No. 608,212. Patented Aug. 2, 1898.

J. F. McELROY.

CAR HEATING SYSTEM.

(Application filed Jan. 6, 1898.)

(No Model.) 2 Sheets—Sheet 1.

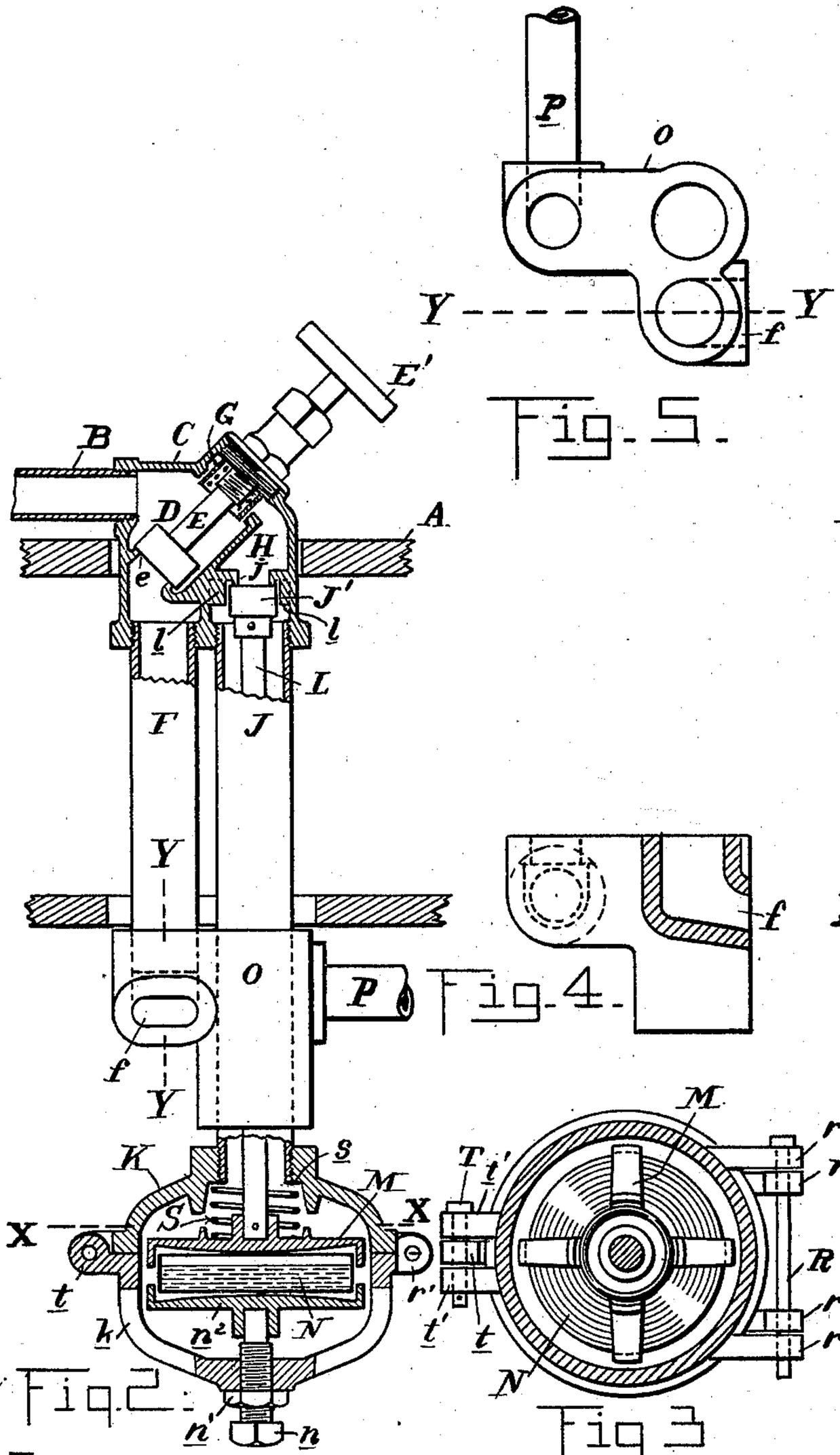

Fig. 5. Fig. 4. Fig. 2. Fig. 3. Fig. 1.

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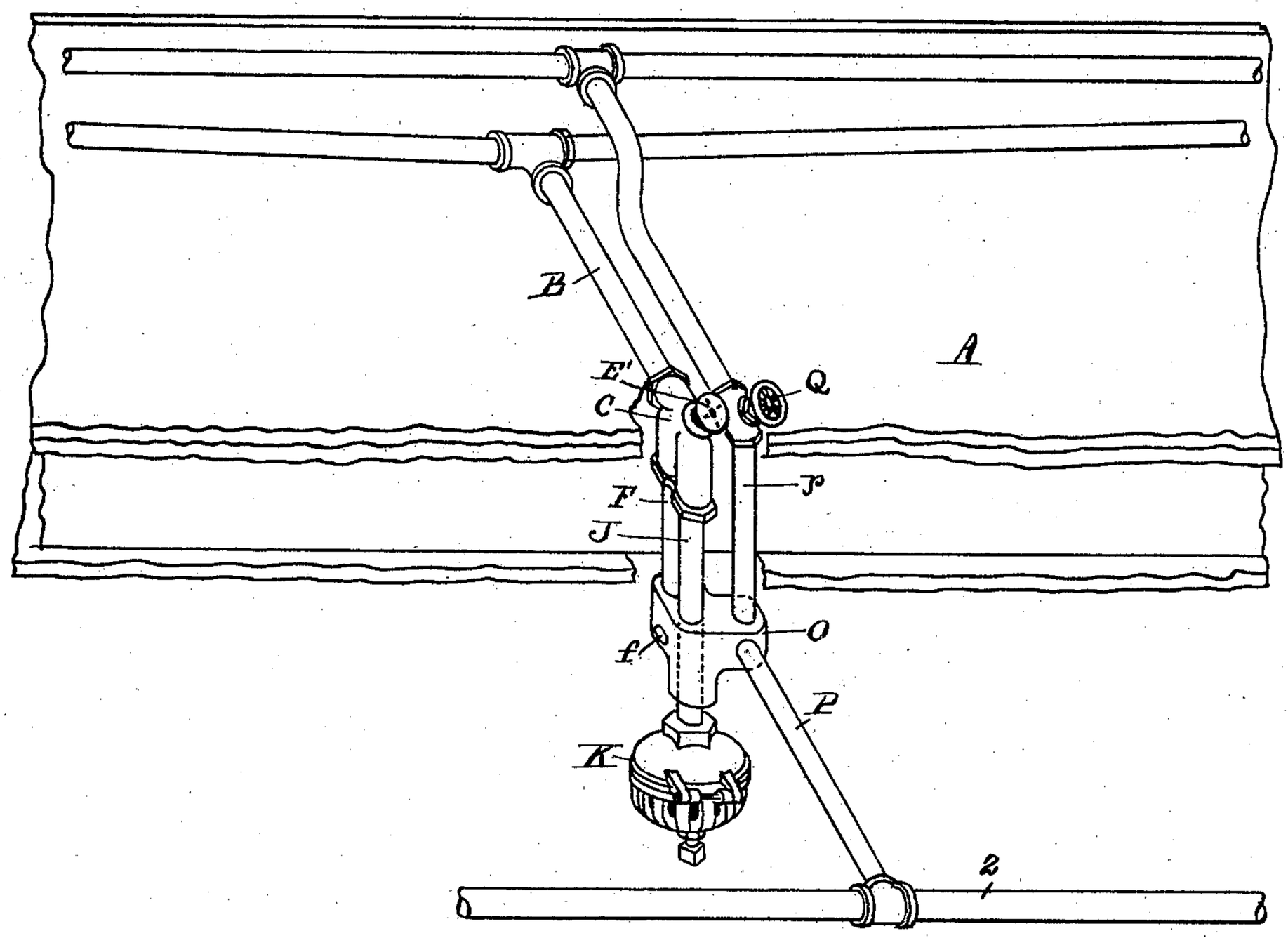
Fig. 6.



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UNITED STATES PATENT OFFICE.

JAMES F. McELROY, OF ALBANY, NEW YORK, ASSIGNOR TO THE CONSOLIDATED CAR-HEATING COMPANY, OF SAME PLACE.

CAR-HEATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 608,212, dated August 2, 1898.

Application filed January 6, 1898. Serial No. 665,796. (No model.)

To all whom it may concern:

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

My invention relates to devices or systems for heating railway-cars with steam; and the object of my invention is to provide a car-heating system so arranged and connected up that the return-pipe is automatically checked in its discharge when hot water or steam is emitted therefrom, provided with a blow-off in connection therewith and also provided with a means for preventing freezing at the discharge. I attain this object by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is an elevation. Fig. 2 is a vertical section, partly in elevation. Fig. 3 is a cross-section along the lines *x x* on Fig. 2. Fig. 4 is a section along the lines *y y* on Fig. 2. Fig. 5 is a plan of the metal casing; and Fig. 6 is a section of a car, partly broken away, showing the position of the trap of my car-heating system in connection with the train-pipe beneath the car and the heating-pipes within the car.

Similar letters and figures refer to similar parts throughout the several views.

A represents the floor of a car; B, the return-pipe of a car-heating system, located within the car just above the floor A. The casing C is connected with the return-pipe B and is provided with a sediment basin or pocket D, into which the water of condensation and dirt from the steam system collects. The valve-stem E has a seat *e* at the lower portion of the pocket D. Extending from the sediment basin or pocket D and beneath the seat *e* is a blow-out pipe F, which extends below the car and has an opening *f*, through which the water and dirt accumulating in the pocket D may be expelled when the valve-stem E is raised. The valve-stem E extends through the casing C and is provided with a handle and wheel E′.

A perforated fitting or bonnet G is arranged in the pocket D at the upper portion thereof, preferably about the valve-stem E, in order that it may be readily removed through the opening in the casing through which the valve-stem passes, said perforations communicating with an overflow-chamber H within the casing C, which overflow-chamber H communicates with the tube J, which extends beneath the car and at its lower end is secured to the casing K. Within the tube J, and having a seat at *j* in the valve-casing C, which valve-seat is preferably beneath the floor of the car, I arrange a valve J′ on the valve-stem L, the lower end of which valve-stem is connected with the spider-plate M within the casing K. The spider-plate M is placed in contact with the thermostatic cell N, within which is placed a liquid whose boiling-point is at about 180° Fahrenheit, so arranged that when the liquid in the thermostatic cell reaches about 180° Fahrenheit the diaphragm will be raised, which will raise the valve-stem L against the seat *j*. About the valve-stem L, I arrange a spiral spring S, having a seat on the spider-plate M and against a shoulder *s* in the upper portion of the casing K, which tends to depress the spider-plate M and open the valve J′ from the seat *j* when the liquid in the thermostatic cell is below its expansive point.

The casing K is provided with a series of openings *k k*, allowing for the discharge of water and sediment which may enter through the tube J, which also allow for the free circulation of air in contact with the thermostatic cell N. In order that the tube J and the blow-off pipe F may at their lower extremities be kept warm, and thus prevent freezing therein, I place a metal casing O in contact with the tube J and the pipe F and preferably surrounding each, which casing communicates with the train-pipe 2 by means of the pipe P, thus making a hot metallic connection. The pipe P is connected with the riser *p*, extending into the car, which is there provided with the valve Q.

In order to insure the perfect adjustment of the end of the valve J′ with the valve-seat *j* within the valve-casing C, I arrange guides *l l*, which when the valve J′ is raised direct the end of the valve in such a manner as to positively close the valve-opening in the casing C. In order that the thermostatic cell N may be adjusted in position, I place the

bolt n through the casing K, which bolt engages with the spider n^2, supporting the thermostatic cell, which bolt is arranged to mesh with threads in the casing K and provided with a nut n' on the outside of the casing. The thermostatic cell N is constructed, preferably, of spring metal, and I preferably arrange the spiders M and n^2 in reference to the diaphragm in such a manner that the spiders come in contact with the diaphragm at their centers only.

I preferably construct the casing K in two parts, making an upper and a lower hemisphere, and to these parts I attach or form integral therewith projecting ears r r and r' r' and extend the rod R through said ears, forming a hinge-joint, as shown in Fig. 3. For the purpose of locking the two portions together I place a bolt through the projecting lugs t t', engaging, respectively, with the adjacent portions of the casing. By this means I can open the casing when necessity requires for the purpose of renewing the thermostatic cell or repairing any defect which may arise therein. This arrangement of the receptacle, holding the thermostatic diaphragm in such a manner that the parts may be taken out quickly, is an important part of the invention, since when the lower hemisphere is opened the diaphragm will fall out and the spiders may be quickly removed and replaced when necessary.

The operation of my trap is simple and apparent. It will be noticed that I do not place the valve-seat on the valve connected with the thermostatic cell within the space to be heated and do not depend upon the warmth of the car to prevent the tube within which the valve-stem is placed from freezing. By means of the metal casing connected to the steam-pipe I prevent any possibility of the trap becoming inoperative because of freezing, since the train-pipe is always warm when the car is in operation. When the valve-stem E is in the position shown in Fig. 2, which is its normal position, the discharge from the pipe B is received within the sediment basin or pocket D until the water percolates through the perforations in the fitting G into the overflow-chamber H, where it is discharged from the tube J into the casing K and passes out through the perforations k. When hot water or steam is emitted from the pipe B, and therefrom into the tube J and the casing K, the thermostatic cell, becoming heated, causes the spider-plate M to rise, and the chamber H is closed, preventing further discharge from the pipe B. When the sediment basin or pocket D becomes filled with sediment or it is desired to clean it out or blow off the contents of the return-pipe B, the valve-stem E is raised, allowing for a discharge through the blow-out pipe F. It will be noticed that the sediment contained in the discharge entering the trap is prevented from coming in contact with the diaphragm, it being deposited in the sediment basin or pocket, where it may be blown off through the blow-off pipe F. In traps heretofore used in connection with heating systems, so far as I am familiar, there has been no arrangement provided for this disposition of the sediment, making it necessary for the sediment to be entirely separated from the water before the water passes into the chamber within which the pipe communicating with the thermostatic diaphragm is located. In this respect these traps have been objectionable in use.

In a system for heating cars by steam there is always a slight leakage in the steam-valves, either occasioned by the valves becoming worn or because not entirely shut off, which allows a drip to occur. This drip gradually reaches the valve at the end of the discharge-pipe, and when the steam is turned off in the car the drip freezes, and the system becomes immediately inoperative. This occurs so frequently in cold weather that it is not uncommon to be obliged to lay off cars en route because of the freezing of the discharge-pipe, occasioning great loss in time, as well as inconvenience to the passengers, to say nothing of the expense involved thereby. I have provided by the system hereinbefore described a means for keeping the discharge-pipe warm irrespective of the flow of steam through the radiating-pipes in the cars. This is done by means of the hot metallic contact, it being connected to the train-pipe by means of a pipe and placed but a little distance from the train-pipe. There being no valve in the pipe P between the train-pipe and the hot metallic contact, there will always be steam in the pipe connecting to the hot metallic contact and sufficient heat to prevent freezing at the discharge. The arrangement of the hot metallic contact in such a relation with the thermostatic diaphragm that the heat from the thermostatic cell will not cause the diaphragm to operate requires the proper adjustment of the parts. This is arranged for by separating the hot metallic contact from the train-pipe by means of the short pipe P and arranging the hot metallic contact slightly above the casing carrying the thermostatic cell. The thermostatic cell being actuated by a temperature of from about 165° to 200° Fahrenheit, it is simply necessary to arrange the hot metallic contact so that the heat imparted to the casing holding the thermostatic cell shall not equal that amount.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a car-heating system, a trap, composed of a casing provided with two chambers, communicating with each other through a perforated fitting and also communicating with the discharge connection of said car-heating system, a blow-out pipe communicating with one of said chambers, a valve adapted to close the opening between said blow-out pipe and the chamber with which it communicates, the other of said chambers communicating with a fitting carrying a thermostatic cell, a spider-

plate arranged in contact with the diaphragm of said thermostatic cell, a valve-stem connected with said spider-plate, a valve on said valve-stem arranged to close the communication between one of said chambers and the fitting carrying the thermostatic cell or to open the same, depending upon the action of said diaphragm, and a hot metallic connection between the blow-out pipe and the fitting carrying said thermostatic cell and the receptacle containing the hot steam of the car-heating system, substantially as described.

2. In a car-heating system, a trap consisting of a casing provided with two chambers, communicating with each other through a perforated fitting, and also communicating with the discharge connection of said car-heating system, a blow-out pipe communicating with one of said chambers, a valve adapted to close the opening between said blow-out pipe and the chamber with which it communicates, a tube connecting the other of said chambers with a fitting containing a thermostatic cell, a valve adapted to close the opening between said tube and said chamber, a valve-stem connecting said valve with a spider-plate, said spider-plate arranged to rest upon the diaphragm of said thermostatic cell, guides placed in said tube, arranged to direct said valve to its seat, a fitting carrying said thermostatic cell composed of two parts hinged together, an adjustable plate in said fitting adapted to hold said thermostatic cell in position, a hot metallic connection between said blow-out pipe and said tube connected with a pipe communicating with the train-pipe, all substantially as described.

3. In a thermostatic trap, a receptacle for holding a diaphragm, consisting of two members hinged together, with a means for locking the same in position, spiders for holding the diaphragm in position, said diaphragm constructed of spring metal, a means for adjusting said spiders in connection with said diaphragm, said receptacle provided with openings therethrough allowing for the circulation of air, a valve-stem operated by said diaphragm, so arranged that the receptacle may be opened and the spiders, diaphragm and valve-stem removed or placed in position, substantially as described.

4. In a trap, a casing containing a sediment-basin, a valve for blowing out dirt from the sediment-basin, a perforated fitting placed in the overflow of said sediment-basin, and so arranged that said fitting can be removed for cleaning by taking out the bonnet of the valve and without disconnecting the trap, combined with an overflow-basin and a valve at the discharge end of said overflow-basin controlled by a thermostatic cell, substantially as described.

5. A trap composed of a casing provided with a port connecting to a heating system, an overflow-basin, a sediment-basin located in the line of flow from the heating system to the overflow-basin, a perforated fitting between said sediment-basin and said overflow-basin, a blow-out pipe controlled by a valve communicating with the sediment-basin, the overflow-basin provided with a valve controlled by a thermostatic cell, substantially as described.

6. In a car-heating system, a trap communicating with the discharge end of said system, said trap composed of a casing provided with a sediment-basin placed in the floor of the car, a blow-out pipe connected to the bottom of said sediment-basin, a partition separating the sediment-basin from an overflow-basin, the upper part of said partition perforated, said overflow provided at its bottom with a valve controlled by a thermostatic cell, substantially as described.

7. In a car-heating system, a steam-supply pipe, a trap connected with the discharge end of said heating system, said trap consisting of a casing provided with a sediment-basin having a blow-out pipe controlled by a valve, an overflow-basin provided with a valve controlled by a thermostatic cell, a discharge-pipe communicating with the valve in said overflow-basin, a fitting provided with a steam-port communicating with the steam-supply pipe, said fitting also having a portion which surrounds or forms part of said discharge-pipe, substantially as described.

8. In a car-heating system, a steam-supply pipe, a system of circulating-pipes within the car, a thermostatic trap connected to the discharge end of said circulating system, said trap in hot metallic connection with the steam-supply pipe in such a manner that the casing of said trap shall be maintained at a temperature above the freezing of the circulating fluid but below the temperature at which the thermostatic trap operates, substantially as described.

In witness whereof I have hereunto set my hand this 3d day of January, 1898.

JAMES F. McELROY.

Witnesses:

CHAS. B. MITCHELL,

W. W. ERWIN.