

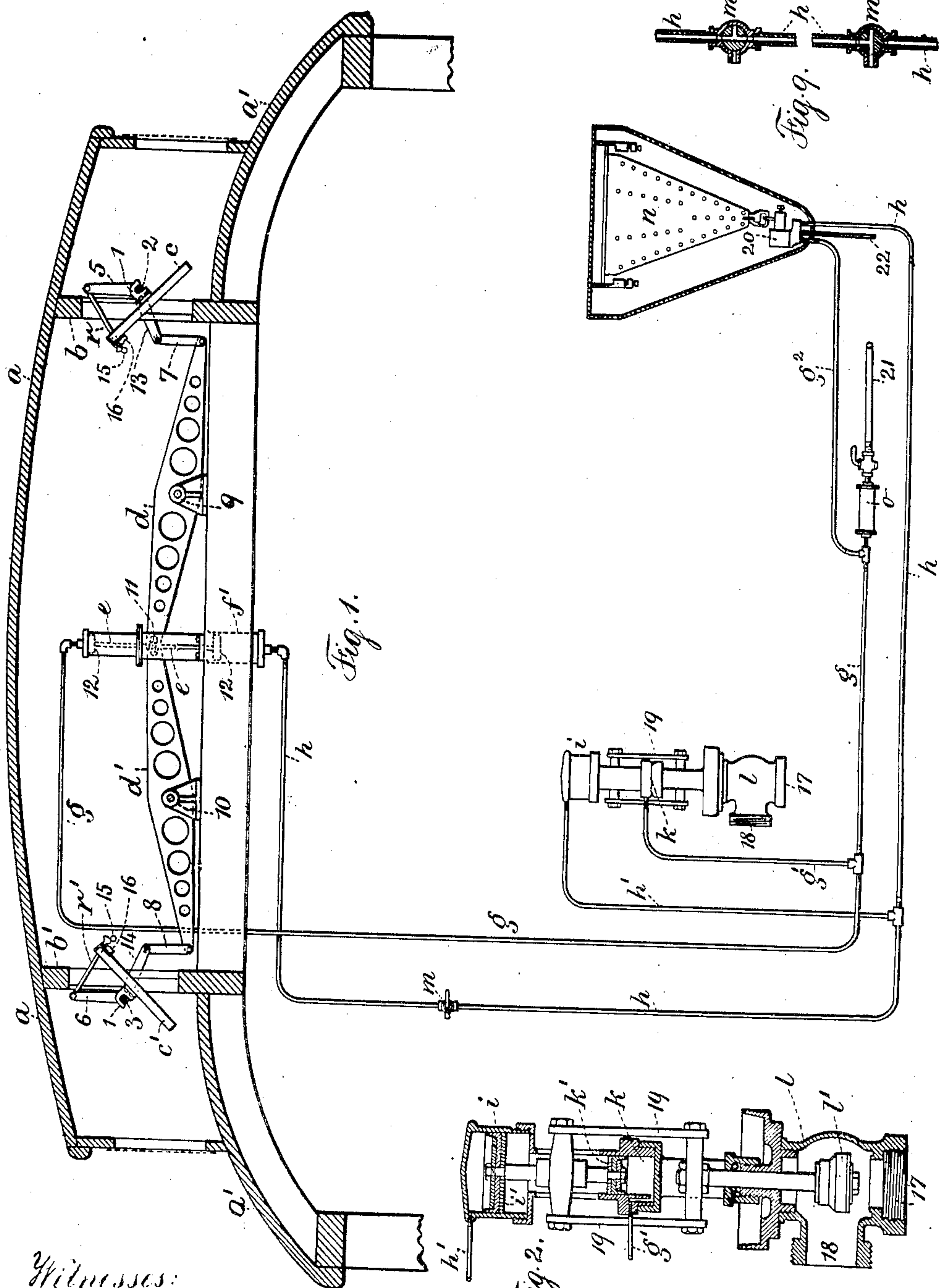
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PATENTED APR. 17, 1906.

F. C. CHADBORN.
AUTOMATIC VENTILATING APPARATUS.

APPLICATION FILED MAR. 27, 1902.

2 SHEETS—SHEET 1.



Witnesses:
J. Stait
Chas. H. Smith

Inventor:
Frederic C. Chadborn
per L. W. Lurrell & Son attys.

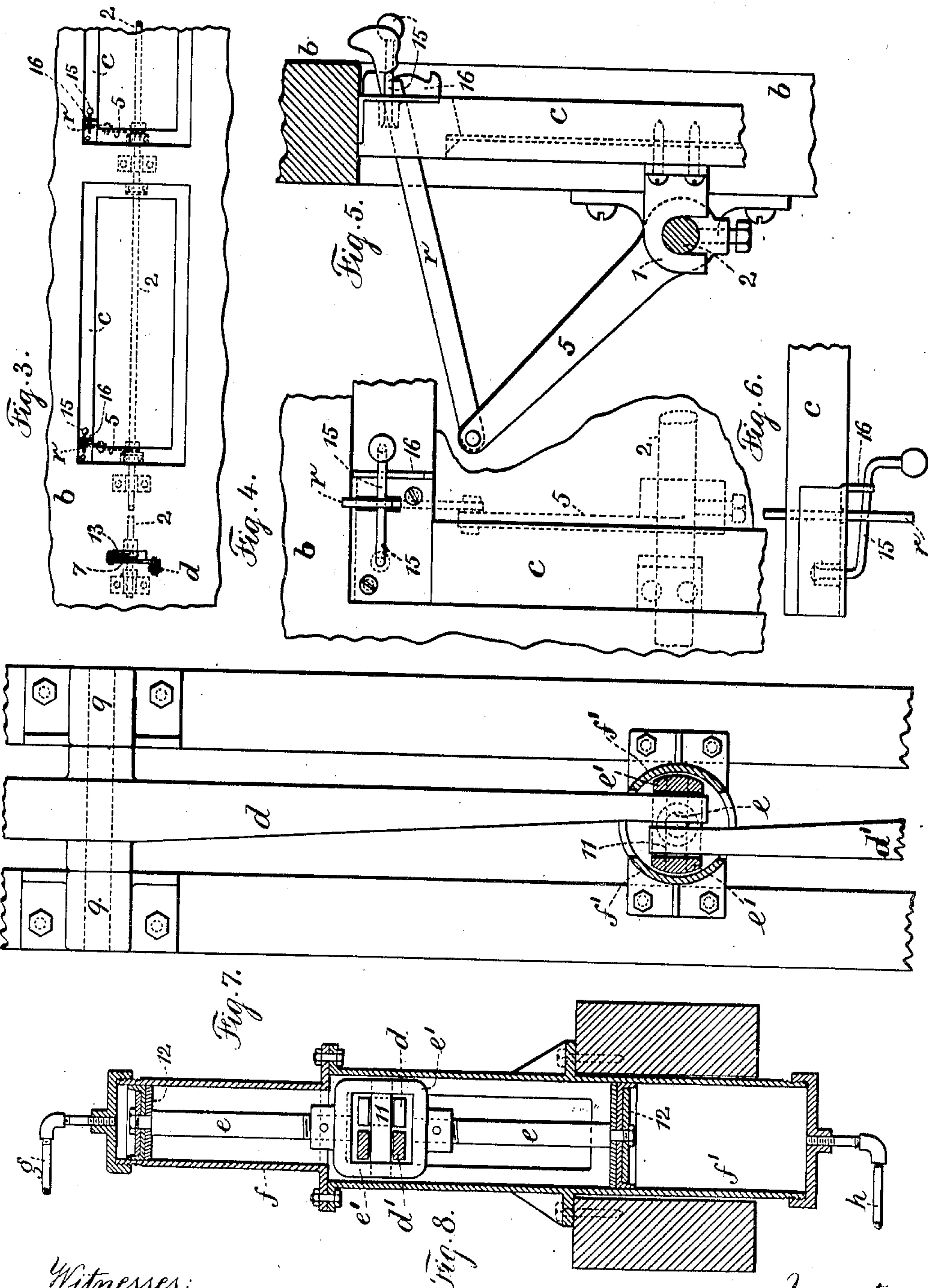
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UNITED STATES PATENT OFFICE.

FREDERIC C. CHADBORN, OF NEWBURGH, NEW YORK, ASSIGNOR OF SEVENTY ONE-HUNDREDTHS TO MARK J. KEOGH, MICHAEL H. KEOGH, DANIEL S. GEROW, AND ROBERT H. BARNETT, OF NEWBURGH, NEW YORK.

AUTOMATIC VENTILATING APPARATUS.

No. 818,229.

Specification of Letters Patent.

Patented April 17, 1906.

Application filed March 27, 1902. Serial No. 100,190.

To all whom it may concern:

Be it known that I, FREDERIC C. CHADBORN, a citizen of the United States, residing at Newburgh, in the county of Orange and State of New York, have invented an Improvement in Automatic Ventilating Apparatus, of which the following is a specification.

My invention relates to improvements in ventilating apparatus for railway and trolley cars and similar vehicles actuated automatically both by the heating system of the car and a fluid-pressure system such as is usually employed in connection with the brakes.

In Letters Patent granted to me December 24, 1895, No. 551,889, I have shown and described a system of ventilation for greenhouses, &c., in which the thermostat, the valve actuated thereby, and the pipes immediately connected thereto for fluid are substantially identical with those in the present case; and the object of my invention is to simultaneously actuate the two lines of ventilating-sashes along the sides of a railway-car according to the temperature and closing the same when the temperature goes down, in proportion to the decrease of the temperature, and to open the same in proportion to the increase of the temperature, and at the same time be able by simply opening a cock by hand to simultaneously and instantaneously close all of the sashes prior to the car entering a tunnel, so as to prevent the entrance of smoke and bad air into the car.

In carrying out my invention I suspend the sashes of each side series upon common shafts, and these shafts at one end are connected by arms and links to one end of companion beams suitably pivoted and whose other ends connect with common shafts acted upon by the pistons of fluid-pressure cylinders at either side thereof to simultaneously actuate said shafts. The shafts are provided with series of cranks and latch-arms agreeing in number with and extending to latches upon the sashes. The fluid-pressure cylinders are connected by pipes with other fluid-pressure cylinders employed for admitting steam to or shutting off the same from a radiator of the car. The pistons of these latter cylinders, as well as the pistons of the fluid-pressure cylinders operating the

sashes, are controlled by the thermostatic device acting upon the fluid-pressure valve forming a part thereof. The fluid-pressure is constant in one series of pipes and on the smaller pistons of the fluid-pressure cylinders, while the same is variable in the other set of pipes connecting with the fluid-pressure cylinders having the larger pistons, and in this latter series of pipes is placed the hand-operated cock acting as an escape of the fluid-pressure to one fluid-pressure cylinder of those operating the aforesaid beams.

In the drawings, Figure 1 is a diagrammatic elevation of the devices constituting my invention and a vertical section through the roof of a car. Fig. 2 is a vertical section through the fluid-pressure cylinders controlling the heat supplied to the radiators of the car. Fig. 3 is an elevation of the sash structure at one end of the car. Fig. 4 is an elevation of one corner of one sash. Fig. 5 is a vertical sectional elevation of the parts in Fig. 4 and at right angles thereto, and Fig. 6 is a plan of the parts shown in Fig. 4. Fig. 7 is a plan showing the pivot of one beam and the junction of the two beams. Fig. 8 is a vertical section through the fluid-pressure cylinders actuating the two beams and at the junction of said beams, and Fig. 9 represents two views of the hand-cock in the variable-pressure pipe system.

a a' represent the roof portions of a railway passenger coach or car, and *b b'* the sash-frames along the inner sides of the car, and *c c'* represent sashes upon opposite sides of the car. These sashes are arranged in series along the opposite sides. They are all made alike. I provide shafts 2 3 for the sashes *c c'*. These shafts are in suitable bearings upon the outer faces of the frames *b b'*, and I provide angle-plates 1 on the backs of the sashes, having open jaws fitting over the shafts and by which the sashes are freely hung upon the shafts.

To the shafts 2 3 are connected crank-arms 13 14, extending in one direction, and crank-arms 5 6, extending in the upward direction. From the crank-arms 13 14 extend links 7 8, and these are pivoted to distant ends of companion beams *d d'*. The crank-arms 13 14 and the links 7 8 come at ends of the shafts 2 3 at the same end of the car, and in the space

between the inner surface of the car and the roof structure I prefer to locate the beams d d' . These are provided with suitable bearings 9 10, upon which they are adapted to swing.

The crank-arms 5 6 are in series and agree in number with the number of the sashes, and from each crank-arm 5 6 there extends a latch-arm r or r' , the same being on opposite sides of the car, and on each sash I place a latch 15, bearing upon a latch-plate 16, having a notched edge. The latch-arms r r' extend from the crank-arms 5 6, through apertures in the upper member of the sash-frames, to engagement with the latches 15. In Figs. 4, 5, and 6 I have shown this position of engagement. Each latch is provided with a pivotal connection to a plate secured to the face of the sash-frame, the same being a part of the notched-edge plate 16, and a boss is provided on this plate let into the sash-frame, and in these the latches are pivoted and swing.

By reference to Figs. 4, 5, and 6 it will be apparent that if the latch 15 is moved downward into engagement with the lower notch of the plate 16 the same will be disengaged from the jaw end of the latch-arm r , and in this position any sash may be left closed in its frame, or by the movement of the latch 15 as described any sash may be closed independent of the other sashes. Any latch-arm r r' may be raised from a latch 15 by a hand-rod to push any sash closed, if desired.

I provide a piston-rod e , having a yoke e' , and the adjacent ends of the beams d d' are slotted and pass through this yoke e' and are connected thereto by a pin 11, (see Figs. 7 and 8,) and at either side of the meeting ends of these beams and arranged vertically I place fluid-pressure cylinders f f' , having pistons 12 at the respective ends of the piston-rod e . The pipes g h open into the fluid-pressure cylinders f f' and extend therefrom, the pipe g forming a part of the constant-pressure system and the pipe h part of the variable-pressure system. From this pipe g extend branch or auxiliary pipes g' g'' and from the pipe h an auxiliary pipe h' .

l represents the valve-casing of a steam-radiator having an opening 17 from the supply of steam and an opening 18 to the radiator and within the same a plunger l' to close off the supply. The stem of the valve-plunger passes vertically through the valve-case to a yoke 19, and I provide in connection therewith fluid-pressure cylinders i k , mounted upon a suitable frame supported from said valve-casing l and having therein pistons i' k' of varying sizes. The auxiliary pipe g' from the constant-pressure system connects with and opens into the fluid-pressure cylinder k , in which the piston k' is of smaller area than the piston i' in the fluid-pressure cylinder i and to which the auxiliary pipe h' of the variable-pressure system is connected.

n represents a thermostat or thermostatic device, and 20 the valve of the same. This structure agrees exactly with and operates the same as the device set forth in my Letters Patent hereinbefore mentioned. From this valve 20 extends a waste-pipe 22. An auxiliary pipe g'' extends from the pipe g to this valve 20, and one end of the pipe h is also connected to this valve 20, and it will be noticed by reference to the aforesaid patent that the pipes g'' , h , and 22 occupy the same relation to the valve 20 as pipes therein shown and described.

o represents a receiver and filter interposed in the line of piping between the pipe 21 and the constant-pressure supply system of pipes. This pipe 21 extends to the supply of fluid-pressure, preferably the fluid-pressure system and reservoir beneath the car, there being a valve adjacent to the receiver o that may be opened periodically to admit fluid under pressure or may be left open to keep the pressure in the pipes the same as that in the reservoir.

m represents a three-way or hand-operated cock. (Shown in large size in Fig. 9.) In this view, Fig. 9, the upper view shows a passage clear through the valve-pressure system of pipes h h' , and the lower figure shows the supply to the fluid-pressure reservoir o closed off and an opening established to the air from the fluid-pressure cylinder f' for the escape of any fluid at a greater than atmospheric pressure.

In the operation of the structures illustrated and supposing the temperature of the car to be too high the thermostatic device n will operate the valve 20 to allow fluid-pressure from the pipe g'' through the valve 20 to the pipes h and h' . Pressure in the pipe h' acts upon the piston in the fluid-pressure cylinder i to force the valve l down to its seat and close off the supply of steam to the radiator. At the same time the fluid-pressure through the pipe h enters the fluid-pressure cylinder f' , forcing the piston 12 upward and swinging the beams d d' into the position shown in Fig. 1 and the parts operated thereby into the position also shown in said figure, thus opening the sashes c c' of the side series for the purpose of lowering the temperature.

If the temperature in the car is not high enough, or, in other words, if the car is too cool, the thermostatic device n operates the valve 20, opening communication between the pipes h h' and the waste-pipe 22, so that the pressure therein greater than atmospheric pressure escapes, consequently permitting the pressure in the constant-pressure system of pipes g g' to act, the pressure in the pipe g' acting upon the piston in the fluid-pressure cylinder k , raising the same and the plunger l' of the valve to lift the same from its seat and permit the entrance of steam to the radiators to warm up the car. At the same

time the fluid-pressure in the pipe *g* acts in the fluid-pressure cylinder *f* upon the piston 12 to force the same, with the yoke *e'*, downward and swing the beams *d d'* into the opposite position from that shown in Fig. 1 and therewith actuate the sashes *c c'* and close the same.

It will be apparent that not only the extreme of these positions is possible, but by slight movements and changes of the parts intermediate positions are possible, so that the sashes may be fully opened or closed or partially so.

To provide for the entrance of the car with these improvements into a tunnel, where it is advantageous to close all the ventilators and prevent the entrance of smoke and gases from the engine, the hand-actuated cock *m* in the pipe *h* is provided, as hereinbefore described, because with this device the porter of the car may turn the same from the uppermost position, Fig. 9, to the lowermost position, moving the parts to close the pressure in the system of pipes *h h'* and establish communication with the atmosphere and the fluid-pressure cylinder *f'*, thus relieving all excess of pressure over and above atmospheric pressure and permitting the constant pressure in the constant-pressure system through the pipe to act upon the piston 12 and move the beams simultaneously and instantaneously from the position, Fig. 1, to the reverse position and close all of the sashes. The apparatus is left in this position while the car is passing through the tunnel, and the automatic functions are reestablished after the car passes out of the tunnel by the porter or attendant simply turning the cock *m* to reestablish the fluid-pressure throughout the pipe *h* and against the piston in the fluid-pressure cylinder *f'*.

While I have herein shown and described the devices of my invention as particularly applicable to car ventilation, I do not in any respect limit myself in this regard, as my invention may be employed in vessels, factories, dwellings, and the like, where there are forms of ventilating-sashes that require operation by heat control.

I claim as my invention—

1. The combination in an automatic ventilating apparatus, with the side ventilating-sashes of the car, a thermostatic device and a supply of fluid under pressure, of means actuated by the thermostatic device and the fluid-pressure for regulating the supply of steam to the heating apparatus of a car, means also actuated thereby for simultaneously opening and closing the sashes, and a device interposed between the respective means and by the actuation of which all of the sashes of the series may be caused to simultaneously and instantaneously close, substantially as set forth.

2. In an automatic ventilating apparatus,

the combination with the series of sashes in the respective sides of the car and devices upon which the same are mounted and adapted to swing, of fluid-pressure cylinders and pistons therein moving in the same direction, means for controlling the same by the temperature of the car and corresponding devices located at one end of the car, and on opposite sides of the fluid-pressure cylinders and pistons and actuated thereby and in turn connected respectively to the sashes of the series, whereby all of the sashes are simultaneously and instantaneously actuated, substantially as set forth.

3. In an automatic ventilating apparatus, the combination with the series of sashes in the respective sides of the car, of fluid-pressure cylinders and pistons therein moving in the same direction, means for controlling the same by the temperature of the car, corresponding devices located at one end of the car, actuated by the fluid-pressure cylinders and pistons and connected respectively to the sashes of the series, whereby all of the sashes are simultaneously and instantaneously actuated, and means associated with one of said fluid-pressure cylinders for relieving the pressure therein and permitting the pressure in the other cylinder to actuate the means employed to close all of the sashes, substantially as set forth.

4. In an automatic ventilating apparatus, the combination with the sashes in series at the sides of the car, of shafts and devices connected to the sashes for loosely pivoting the same to said shafts, fluid-pressure cylinders having pistons connected and moving in the same direction, and pipes for supplying pressure to the opposite sides of said pistons, a pair of oppositely-placed beams in one end of the car and connections from adjacent ends thereof to the piston-rod of said pistons, whereby said beams are simultaneously actuated, and devices connected respectively to said shafts, sashes and the opposite ends of said beams, whereby with the movement of the beams the sashes may be opened or closed, substantially as set forth.

5. In an automatic ventilating apparatus, the combination with the sashes in series at the sides of the car, of shafts and devices connected to the sashes for loosely pivoting the same to said shafts, fluid-pressure cylinders having pistons connected and moving in the same direction and pipes for supplying pressure to the opposite sides of said pistons, a pair of oppositely-placed beams in one end of the car and connections from adjacent ends thereof to the piston-rod of said pistons, whereby said beams are simultaneously actuated, and devices connected rigidly to corresponding ends of the shafts and to the distant or free ends of said beams and other devices agreeing in number with the number of the sashes and connected respectively to the said

shafts and sashes whereby the sashes may all be opened or shut by the movement of the beams or any one or more of said sashes may be closed by hand, substantially as set forth.

5 6. In an automatic ventilating apparatus, the combination with the sashes in series at the sides of the car, of shafts and devices connected to the sashes for loosely pivoting the same to said shafts, fluid-pressure cylinders
10 connected pistons therein moving in the same direction and automatic means for controlling the fluid under pressure to the said pressure-cylinders, a pair of oppositely-placed beams in one end of the car and connections
15 from adjacent ends thereof to the piston-rod of said pistons, whereby said beams are simultaneously actuated, and crank-arms 13, 14 secured to said shafts at one end and links
20 7 8 extending from said crank-arms to the distant free ends of said beams, and series of crank-arms 5 6 also secured to said shafts and agreeing in number with the number of the sashes, and latch-arms $r r'$ pivoted to the
25 crank-arms 5 6 and adapted to pass through the upper portions of said sashes, and means secured to the sashes and in one position engaged by the latch-arms and in another position free from said latch-arms, substantially
30 as and for the purposes set forth.

30 7. In an automatic ventilating apparatus, the combination with the sashes in series at the sides of the car, of shafts and devices connected to the sashes for loosely pivoting the same to said shafts fluid-pressure cylinders
35 ders connected pistons therein moving in the same direction and automatic means for controlling the fluid under pressure to the said pressure-cylinders, a pair of oppositely-placed beams in one end of the car, and connections
40 from adjacent ends thereof to the piston-rod of said pistons, whereby said beams are si-

multaneously actuated, and crank-arms 13, 14 secured to said shafts at one end and links 7 8 extending from said crank-arms to the distant free ends of said beams, and
45 series of crank-arms 5 6 also secured to said shafts and agreeing in number with the number of the sashes, and latch-arms $r r'$ pivoted to the crank-arms 5 6 and adapted to pass through the upper portions of said sashes,
50 latches 15 pivoted to said sashes and notched latch-plates 16 engaged thereby, whereby in one position of the latches 15 the same are engaged by the latch-arms $r r'$ and in the other position are free of said latch-arms,
55 so that the sashes can be moved by hand, substantially as set forth.

8. In an automatic ventilating apparatus, the combination with the series of side sashes of the car, of fluid-pressure cylinders, oppositely-placed connected pistons therein, fluid-pressure pipes opening into the said cylinders, beams $d d'$ connected to the piston-rod of said pistons at adjacent ends, devices connecting the beams with the sashes, whereby
60 the sashes may be opened or closed or held at intermediate points, a thermostatic device for controlling the fluid-pressure in the pipes and acting against the respective pistons, and a hand-operated cock in the pipe leading to
70 one of said fluid-pressure cylinders, whereby the pressure therein may be released to permit the pressure against the other piston to operate so as to effect the movements of the mechanism and simultaneously and instantaneously
75 to close all of the sashes, substantially as set forth.

Signed by me this 24th day of March, 1902.
FRED. C. CHADBORN.

Witnesses:

GEO. T. PINCKNEY,
S. T. HAVILAND.