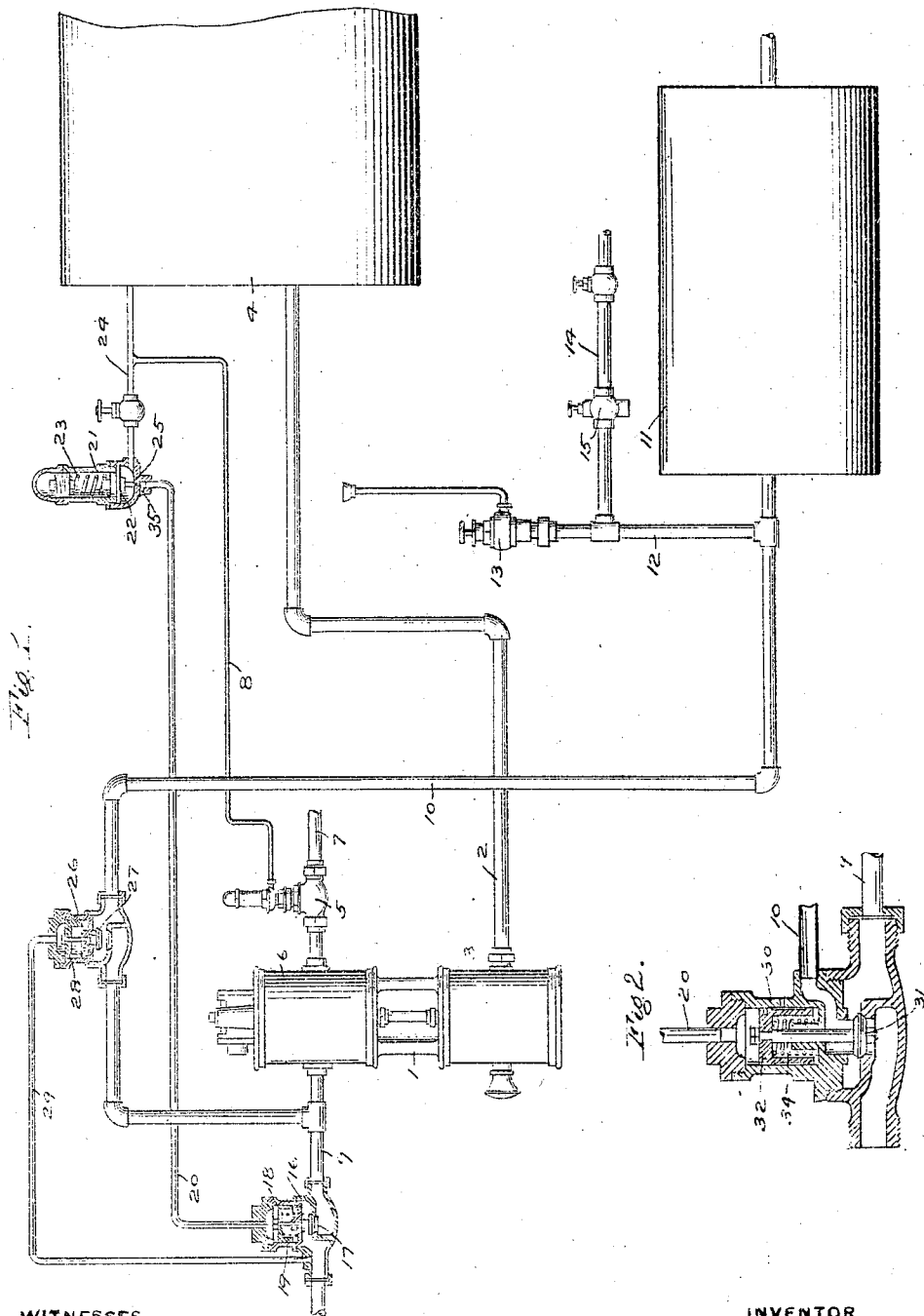


F. F. COGGIN.
CAR HEATING SYSTEM.
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1,024,062.

Patented Apr. 23, 1912.



WITNESSES
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UNITED STATES PATENT OFFICE.

FRANK F. COGGIN, OF NEW YORK, N. Y., ASSIGNOR TO ECONOMY CAR HEATING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF MAINE.

CAR-HEATING SYSTEM.

1,024,062.

Specification of Letters Patent.

Patented Apr. 23, 1912.

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To all whom it may concern:

Be it known that I, FRANK F. COGGIN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented new and useful Improvements in Car-Heating Systems, of which the following is a specification.

My invention relates to steam heating systems, and more particularly to a system adapted for heating cars in railway trains.

In my prior Patents Nos. 664,076 and 783,422, granted respectively on Dec. 19, 1900 and Feb. 28, 1905, I have disclosed a heating system wherein the exhaust steam from the air pump employed to compress air for the fluid pressure brakes, is utilized for heating the cars in the train.

It sometimes happens, should the steam pressure in the locomotive boiler become low, that the back pressure of the exhaust steam, which is necessarily caused by its use in the heating system, is sufficient to cause the pump to nearly or quite stop running, and, as a consequence, the fluid pressure in the main reservoir may become lower than desirable. To obviate this difficulty, means are provided, according to the second patent above mentioned, for automatically opening a free exhaust to the atmosphere from the pump exhaust, when the main reservoir pressure falls below a predetermined degree, thus relieving the pump of the back pressure of the exhaust steam and thereby insuring the full operation of the pump to maintain the desired pressure in the main reservoir. With this prior construction, however, in order to again connect the heating system with the exhaust steam supply, it is necessary for the engineer to operate the controlling valve by hand.

It is the main object of my present invention, therefore, to provide a simplified construction of this character wherein the control of the exhaust steam from the pump is automatically governed without any attention on the part of the engineer.

In the accompanying drawing; Figure 1 is a diagrammatic view of a locomotive equipment for utilizing the exhaust steam from the air pump for heating the cars, illustrating one form of my present invention applied thereto; and Fig. 2 a vertical section of a valve device, embodying one form of my invention for controlling the

exhaust steam from the pump and for preventing back flow of steam from the heating system.

According to Fig. 1 of the drawing, the car heating apparatus utilizes the exhaust steam from an air pump 1, of the usual construction for compressing air for use in the brake system, the air cylinder 3 of the pump being connected by a pipe 2 with a main reservoir 4, and having the usual pump governor 5 for controlling the steam supply to the steam cylinder 6 of the pump through the steam pipe 7, the governor being subject to main reservoir pressure by way of the pipe 8.

The steam exhaust pipe 9 from the pump 1 is connected by a pipe 10 with a reëvaporating drum 11, from which steam is supplied to heat the cars of the train. The pipe 10 is connected to a relief pipe 12 in which is arranged an adjustable relief valve 13, adapted to open and permit the escape of steam should the pressure in the reservoir 11 exceed the predetermined degree at which said valve may be adjusted. A direct live steam pipe 14 may also be provided, having a pressure regulator 15, which is adjusted so that should the pressure in the reservoir 11 fall below a predetermined minimum degree the valve will open and supply live steam to the reservoir until the pressure is restored.

So far as described the construction is similar to that disclosed in my prior patents above mentioned. According to one construction of my present invention I provide a valve device 16 for controlling an atmospheric exhaust from the pump exhaust pipe 9 and said device may comprise a valve 17, operated by a piston 18, subject on one side to the pressure of a spring 19 and on the opposite side to fluid pressure from the main reservoir at certain times. Said piston being connected by a pipe 20 to a pressure governor 21, which may be of the ordinary construction, having a diaphragm 22, subject on one side to the pressure of an adjustable spring 23 and on the opposite side to main reservoir pressure by way of the pipe 24. The diaphragm 22 governs a valve which controls the admission of air from the main reservoir to the piston 18 of the exhaust valve 17.

In operation, the pressure governor 21 is adjusted to the desired minimum degree of

main reservoir pressure, so that above that pressure the valve 25 is open and air is supplied from the main reservoir to the piston 18, causing the same to close the valve 17 against the pressure of the spring 19. The exhaust to the atmosphere is thus cut off, and as the air pump 1 operates, the exhaust steam therefrom flows through the pipe 10 to the reëvaporating drum 11, whence the steam is supplied for heating the cars.

Should the boiler steam pressure happen to fall to a low point, so that the back pressure of the exhaust steam interferes with the full action of the pump or even causes the same to stop, the main reservoir pressure may also fall, but since the pressure governor closes the valve 25 as soon as the main reservoir pressure becomes reduced to a certain point, the fluid pressure in the pipe 20 and on piston 18 reduces through the usual small vent port 35, so that said piston 18 is shifted by the spring 19, opening the exhaust valve 17 and permitting the pump steam exhaust to go to the atmosphere. The back pressure on the pump is thus relieved, and the pump at once starts into full action. The main reservoir pressure is thus brought up to the desired degree at which the pressure governor 21 is adjusted and thereupon causes the valve 25 to open and admit fluid to the piston 18, which then operates to close the exhaust valve 17. The exhaust steam is then diverted to the pipe 10 and the drum 11.

Should the pressure of the exhaust steam rise above the degree at which the relief valve 13 is adjusted, the excess pressure is blown off, and if the pressure becomes less than the desired minimum degree then the pressure regulator 15 opens and admits live steam to the heating system.

When the exhaust valve 17 is open and the exhaust steam is passing to the atmosphere, in order to prevent the back flow of steam from the heating drum to the atmosphere, I provide, according to the construction illustrated in Fig. 1, a valve device 26 which comprises a valve 27 for controlling communication from the heating drum to the pump exhaust pipe, and a piston 28 for operating said valve.

One side of the piston 28 is connected by a pipe 29 with the pump exhaust outlet beyond the valve 17, and thus, when the valve 17 is open and the pump is exhausting to the atmosphere, exhaust steam flows through the pipe 29 to the upper side of the piston 28, thus operating the piston to close the valve 27, so that the steam in the heating drum 11 is prevented from flowing back through the pipe 10 and escaping to the atmosphere.

In the construction illustrated in Fig. 2, I provide a valve device 30 comprising a double seated valve 31, adapted in one ex-

treme position to close communication between the atmospheric exhaust and the exhaust pipe 9 and open communication from the pipe 9 to the pipe 10, leading to the heating drum, and in the other extreme position to cut off the pipe 10 and open the atmospheric exhaust. The valve 31 may be operated by a piston 32, subject on one side to the pressure of a spring 34 and on the opposite side to main reservoir pressure through the pipe 20, when the valve 25 is open. With this construction it will be seen that so long as the piston 32 is exposed to main reservoir pressure, the same will be maintained in its outer position with the valve 31 closing the atmospheric exhaust and maintaining communication open from the pump exhaust pipe 9 to the heating system supply pipe 10, but when the main reservoir pressure falls below the predetermined minimum degree the main reservoir pressure being cut off from the piston 32, the spring 34 shifts the piston and valve 31 to the inner position, in which the heating supply pipe 10 is cut off and the atmospheric exhaust is open, thus the valve device 30 performs the functions of both of the valve devices 16 and 26.

It will now be apparent that in my present invention I have provided automatic means for controlling the exhaust steam heating system, requiring no attention on the part of the engineer, in the ordinary operation thereof.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a car heating system the combination with a steam actuated air pump having an exhaust outlet to the atmosphere and a communication for supplying exhaust steam to the heating system, of valve mechanism governed by the pump pressure for automatically closing the atmospheric exhaust outlet, and operating to open the exhaust outlet to the atmosphere and to positively close said communication to the heating system when the pump pressure falls to a predetermined point.

2. In a car heating system the combination with a steam actuated air pump having an outlet to the atmosphere for exhaust steam, and a communication for supplying exhaust steam to the heating system, of a valve device governed by the pump pressure for opening and closing said exhaust outlet to the atmosphere, and means governed by the flow of exhaust steam to the atmosphere for closing said communication to the heating system.

3. In a car heating system the combination with a source of exhaust steam, an atmosphere outlet therefor, and means of communication from said source to the heating system, of a valve device governed by the pump pressure for opening and closing

the exhaust outlet to the atmosphere, and a valve means governed by the flow of the exhaust steam to the atmosphere for closing said communication to the heating system.

5 4. In a car heating system the combination with a steam actuated air pump having an atmospheric exhaust outlet, a reservoir into which said pump is adapted to compress air, and means for supplying exhaust steam from the pump to the heating system, of a valve for controlling communication from the exhaust steam outlet of the pump to the atmosphere, a movable abutment operated according to the degree
10 of pressure in the reservoir for actuating said valve, and means operated by the flow of exhaust steam through said valve to the atmosphere for controlling communication from the exhaust steam outlet of the pump
15 to the heating system.

5. In a car heating system, the combination with a steam actuated air pump having an atmospheric exhaust outlet, a reservoir into which said pump is adapted to compress air, and means for supplying exhaust steam from the pump to the heating system, of a valve for controlling communication from the exhaust steam outlet of the pump to the atmosphere, a movable abutment operated by the reduction in reservoir pressure to a predetermined degree for opening said valve, and means operated by the flow of exhaust steam through said valve to the atmosphere for closing communication from the exhaust steam outlet of the pump to the heating system.

6. In a car heating system, the combination with a steam actuated air pump having an exhaust steam outlet to the atmosphere, a reservoir into which said pump is adapted to compress air, and means for supplying exhaust steam from the pump to the heating system, of valve means for controlling the flow of exhaust steam from the pump to the atmosphere and to the heating system, a movable abutment for controlling the action of said valve means, a spring acting on one side of said abutment tending to move same in one direction, and means subject to reservoir pressure for controlling the admission of fluid pressure to the opposite side of said abutment.

7. In a car heating system, the combination with a steam actuated air pump having an atmospheric exhaust steam outlet, a reservoir into which said pump compresses air, and a supply pipe for the heating system

connected to the steam exhaust from the pump, of automatic means operated according to the degree of reservoir pressure for establishing communication from the steam exhaust of the pump to said supply pipe and adapted upon the reservoir pressure falling to a predetermined degree to close said communication and open the pump exhaust to the atmosphere.

8. In a car heating system, the combination with a source of exhaust steam, a pipe adapted to establish communication from said source to the atmosphere, and a supply pipe leading from the source of exhaust steam to the heating system, of a valve device operating independently of the exhaust steam pressure for controlling communication through said atmospheric exhaust pipe and means operated by the flow of exhaust steam upon the opening of the atmospheric exhaust outlet for closing the communication through which exhaust steam is supplied to the heating system.

9. The combination with a steam operated air brake system, and a steam operated train heating system adapted to be brought into communication with and supplied by the exhaust steam from the said air brake system, the said steam exhaust being open to an atmosphere of lower pressure than that within the said steam heating system, of means whereby the communication between the said systems is automatically effected and broken as the air pressure of the said air brake system rises and falls, respectively.

10. The combination of a steam operated air brake system and a steam operated train heating system adapted to be brought into communication with and supplied by the exhaust steam from the said air brake system, the said steam exhaust also being open to the atmosphere, an automatic valve adapted to open and close the exhaust to the atmosphere when the air pressure within said air brake system falls below or rises above a certain predetermined degree, respectively, and an automatic valve governing the said communication between the two systems, said last named valve adapted to open when the first named valve closes and to close when the first named valve opens.

In testimony whereof I have hereunto set my hand and seal.

FRANK F. COGGIN. [L. s.]

Witnesses:

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FRANCIS CONDON.