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W. H. PEARCE.

CAR HEATING SYSTEM AND STEAM TRAP THEREFOR.

APPLICATION FILED JULY 27, 1901.

NO MODEL.

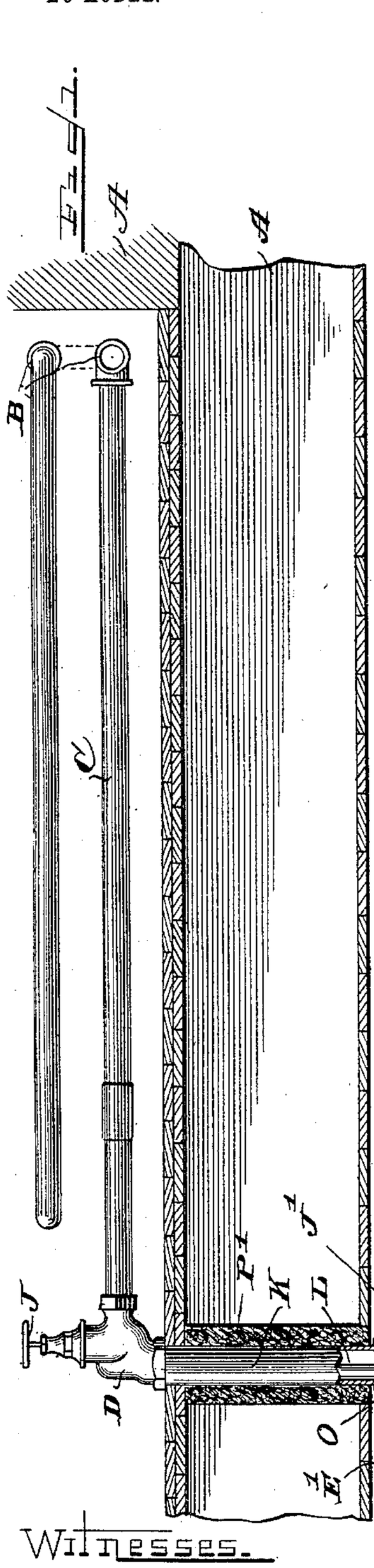

Fig. 1.

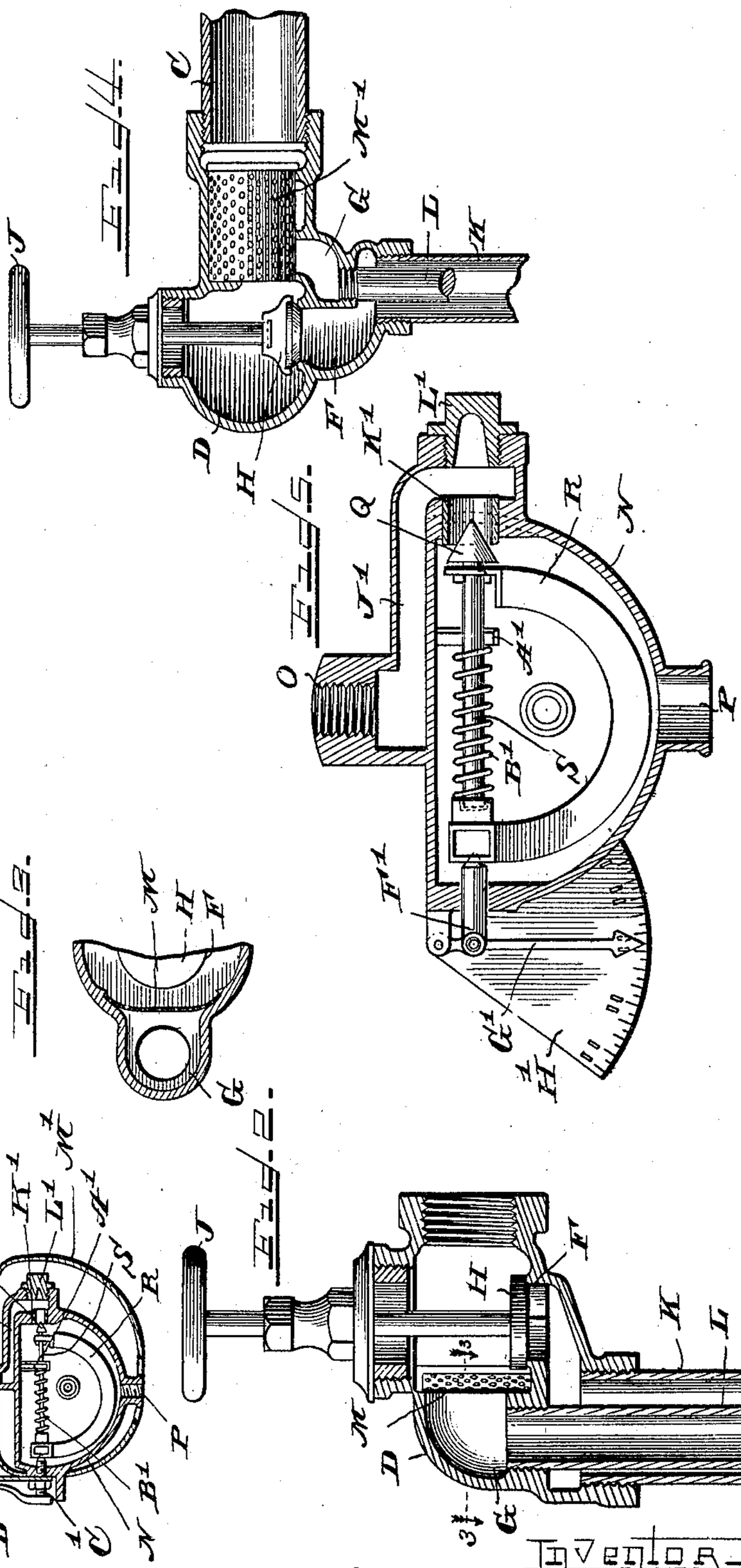

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses.

J. H. Glendenning.

G. A. Paubeschmidt.

Inventor.

William H. Pearce

By Brown & Darby

Attys

UNITED STATES PATENT OFFICE.

WILLIAM H. PEARCE, OF CHICAGO, ILLINOIS.

CAR-HEATING SYSTEM AND STEAM-TRAP THEREFOR.

SPECIFICATION forming part of Letters Patent No. 719,363, dated January 27, 1903.

Application filed July 27, 1901. Serial No. 70,002. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. PEARCE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Car-Heating System and Steam-Trap Therefor, of which the following is a specification.

This invention relates to car-heating systems and steam-traps therefor.

The object of the invention is to provide means which are simple and efficient for automatically regulating the heating system of cars, whereby the temperature of the cars may be maintained uniform.

A further object of the invention is to provide means for preventing the freezing up of the trap employed for effecting the automatic regulation of the heating system.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference-signs appearing thereon, Figure 1 is a broken view, in vertical transverse section, of a portion of a car, showing the application thereto of a portion of the heating system thereof and of a construction embodying the principles of my invention. Fig. 2 is an enlarged broken detail view in section of a valve-casing employed in connection with my invention. Fig. 3 is a broken detail view in section on the line 3 3 of Fig. 2. Fig. 4 is a view similar to Fig. 2, showing a modified construction embodying my invention. Fig. 5 is a detached detail view in section of a construction of trap employed in connection with my invention.

In car-heating systems employing steam, hot water, or the like for the heating medium it is a matter of material consequence to be able to regulate the degree of temperature in the car to suit the conditions of temperature of the outer air. Thus on an extremely cold day it is desirable to maintain a higher degree of temperature than is desirable or necessary on a mild day. It is also desirable to maintain a uniform temperature, in order that the car will not be heated to the required or desired temperature and then cooled down to a point below that at which it is desired to maintain the car. Difficulty has been experienced heretofore in the employment of automatic heat-regulating devices by reason of the same freezing up. This is especially true in the case of automatic traps when placed on the outside of a car, which is the usual arrangement of such devices. It is among the special purposes and objects of my invention to provide a construction and arrangement of a car-heating system which is simple, economical, and efficient, whereby the temperature in the car may be regulated to conform to the temperature of the outer air, and wherein a uniform temperature is automatically maintained within the car, and wherein freezing up of the traps or other parts exposed to the temperature of the outer air is prevented.

I attain the objects mentioned in the arrangement and construction shown in the accompanying drawings, wherein reference-sign A designates a portion of the structure of the car-body, and B the pipes or coils of the heating system, and which may be located at any suitable or convenient point on the car and in the usual manner. The heating-coils of the system terminate in a pipe or connection C, which delivers through a valve-casing D of special construction, presently to be more fully described, and thence to or through a trap, and thence to the atmosphere. The valve-casing D is provided with separate and independent passages F G. (See Figs. 2, 3, and 4.) The passage F is controlled by an ordinary hand-operated stop-valve H, the stem J of which projects through the casing and into convenient position to be grasped and actuated, while the passage G is normally open. Arranged to communicate with passage F is a pipe K, which extends through the car body or floor and delivers to the outer air, while a pipe L, of smaller diameter, is arranged within pipe K to extend longitudinally therethrough, said pipe communicating at one end with the passage G of the valve-casing and at the other end delivering into the trap. If desired, and preferably, the passage G may be protected by a perforated or foraminous partition-screen M, (see Fig. 2,) or in the form shown in Fig. 4 the screen M′ may be in the

form of a perforated sleeve, as clearly shown. The trap comprises a casing N, having an inlet opening or passage O, into which the pipe L delivers, and an exhaust-opening P, delivering to the outer air. The passage through the trap-casing N is controlled by a valve Q, suitably connected to an expansion device or coil R, arranged within the trap-casing and adapted to be acted upon by the heating medium passing through the trap. The valve Q is carried upon a stem S, and the expansion-coil R is of U shape, one end thereof being connected to and forming a support for the valve-stem S at a point adjacent to the valve Q, said valve-stem S being suitably supported at its other end adjacent to the opposite end of the expansion coil or device. If desired, the trap-casing may be provided with a lug or seat A′, arranged to form a support and guide for the valve-stem. A spring B′ may serve to oppose the spreading apart of the ends of the expansion coil or device. It will be understood that the passage of the heating medium through the trap-casing affects the expansion coil or device in a manner to cause the ends thereof to spread apart and to seat the valve. Provision may be made for so adjusting the expansion device of the trap as to cause the valve to be seated at any desired predetermined temperature. This idea may be embodied in many specifically different constructions. In Fig. 1 I have shown a screw C′, tapped through the trap-casing in line with the valve-stem S and forming a bearing for the end of the expansion coil or device R. By turning up or backing off screw C′ the temperature at which the valve Q will be seated may be regulated, and in order to set the device to permit the seating of the valve at a predetermined temperature I may associate with adjusting-screw C′ a pointer D′, arranged to operate over a graduated flange E′, as will be readily understood. In Fig. 5 a slightly-modified construction is shown wherein instead of employing a set-screw for effecting the desired adjustment of the expansion coil or device I employ a pin F′, arranged to project through the casing N and to engage and form a bearing for the end of the coil or device R, and I connect the bearing-pin F′ with a pointer G′, arranged to operate over or in coöperation with a graduated flange H′. By this construction it will be seen that the point at which the valve Q is seated may be adjustably regulated and predetermined. It is obvious that many other constructions of adjusting mechanism may also be equally well adapted for this work.

It is stated above that the valve Q controls the passage through the trap-casing and the flow therethrough of the heating medium delivered through the smaller pipe L. It is also stated that said pipe L delivers into a mouth or opening O into said casing. In order to obtain the best results, it is desirable to avoid the direct delivery of pipe L into the space occupied by the expansion device or coil R, and therefore I provide a lateral passage J′, into one end of which the pipe L delivers, the other end of said lateral passage finding communication with the space occupied by the expansion-coil through a valve-seat K′, formed in a partition-wall in the trap-casing and with which valve Q coöperates. If desired, the passage J′ may be provided with a removable plug or opening L′, which may be removed at any time for the purpose of blowing or cleaning out the trap or removing any sediment or deposit which might accumulate in the passage J′. If desired, an inclosing cover M′ may be arranged to surround the trap to afford protection of the same against the ingress of dust, dirt, and the like, and also to aid in avoiding freezing thereof in extremely cold weather.

It will be observed (see Fig. 2) that the connection of pipe L to the passage G in the valve-casing D is somewhat higher than the point of delivery from said valve-casing into the outer or inclosing pipe K. In other words, pipe L extends to a point somewhat higher than pipe K.

The operation of the construction and arrangement set forth is as follows: Suppose it is desired to heat up the car, the trap-valve Q being open. The heating medium is turned onto the system and the valve H is opened. Under these conditions the steam, hot water, or the like circulates through the coils or pipes of the heating system and finally exhausts through the valve-casing D and the trap E. Any deposit of scale, sediment, or other foreign matter or the water of condensation which may have accumulated in the coils or pipes of the heating system will be expelled or blown off through the opening or passage F in the valve-casing D and through the larger pipe K. The passage G and pipe L (the latter being of smaller area than pipe K) are protected by the screen M or M′, thus protecting the trap from receiving such scale, deposit, or the like. The trap is located beneath and in close proximity to the delivery end or mouth of pipe K. Therefore the exhausting heating medium which passes through said pipe drips upon the trap-casing, and that portion of the heating medium which passes through pipe L enters the trap and passes out or exhausts therethrough, and consequently the trap is subjected to the temperature of the heating medium, and when that temperature attains the desired degree the expansion-coil operates to cause valve Q to be seated, thereby cutting off the exhaust through the trap, and so long as the valve H remains open the exhaust of the heating medium continues through the passage F and pipe K. By suitably adjusting the expansion-coil the trap may be set to close at any desired predetermined temperature, and when the desired degree of temperature is attained in the heating system the supply is cut off, and thereafter only the drippings or condensation passes through or exhausts through pipe

K. By closing valve H and without cutting off the supply of heating medium to the system it will be seen that the circulation through the system is arrested as long as the trap-valve remains closed. The closing of this valve takes place only after the temperature has attained the desired degree, and such closing is effected automatically. When, however, the temperature falls below the desired point, the trap-valve will again open automatically by the contraction of the expansion-coil, thereby permitting the circulation to again start up until the desired temperature is again attained, at which point the trap-valve will again close.

It will be observed that the construction and arrangement shown in Fig. 4 differs from that shown in Fig. 2 principally in the location of the trap-passage G and pipe L nearer the delivery end of pipe C from the heating system of coils or pipes, thus enabling the drippings or condensation from the steam to pass through such passage and pipe, and hence also through the trap, whereas in Fig. 2 this dripping or condensation will pass through passage F when valve H is unseated; but in either case the trap will be subjected to the temperature of such drippings or condensation or any portion of the steam, hot water, or the like which may also pass through, and hence by the automatic action of the trap dependent upon the temperature of the heating medium a uniform temperature is maintained throughout the entire car-heating system.

It will be observed that the trap-pipe L is arranged within and inclosed by the pipe K, and hence should, by exposure to the cold atmosphere, the drippings from pipe K on the trap freeze up—as, for instance, when a car is detached from the train and left standing on a siding or disconnected from a source of supply of the heating medium—then when the car is again coupled up with the train and the heating medium supplied to the coils B the flow of the heating medium through pipe L and the trap will quickly thaw out any freezing that may occur at the mouth or delivery end of pipe K. Similarly, in the construction shown in Fig. 4, should the drippings or water of condensation which passes through pipe L become frozen, then when the steam or hot water is turned onto the system and valve H unseated the frozen pipe L will become surrounded by the heating medium exhausting through pipe K, thereby rapidly thawing out the apparatus. In this manner not only is the objection of freezing overcome, but when the car is in train service and in connection with a source of supply of the heating medium freezing of the trap or of its connections is prevented by the constant supply thereto either of the exhausting heating medium or of the drippings or heated water of condensation. If desired, and in order to still further protect said pipes against freezing, they may be suitably packed or surrounded by heat-insulating material P'—such, for instance, as asbestos. Thus it will be seen that in a most simple, economical, and efficient manner I secure a uniform temperature in the heating system. It will also be seen that such temperature may be varied or regulated to suit climatic conditions and that the operation of the regulating and controlling means is automatic, and efficient protection against freezing is attained.

Many variations and changes in the details of construction and arrangement would readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. While, therefore, I have shown and described specific constructions and arrangements embodying the principles thereof, I do not desire to be limited or restricted thereto; but,

Having now set forth the object and nature of my invention and constructions embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent, is—

1. In a car-heating system, heating-coils, a valve-casing having independent passages both arranged to communicate with said coils, a trap, a pipe communicating at one end with one of the valve-casing passages and delivering at the other end into said trap, an exhaust-pipe communicating at one end with the other of said valve-casing passages and at the other end delivering upon the trap-casing, and a single valve arranged in the valve-casing to control one of said independent passages, as and for the purpose set forth.

2. In a car-heating system, heating-coils, a valve-casing having independent passages both arranged to communicate with said coils, a trap, a pipe communicating at one end with one of the valve-casing passages and delivering at the other end into said trap, an exhaust-pipe communicating at one end with the other of said valve-casing passages and at the other end delivering upon the trap-casing, and a single valve arranged in the valve-casing to control said exhaust-pipe communication, as and for the purpose set forth.

3. In a car-heating system, heating-coils, a valve-casing having separate passages both communicating with said coils, a steam-trap, a pipe communicating at one end with one of the passages of said valve-casing and at the other end delivering into said trap, an exhaust-pipe communicating at one end with the other of said valve-casing passages, the opposite end of said exhaust-pipe being open, said trap being arranged below the open end of said exhaust-pipe, whereby said exhaust-pipe delivers upon the casing of said trap, and a single valve arranged in said valve-casing and operating to control the communication of the exhaust-pipe with said valve-casing, as and for the purpose set forth.

4. In a car-heating system, heating-coils, a valve-casing having independent passages both arranged to communicate with said coils,

a trap, a pipe communicating at one end with one of the valve-casing passages and delivering at the other end into said trap, an exhaust-pipe arranged in inclosing relation with respect to said first-mentioned pipe communicating at one end with the other of said valve-casing passages, the opposite end of said exhaust-pipe being open and terminating above the trap-casing, and a valve arranged in said valve-casing to control the communication of said exhaust-pipe, as and for the purpose set forth.

5. In a car-heating system, a trap comprising a casing having an inlet and an outlet opening, a valve-seat arranged in one of said openings, a valve coöperating with said seat, an expansion device connected to said valve, said trap-casing provided with an opening in line with said valve-seat, a removable plug for closing said opening, a steam-coil, and a pipe communicating at one end with said steam-coil and delivering at the other end into said trap-casing; all combined and arranged, as and for the purpose set forth.

6. In a car-heating system, a trap comprising a casing having an inlet and an outlet opening, a valve for controlling one of said openings, an expansion device connected to said valve, devices arranged to extend through said casing to engage said expansion device for adjusting the point at which said valve will be seated, and a pointer associated with said adjusting device whereby said valve may be set to close at any desired predetermined temperature, as and for the purpose set forth.

7. In a car-heating system, a trap comprising a casing having an inlet and an outlet opening, a valve for controlling one of said openings, an expansion device connected to said valve, a screw arranged to project through said casing to engage said expansion device for adjusting the same, a lever for rotating said screw, and a dial-plate with which said lever coöperates to designate the point at which the trap is set to operate, as and for the purpose set forth.

8. In a car-heating system, a trap comprising a casing having a chamber, an inlet-opening and an outlet-opening, said casing also provided with a lateral passage communicating with said inlet-opening and delivering transversely into said chamber, a valve for controlling the communication between said lateral passage and said chamber, and an expansion-coil arranged in said chamber and adapted to control the movements of said valve, as and for the purpose set forth.

9. In a car-heating system, heating-coils, a valve-casing having passages arranged to communicate with said coils, a trap-casing, a pipe communicating at one end with one of the valve-casing passages and delivering at the other end into said trap-casing, an inclosing cover or shield arranged to inclose the trap-casing, an exhaust-pipe communicating at one end with said valve-casing and at the other end delivering into said shield or cover and upon said trap-casing; all combined and arranged, as and for the purpose set forth.

In witness whereof I have hereunto set my hand, this 23d day of July, 1901, in the presence of the subscribing witnesses.

WILLIAM H. PEARCE.

Witnesses:
E. C. SEMPLE,
S. E. DARBY.