereinafter more fully explained.

In the drawing, Figure 1 is a transverse vertical section of a car, showing a method of ventilating the same. Fig. 2 is an end view of a car, and also a transverse vertical section of the heater under the platform. Fig. 3 is a horizontal section of the heater under the platform on the line *x x*; and Fig. 4 is a side view of the car, with a portion of it broken away, showing a transverse vertical section of a heater placed within the car.

A represents the body of a car constructed with spaces *A'* between its inner and outer walls, and with spaces also under its floors. The spaces between the side walls extend up between the windows. In these spaces are arranged flues *C*, which communicate with openings *B* in the floor of the car, and then extend under the floor to the side of the car, and then up through the spaces in its side walls and on up through its roof, and have their upper ends on the outside of the car provided with a cowl or other suitable device, as shown in Fig. 1. These flues *C*, instead of extending under the floor, I also arrange on the upper side of the same, under the seats, with an opening *F* into the aisle, as shown in the same figure; or when desired to have them out of the way, so as not to interfere with sweeping and cleaning the car, I extend them up on the inner or outer side of the outer supports of the seats and then along under the under side of the seats to the spaces *A'*, as shown in dotted lines in the same figure. In this way it will be seen that the air will be drawn from the car through these flues, and in the direction shown by the arrow in the same Fig. 1, and that the spaces between the frame-work or walls of the car will be utilized for the purpose.

In connection with this arrangement of flues for ventilating the cars, I construct and use a heating apparatus, placed either outside and under the platform or inside of the car. When placed under the platform I construct this heater *G*, as clearly shown in section in Figs. 2 and 3, with triple walls so as to surround its furnace *P* with, first, a hot-air space, *Z*, and a cold-air space, *Y*—that is, so that the cold-air may pass into the pipe *T* from the outside, and then through the space *Y* on through the space *Z*, and then up into the interior of the car through flues suitable for the purpose. By having the furnace thus surrounded by a triple wall, and causing the air to take this circuitous passage, it will be seen that the heat is well utilized. Besides this, I further economize the heat by carrying the smoke-flue *N* up onto the floor of the car, and thence along one side of the same to its opposite end, and up this end and through the roof, as shown by the dotted lines in Figs. 2 and 4. That portion of the smoke-flue which is within the car is made of cast-iron, and of one or more lengths; when made of pieces jointed together they should be closely connected. The ends of that portion of the smoke-flues that extends along the floor are provided with openings, *O*, which are closed by stops or covers, *S*, as shown in Fig. 4. These openings afford access to the flues for the purpose of cleaning them when desired. The heater *G* under the platform has a dish-shaped opening, *H*, with a passage, *h*, leading to its fire-box, through which the fuel is fed. This shape of the opening being for the purpose of directing the fuel into the passage *h*, as shown, a rod or lever, *I*, is connected to the grate, for the purpose of shaking it by a person on the platform. The upper end of this rod *I* is held by a guard, *k*, or slot in the platform of sufficient length to allow sufficient movement of the rod to shake the grate. Another rod or lever, *L*, with its upper end extending above the platform, is used to operate a slide, *Q*, for regulating the draught of air to the fire or closing the same. To this same lever may also be attached another lever, *M*, for operating a damper in the smoke-flue, as shown in Fig. 2. The coal-box, *R*, with door *r*, may be placed under the end seat on the opposite side from the heater, or a special fuel-box may be provided. The end of the pipe through which the cold air enters is provided with a hood, *e*, pivoted to swing so as to catch the air-currents, and direct them as shown by the arrows.



Instead of having the heater under the platform it may be placed within the car, and arranged as shown in Fig. 4. The heater thus placed is marked  $G'$ , and is provided with a hot-air space,  $c$ , about its furnace. This space is supplied with fresh air by a pipe,  $d$ , extending under the car, the end of which is provided with a swinging hood for catching and directing the air-currents, as shown by the arrows  $f$  in Fig. 4. The hot-air space about the heater may be divided into an upper and lower space by a partition,  $v$ , and the lower space provided with a pipe or flue,  $x$ , for conducting the heated air to any part of the car at any desired distance from the floor. The heater under the platform may also have its hot-air space divided by a partition,  $v$ , for the purpose of conducting the hot air in different directions.

The advantages of heating and ventilating cars in the manner and by the means herein described are many. By utilizing the spaces between the walls of the car there is not only a saving of room, but the frame-work of the car is measurably protected from decay and rot. It is well known that during damp or wet weather more or less moisture finds its way into the open spaces in the frame. When being confined it can only dry away very gradually; but by using these spaces for ventilating-flues they are kept warm and dry, and the frame of the car is thus protected from the injurious effects of prolonged dampness. By the construction and arrangement of the heating apparatus it will be seen that the car is kept constantly filled with fresh hot air to supply the place of the lower stratum of the same that is being constantly drawn away by the ventilating-flues; and that this hot air can be introduced at any desired place so as to make the heat uniform throughout the

car; at the same time, the arrangement of the cast-iron smoke-flue near the floor tends to keep the feet of the passengers warm. As the air is drawn from the car near its floor, through the mouths of the ventilating-flues, it will be seen that by the combination of the methods for heating and ventilating above described there must be a constant and thorough circulation and distribution of warm air throughout the car.

I claim—

1. The method herein described of ventilating a railway car by means of the vacant space or spaces  $A'$  between its walls, whereby said space is utilized as flues and the space between the walls is also thoroughly ventilated and dried.

2. In combination with the foregoing, the tubes  $C$ , having their open ends arranged to receive the outgoing air at or near the central aisle of the car and conduct it into the space or spaces  $A'$ , substantially as described.

3. A car-heater, substantially such as is herein described, having a partition,  $V$ , dividing its hot-air chamber into two parts separate from each other, from both of which the hot air is conveyed into the car simultaneously, whereby the car is heated at both ends, irrespective of the direction in which it is moving or in which the wind may chance to be blowing.

4. The arrangement in a car of the ventilating and heating devices in such a manner that the incoming hot and fresh air shall enter at the bottom and the outgoing foul air shall also be taken from the bottom or near the bottom, substantially as described.

Witnesses:

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