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MEANS FOR THE REMOVAL OF WATER OF CONDENSATION FROM STEAM PIPES-

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Fig. 4

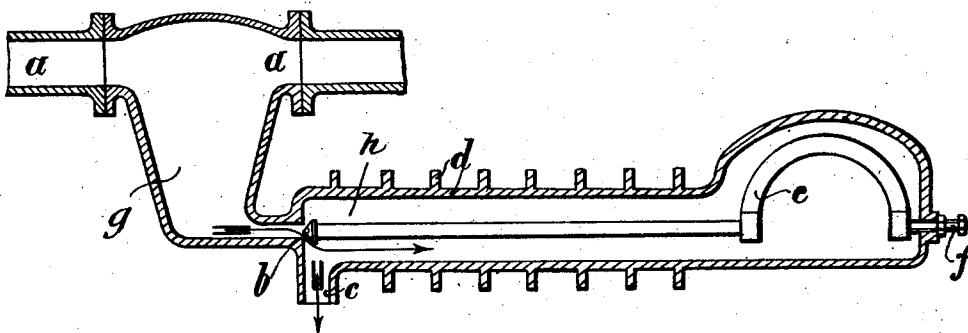
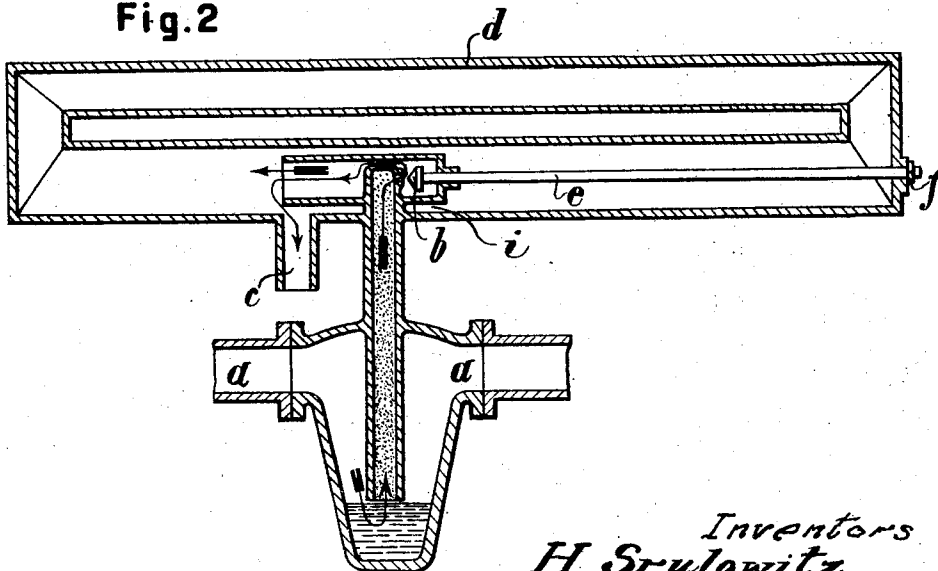


Fig. 2



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MEANS FOR THE REMOVAL OF WATER OF CONDENSATION FROM STEAM PIPES.

Application filed December 6, 1922. Serial No. 605,298.

To all whom it may concern:

Be it known that we, HERMANN SRULOWITZ, mechanical engineer, and LOUIS FRIEDMANN, manufacturer, both of the Austrian Republic, citizens of the Republic of Austria, residing at Vienna, in the Republic of Austria, have invented certain new and useful Improvements in Means for the Removal of Water of Condensation from Steam Pipes, of which the following is a specification.

The invention relates to installations for drawing the water of condensation from steam pipes and especially to arrangements in railway cars in which the water of condensation is to be drained from the main supply pipe of the heating installation. Arrangements have been proposed in which the water is draining away into the atmosphere without the thermostatic element which controls the escape valve being affected by the heat of the water. For this purpose the water itself is either allowed to escape before reaching the thermostat, or the thermostatic element is placed above the exit opening for the water. These constructions are, however, always disadvantageously affected by the circumstance that the water in high pressure steam leads, for example in the high pressure steam leads of railway cars, has a temperature above 100° C., and consequently after its passage through the valve is under atmospheric pressure and again develops vapors, so that the thermostatic element is not, as intended, removed from the effect due to the heat of the water, since the subsequently formed vapors cause the thermostat to close the valve.

According to the invention this drawback is obviated by inserting a large cooling surface between the drain valve and the thermostat, for the purpose of condensing, before it can reach the thermostat, any vapor which is formed from the hot water. It is immaterial for the purpose of the invention whether this surface is exposed to atmospheric air or to the air of the space to be heated, for example, a railway car. Therefore, any heater or radiator controlled by a thermostat, or a series of such members, can be used as means for draining water of condensation within the scope of the invention, if between the drain valve and the thermostat a sufficiently large cooling surface is inserted.

It is of course of advantage to locate the surface capable of radiating heat in such manner that the heat which is emanated is utilized for heating the car or part of the car.

In the drawings two modifications of the invention are shown by way of example.

Fig. 1 illustrates a transverse section through one modification of the invention in which the cooling surface is inserted in the path of the vapours emanating from the condensate and is connected with the discharge room and with the room containing the thermostatic member.

Fig. 2 shows another modification, wherein the discharge room and the thermostatic element are arranged adjacent to each other and are intercommunicating, while the cooling surface is also connected to both rooms.

In Fig. 1 *a* denotes the main supply pipe of the heating installations to be drained. *g* is a steam separator which may or may not be inserted into the main supply pipe. The water is drained by means of the valve *b* which controls the passage through which the water escapes from the lower part of the steam supply pipe into a discharge room or chamber *h* directly in communication with the atmosphere. A cooling surface *d* which may be placed in a room to be heated and then acts as a radiator for said room opens into said discharge room *h* and according to Fig. 1 forms a continuation of said room and leads to the room where the thermostatic element *e* is arranged, which controls the drain valve *b*. An exit opening for the condensate *c* may be arranged either ahead of said surface *d* or behind it, or at both places an exit opening may be provided. It is however to be noted that the exit opening *c* may also be arranged at any place between the two places indicated in Fig. 1. A regulating screw *f* is provided, by means of which the thermostat may be adjusted.

In the modification shown in Fig. 2 the discharge room *h* is situated adjacent to the room containing the thermostat *e* and an annular opening *i* may or may not be arranged, by means of which the two rooms are allowed to communicate. The heating surface *d'* is also communicating with both rooms. The exit opening *c* may be arranged as shown in Fig. 2 in the discharge room or in the room containing the thermostat *e*.

In this arrangement the condensate may therefore leave the apparatus either at *c* as shown or through the annular opening *i* and an opening (not shown) provided for in the chamber of the thermostat *e* without flowing over the heating surface *d'*.

If necessary however the partition between the discharge room and the thermostat chamber may be without any opening and the condensate then will flow through the room provided with the heating surface and leave the apparatus at an exit opening below the thermostat.

In some cases it is also of advantage to cut off the communication between the chamber provided with the heating surface *d'* and the thermostat chamber and by providing a special exit opening in *d* leading into the atmosphere.

The operation of the arrangement is as follows: The water which has formed in the steam lead *a* escapes under the action of the steam pressure through the valve *b* and flows through the opening *c* into free space. After leaving the valve the hot water, in consequence of the reduction of pressure, is vaporized and the more readily the higher the pressure and consequently the higher the temperature in the steam lead. The vapours formed in this way pass over the opening *c* and condense on the surface *d* on their way to the thermostat *e*, so that the temperature of the latter is not affected either by water or by the steam formed from the water. The thermostatic element which controls the valve *b* consequently holds the valve open until besides water also dry steam escapes through the valve, in order, finally, to raise the thermostat to the temperature to which the apparatus has been set. If too much dry steam comes from the drain valve the thermostat is hotter, becomes longer, and more or less closes the valve. The cooling surface inserted between the valve and the thermostat is sufficient to condense the steam formed from the water and the thermostat only closes when besides this steam an excess of dry steam escapes through the valve.

From the above it will be seen that the object of the invention is to allow complete drainage of the supply pipe arrangements having an automatic thermostatically controlled valve and at the same time utilization of the heat contained in the condensate for heating purposes.

The complete drainage is obtained by removing the influence of the heat of the vapours developed by the condensate from the thermostat, thus protecting the arrangement against premature closing of the drain valve, while on the other hand it remains under the influence of any live steam which may escape after completion of the drainage of the main pipe.

On the other hand the heating capacity

of the vapours and if necessary of the condensate itself is utilized by passing them through the heating surface protecting the thermostat, which may be exposed to the air of a room to be heated, so that the heat contained in the drainage products is not wasted but may furnish an additional component for the heating service.

What we claim is:

1. In a heating installation for railway cars an arrangement for draining the main supply pipe of the installation while working, comprising a drain valve, a thermostatic element controlling the drain valve and a surface capable of radiating heat arranged behind the draining valve and ahead of the thermostatic element so that the vapors first pass in contacting relation with the heat radiating surface and are condensed so that no vapors can reach the thermostatic element.

2. In a heating installation for railway cars an arrangement for draining the main supply pipe comprising a separator, a drain valve in communication with the lower part of said separator, a thermostatic element controlling said drain valve, a room provided with a surface capable of radiating heat arranged behind the drain valve and ahead of the thermostatic element so that the vapors first pass in contacting relation with the heat radiating surface and are condensed so that no vapors can reach the thermostatic element.

3. In a heating installation for railway cars an arrangement for draining the main supply pipe during operation comprising a drain valve communicating with the main pipe, a thermostatic element controlling the valve, a room enclosing the element, another room having a surface capable of radiating heat arranged in communication with the drain valve and with the room containing the thermostatic element so that the vapors first pass in contacting relation with the heat radiating surface and are condensed so that no vapors can reach the thermostatic element.

4. In a heating installation for railway cars an arrangement for draining the main supply pipe of the installation during the operation of the installation comprising a drain valve for the condensate and a thermostatic element controlling the valve, means for condensing the vapors emanating from said condensate without influencing the thermostatic element.

5. In a heating installation for railway cars an arrangement for draining the main supply pipe of the installation comprising a drain valve communicating with said supply pipe, a thermostatic element controlling said drain valve, a discharge room into which said drain valve discharges, a heat radiating surface for condensing the vapors emanating from the condensate in the discharge room

before the vapors act on the thermostatic element, and an outlet for the water of condensation arranged to allow escape of the water of condensation without affecting said thermostatic element.

5 6. In a heating installation for railway cars an arrangement for draining the main supply pipe of the installation comprising a drain valve communicating with said supply
10 pipe, a thermostatic element controlling said drain valve, a heat radiating surface capable of condensing the vapors emanating from the condensate entering through the drain valve, an outlet for the water of condensa-
15 tion arranged to allow escape of the water of condensation without affecting the thermostatic element, said outlet being arranged in the path of the vapors ahead of the radiating surface.

7. In a heating installation for railway cars an arrangement for draining the main supply pipe of the installation comprising a drain valve communicating with said supply pipe, a thermostatic element controlling the drain valve, a discharge room into which
25 the drain valve discharges the condensate, a room containing the thermostatic element, a communication between the two last named rooms, a radiating surface in communication
30 with both rooms and an outlet in one of said rooms allowing escape of the condensation water without passage through the heating surface.
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In testimony whereof we have hereunto set our hands.

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