E. H. GOLD.

LOW PRESSURE HEATING.

APPLICATION FILED JULY 10, 1905.

922,131.

Patented May 18, 1909.

2 SHEETS—SHEET 1.

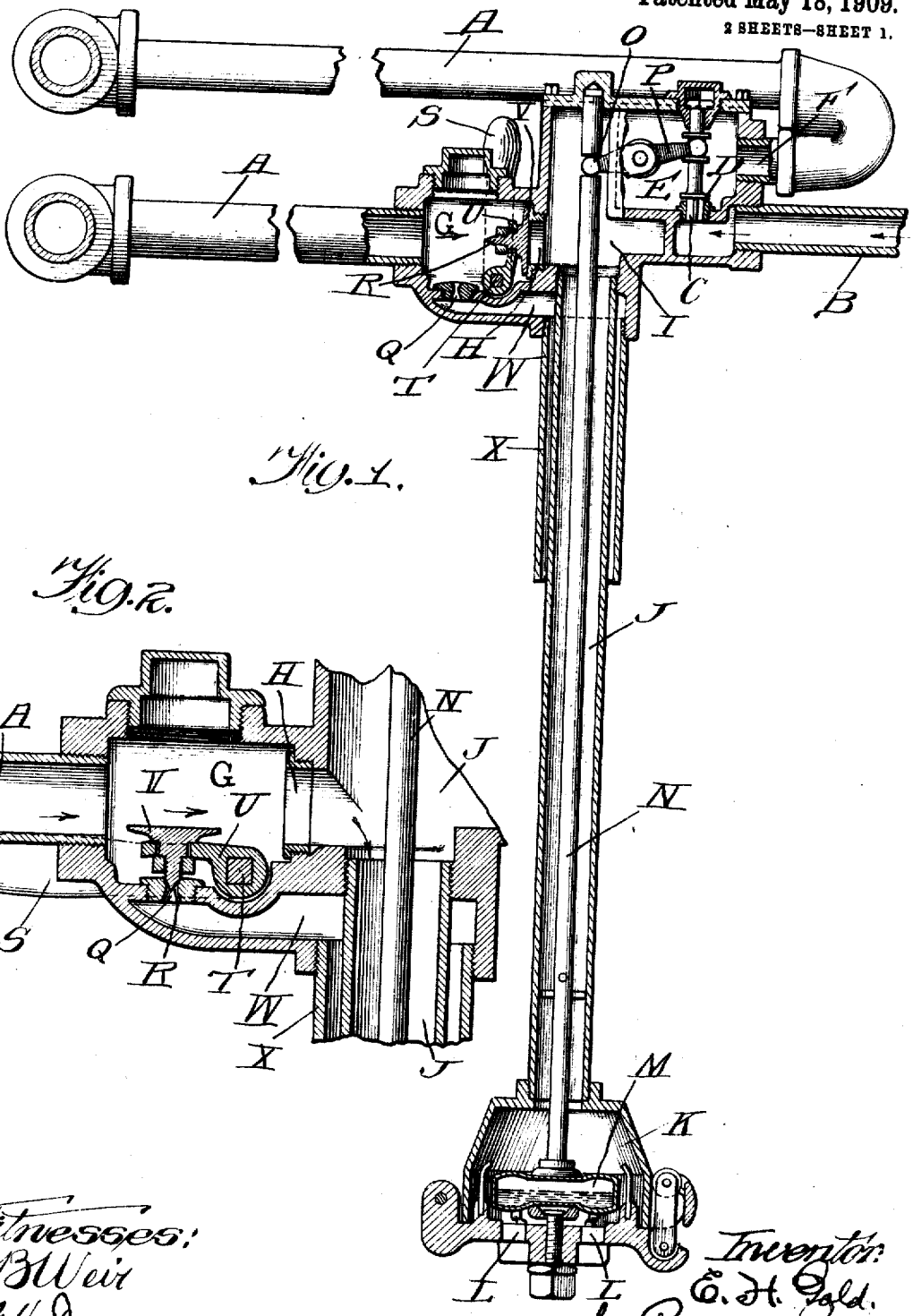


Fig. 1.

Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

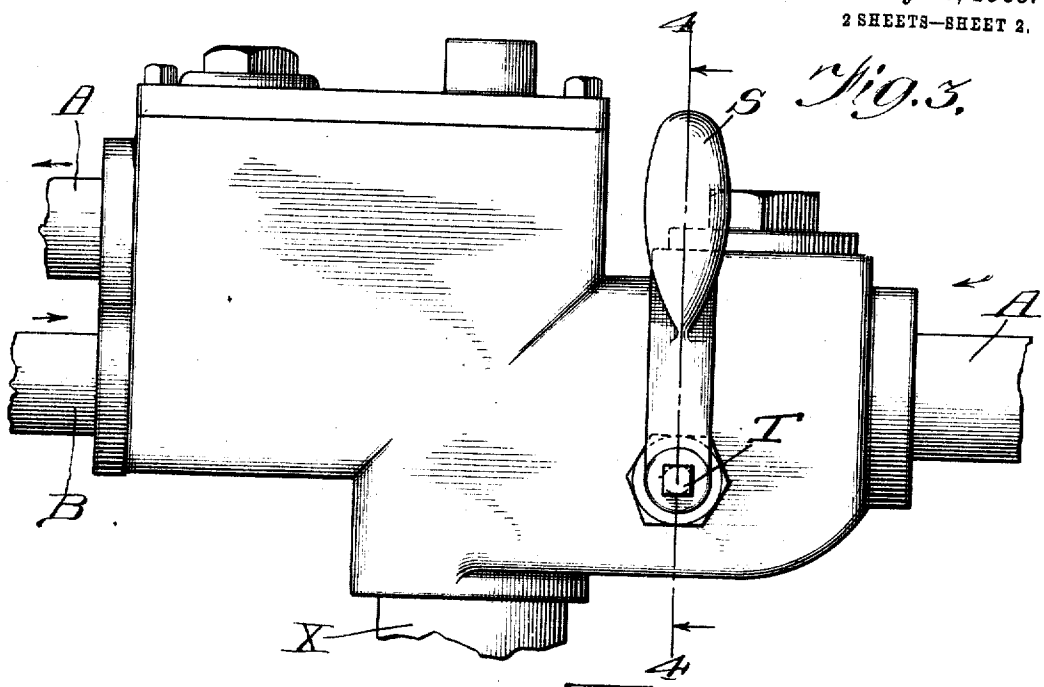
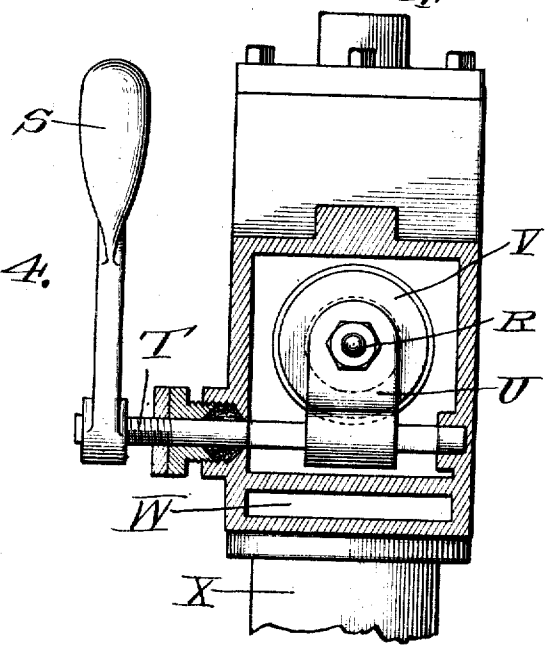


Fig. 4.



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UNITED STATES PATENT OFFICE.

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LOW-PRESSURE HEATING.

No. 922,131. Specification of Letters Patent. Patented May 18, 1909.

Application filed July 10, 1905. Serial No. 268,908.

To all whom it may concern:

Be it known that I, EGBERT H. GOLD, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Low-Pressure Heating, of which the following is a specification.

My invention relates, primarily, to heating systems, in which a radiating system is supplied with a heating medium at relatively high pressure, the heating medium in the radiating system being, however, maintained normally at a much lower pressure than that of the supply, and preferably at a substantially uniform pressure.

The object of my present invention is to provide a simple device, whereby cold air and water of condensation may be readily forced out of the radiating pipes and the radiating pipes may be filled with a heating medium at substantially the supply pressure and maintained at such pressure until the room, car, or other apartment to be heated has been brought to a sufficiently high temperature, whereupon the automatic controlling system may be brought into operation so as to thereafter maintain the desired temperature in the apartment to be heated by means of a heating medium at relatively low pressure within the radiating pipes.

More specifically my present invention is intended for use in connection with low pressure heating systems on railway cars, whereby, when steam is first turned into the car, a cold car may, by a very simple mechanism, be quickly heated by means of high pressure steam, the low pressure controlling device being temporarily out of operation, whereupon the low pressure device may be put into operation and the desired or attained temperature may thereafter be maintained by the operation of the low pressure device. It will be seen therefore, that my present invention is to be distinguished from those interchangeable systems such as illustrated in my co-pending applications No. 243,361 and No. 245,311, which are so constructed that the system may, at will, be converted into a low pressure or a high pressure system, the apparatus being so constructed that the system will normally continue to operate, either as a high pressure or a low pressure system as desired, whereas my present invention relates to a simpler mechanism for the purpose of producing temporarily a high pressure system, which shall operate as above indicated, and while it might be possible to proportion and adapt my present invention so as to constitute what might be an interchangeable system, operating continuously at high pressure or at low pressure, as desired, such is not the primary purpose of my invention.

These and such other objects as may hereafter appear are attained by my invention, a convenient embodiment of which is shown in the accompanying drawings, in which—

Figure 1 is a sectional view of a portion of a typical low-pressure heating system. Fig. 2 is an enlarged sectional view of the shut-off valve mechanism. Fig. 3 is a rear elevation of Fig. 1; and Fig. 4 is a view, partly in section, on the line 4—4 of Fig. 3, looking in the direction indicated by the arrows.

Like letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A indicates the pipes of a radiating system, to which a heating medium, such as steam, is supplied through a supply pipe B leading to an inlet port C, which is controlled by the valve D mounted in an inlet chamber E from which the heating medium flows through the port F, into the radiating pipes, returning normally through the chamber G, the port H, the outlet chamber I, the discharge pipe J, diaphragm chamber K and ports L to the atmosphere, or to any suitable zone of lower temperature.

The valve D is adapted to be operated by means of a diaphragm M, stem N, and levers O and P, as shown in my Patent No. 771,628, such operating device constituting a typical controlling device for a low-pressure system, whereby a low and comparatively uniform pressure and temperature is maintained in the radiating pipes, which are supplied from a source of high pressure.

Normally, when the system is in operation as a low-pressure system, the blow-off Q is closed by the valve R and the port H is open as shown in Fig. 1, so that the steam or other heating medium flows freely through the port H, into the chamber I, thence through the pipe J and diaphragm chamber K. Whenever the pipe J is filled with steam or vapor at a sufficiently high temperature, the diaphragm M will be expanded, thereby lift-

ing the stem N, and operating the levers O and P to close or throttle the valve D. When, however, steam is first turned on for the purpose of heating a cold car, or other apartment, it may be that the heating medium at the low temperature which is sufficient to expand the diaphragm M will not initially heat a cold car, or room, with sufficient rapidity. Therefore, the handle S is raised to the position shown in Fig. 1, thereby operating the spindle T, upon which is mounted the valve-arm U, carrying the valves R and V, so that the valve V closes the port H, thereby disconnecting the diaphragm of the automatic control device from the radiating system and permitting the diaphragm to remain cold and contracted and the valve D to remain wide open, with the result that the heating medium at full train-pipe pressure, or other high pressure, will fill the radiating pipes, forcing the cold air and water of condensation out through the blow-off Q, whence it will escape through the chamber W and pipe X.

Inasmuch as it does not greatly matter whether the valves R and V are mounted together, as shown, or separately, I have in the claims referred to this mechanism as means for normally closing the blow-off port and for temporarily cutting the automatic controlling means out of operation, intending thereby to cover any device performing the functions of valves R and V, whether mounted to operate in unison or separately.

I do not here claim broadly an apparatus whereby steam may be circulated at atmospheric pressure or at a substantially higher pressure, nor broadly an apparatus whereby this result may be attained by opening or closing communication between the radiating system and the automatic inlet controlling apparatus, but reserve the right to claim such subject-matter in my copending applications No. 245,311 and No. 314,698.

As soon as the pipes are filled with steam, or other suitable heating medium, the inflow at high pressure will be much more rapid than the escape through the constricted blow-off Q,—which it will be understood must be of smaller minimum diameter than the minimum diameter of the inlet port C,—and the pipes will continue to fill until the pressure within the radiating system will be substantially the same as that within the feed-pipe B and will be maintained at such high pressure until the car, or other apartment, has been brought to a sufficiently high temperature, whereupon, the handle S being moved to the position shown in Fig. 2, the port H will be opened and the heating medium will be forced into the outlet chamber I and thence until it comes in contact with the diaphragm M, whereupon the automatic, low-pressure controlling device will come into operation, the inflow of the heating medium to the radiating pipes will be throttled, and a wide and free discharge being opened by the opening of the port H, the pressure and temperature within the radiating pipes will quickly drop to the desired low point.

From the foregoing, it will be readily understood that inasmuch as, when the automatic controlling system is in operation, the radiating system will ordinarily be in full communication with the atmosphere or other zone of low pressure it will be entirely practical, under such conditions, to leave the blow-off Q open at all times, but, as shown in the drawings, the valve R being pointed, and the blow-off Q being made to flare outwardly from its narrowest point, which is reached by the pointed or conical valve R, the valve R will serve, whenever it is closed, to automatically force out of the blow-off any dirt, bits of hose, or other obstruction which is very likely to otherwise accumulate and close such a restricted opening as the blow-off Q. Furthermore, if, for any reason, the discharge from the diaphragm chamber K shall be to a zone of lower pressure than that to which the blow-off pipe discharges, it, of course, will be desirable to close the blow-off Q whenever the port H is opened.

I do not claim broadly in this application the combinations with the other elements of the disclosed system of any outlet discharge device constructed or controlled so as to permit the accumulation of pressure within the system, while at the same time giving a vent for water of condensation; for these combinations are covered broadly by the claims of my applications Serial Nos. 314,698 and 245,311.

I claim:

1. The combination with a radiating system having a blow-off port, of means for supplying a heating medium thereto at a relatively high pressure, means for automatically maintaining the heating medium within said radiating system at a relatively low pressure, means for temporarily cutting said automatic controlling means out of operative contact with the radiating system, and for at the same time opening the blow-off port the said blow-off port being of such constricted area with relation to the supply port that the pressure within said radiating system will rise, although said blow-off port remains open.

2. The combination with a radiating system provided with an inlet port and provided with a blow-off port the effective opening through which latter is much smaller than that of said inlet port, of means for supplying a heating medium to said radiating system through said inlet port at a relatively high pressure, means for automatically maintaining the heating medium in said radiating system at a relatively low pressure, means for normally closing said blow-off port, and for temporarily cutting said automatic controlling means out of

operation, and for opening said blow-off port whenever said automatic device is so cut out of operation.

3. The combination with a radiating system provided with an inlet port and with a blow-off port having a minimum diameter of much less area than that of the inlet port, means for supplying a heating medium to said system through said inlet port at a relatively high pressure, means in communication with said radiating system for automatically maintaining the heating medium therein at a relatively low pressure, a valve-mechanism for normally closing said blow-off port so constructed and arranged that said valve mechanism may be operated to close communication between said radiating system and said controlling device and at the same time to open said blow-off port, and vice versa.

4. The combination with a radiating system provided with a blow-off, of means for supplying a heating medium thereto at a relatively high pressure, means for automatically maintaining the heating medium in said system at a relatively low pressure, means for cutting said automatic controlling means out of operative connection with said radiating system while leaving a free vent through said blow-off, and for automatically clearing said blow-off of obstructions at the same time that said automatic controlling means is cut into operative connection with said radiating system.

5. The combination with a radiating system provided with an inlet port and two outlet ports, of means for supplying a heating medium to said radiating system through said inlet port at a relatively high pressure, means for automatically maintaining the heating medium in said radiating system at a relatively low pressure, said controlling means being located in proximity to one of said outlets and the other of said outlets being of such constricted area with relation to the inlet port that the pressure within said system will rise although said second-mentioned outlet remains open, a valve to close said last-named outlet, and a valve to shut off communication between said system and the automatic controlling means and the first-mentioned outlet.

6. The combination with a radiating system, of means for supplying a heating medium thereto at a relatively high pressure, means comprising an inlet controlling device for automatically maintaining the heating medium within said radiating system at a relatively low pressure, a discharge device the orifice of which is small relative to the inlet to said system, so as to restrict the discharge of the heating medium relative to its inflow, and means for temporarily cutting said inlet controlling device out of operative contact with the radiating system and for at the same time opening communication between the system and said discharge device, so that the pressure within said radiating system will rise.

7. The combination with a radiating system provided with an inlet port and provided with a discharge device having an orifice small relative to the inlet port, so as to restrict the discharge of the heating medium relative to its inflow, of means for supplying a heating medium to said radiating system through said inlet port at a relatively high pressure, means for automatically maintaining the heating medium in said system at a relatively low pressure, means for shutting off said discharge device, for temporarily cutting said automatic controlling means out of operation, and for putting the system in communication with said discharge device whenever the automatic device is so cut out of operation.

8. The combination with a radiating system provided with an inlet port and with a discharge device having an orifice small relative to the inlet port, so as to restrict the discharge of heating medium relative to its inflow, means for supplying a heating medium to said system through said inlet port at a relatively high pressure, means in communication with said radiating system for automatically maintaining the heating medium therein at a relatively low pressure, and a valve mechanism for shutting off said discharge device so constructed and arranged that said valve mechanism may be operated to close communication between said radiating system and said controlling device and at the same time to put the system in communication with the discharge device, and vice versa.

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