

W. J. HATCH.
 TRAIN HEATING SYSTEM.
 APPLICATION FILED MAR. 20, 1909.

1,003,603.

Patented Sept. 19, 1911.

2 SHEETS-SHEET 1.

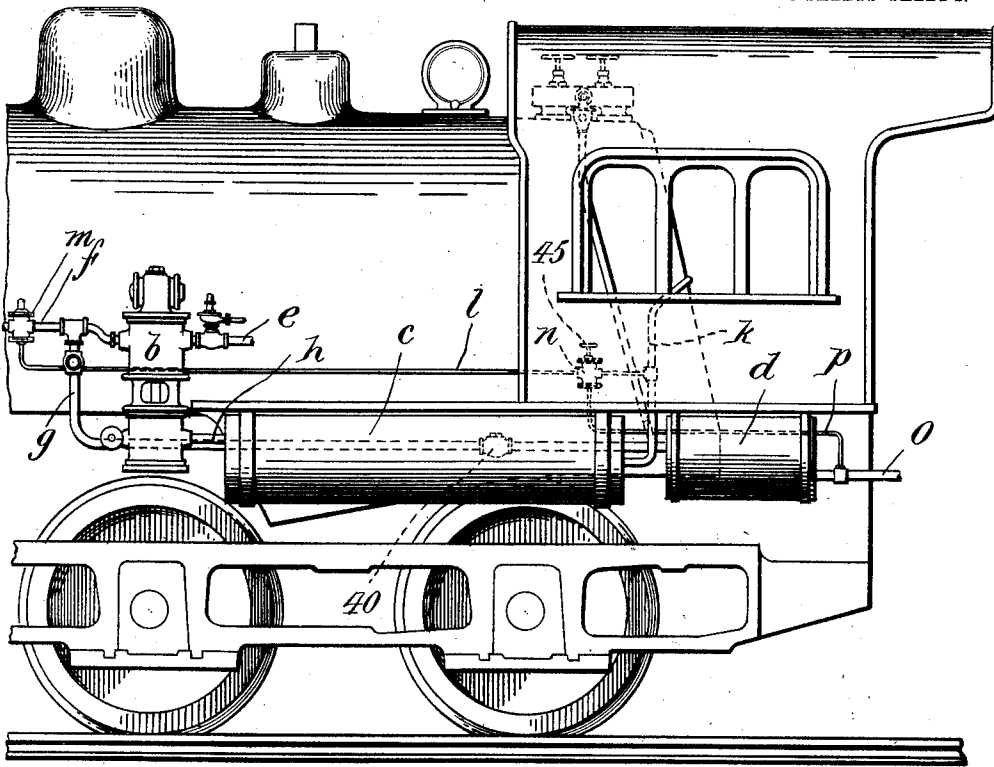
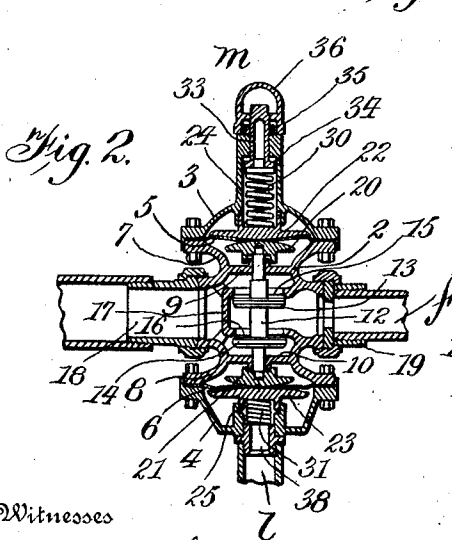
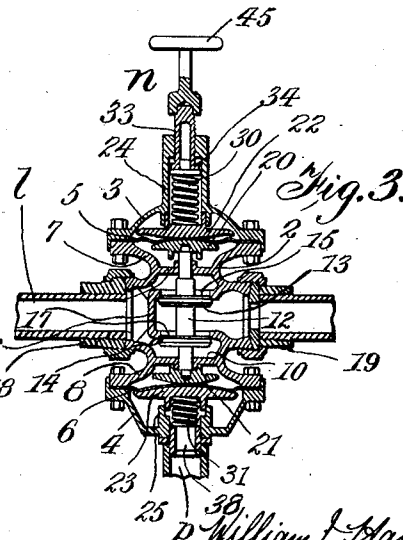


Fig. 1.



Witnesses

Albert J. Batchelor
Wm. J. Hatch



William J. Hatch
 Inventor
 By Attorney
John N. Wau

W. J. HATCH.
 TRAIN HEATING SYSTEM.
 APPLICATION FILED MAR. 20, 1909.

1,003,603.

Patented Sept. 19, 1911.

2 SHEETS—SHEET 2.

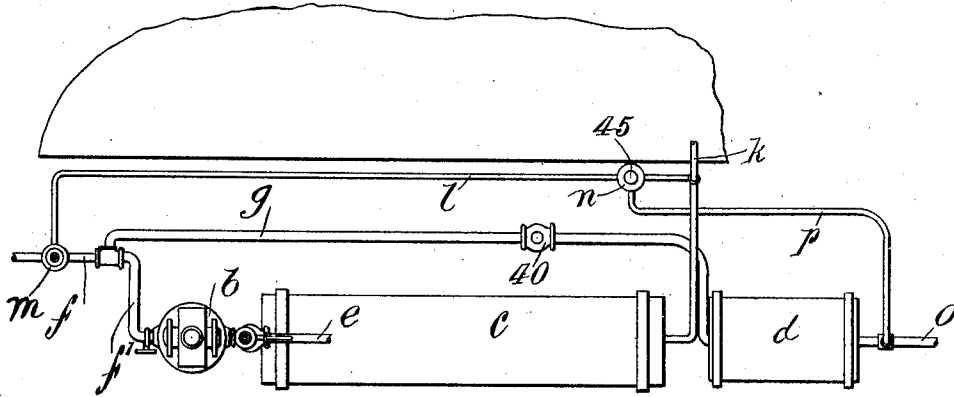


Fig. 4.

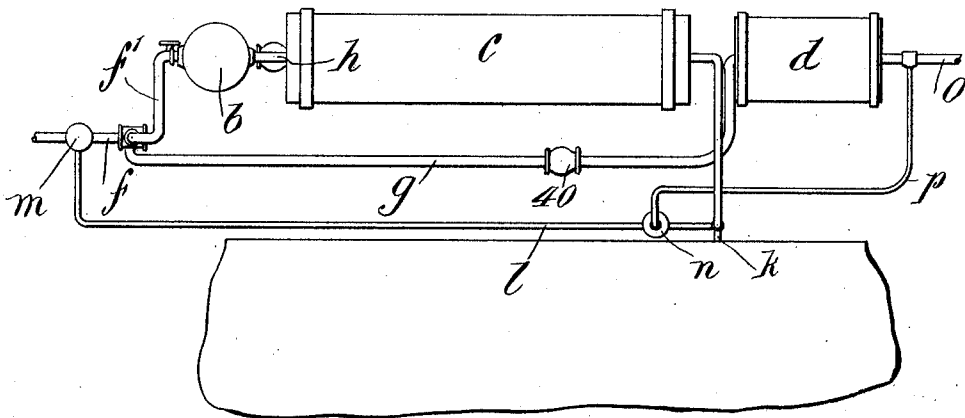


Fig. 5.

Witnesses

Albert B. B. B.
Ed. J. B.

William J. Hatch
 Inventor

By Attorney

Edw. J. B.

UNITED STATES PATENT OFFICE.

WILLIAM JOHN HATCH, OF MONTREAL, QUEBEC, CANADA.

TRAIN-HEATING SYSTEM.

1,003,603.

Specification of Letters Patent. Patented Sept. 19, 1911.

Application filed March 20, 1909. Serial No. 484,785.

To all whom it may concern:

Be it known that I, WILLIAM JOHN HATCH, of the city of Montreal, Province of Quebec, Canada, have invented certain new and useful Improvements in Train-Heating Systems; and I do hereby declare that the following is a full, clear, and exact description of the same.

My invention relates particularly to train heating systems of the type utilizing the exhaust steam from the air pump, and it may be said briefly to consist of the particular construction and combination of parts hereinafter described and pointed out in the claims.

For full comprehension, however of my invention reference must be had to the accompanying drawings forming a part of this specification and wherein:

Figure 1 is a side elevation of a portion of a locomotive with my improved system applied thereto; Figs. 2 and 3 are longitudinal sectional views of the valves used. Fig. 4 is a top plan of my improved system; and Fig. 5 is a bottom plan thereof.

The main parts of my improved system excepting the valves are well known and as is usual with the actuating parts of train heating systems are located on the locomotive.

The air compressor is indicated at *b*, the main air reservoir at *c*, and the steam reservoir at *d*.

e is a pipe leading from the steam supply to the steam end of the compressor, and *f* is the exhaust steam pipe leading to the atmosphere and having a branch *g* connected to the steam reservoir *d*, while *h* is the main air pipe leading from the compressor to the air reservoir *c*, and *k* a pipe connecting the air reservoir to the air brake system and having a branch pipe *l* of diminutive bore connected to a valve *m* controlling the exhaust steam pipe *f*, such branch *l* containing a valve *n*. The connection between this branch pipe *l* and valve *n* is by a joint adapted to present a diminutive leakage port, provided by slightly mutilating the joint, or in any other preferred manner.

The train pipe *o* of the heating system leads as usual from the steam reservoir *d*, and a branch *p* of diminutive bore leads therefrom to the valve *n*. The valve *m* is adapted to be closed by pressure over a predetermined degree in the pipe *k*, and consequently in the main air cylinder, and the

valve *n* is adapted to be closed by pressure over a predetermined degree in the train pipe *o*, and consequently in the heating system. These valves are with one exception precisely the same in construction, each consisting of a main body casting 2, a pair of caps 3, 4 fastening a pair of diaphragms 5 and 6 to the rims of a pair of flared side portions 7 and 8, inner walls 9 and 10 of which present bearings for the opposite ends of an axially movable valve stem 12 carrying valvular disks 13, 14 disposed to normally lie in open relation with a pair of valve seats 15 and 16 in a portion 17 of horizontal U-form in cross-section and cast in the interior of the casing. The opposite ends of the casing carry nipples 18 and 19 by which connection is made between valve *m* and the exhaust steam pipe *f* and valve *n* and the branch air pipe *l*. The ends of the valve stem project into the chambers formed by the lateral flared side portions, the diaphragms and to the inner walls, and such ends carry heads 20 and 21 adapted to bear upon the diaphragms, while a second pair of heads 22 and 23 guided in sleeves 24, 25, cast on the caps 3 and 4 are caused to bear yieldingly upon the outer sides of the diaphragms by springs 30 and 31 housed and guided in the sleeves 24 and 25. The top of the sleeve 24 is diminished and tapped and has a screw-threaded spindle 33 with enlarged bearing end 34 screwed outwardly therethrough and having for its function to adjust the tension of the spring 30, and being set in adjusted position by a nut 35 while a cap 36 screwed upon the protruding end of such spindle protects the nut. The lower end of sleeve 25 has screwed therein a nipple 38 by which one of the valves is connected to the branch air pipe *l* and the other valve to the branch steam pipe *p*. The pressure of spring 30 is sufficient to overcome spring 31. The difference between the valves is that in valve *n* the nut 35 and cap 36 are dispensed with and a handle 45 is mounted upon the protruding end of the spindle 33.

In the preferred embodiment of my invention the spindle 33 of valve *m* is so adjusted that the spring 30 will overcome any desired predetermined pressure in the main air reservoir *c* of the brake system and be overcome by any pressure in excess of that predetermined; the effect being that upon the air pressure becoming depleted this valve

m will open thus opening a practically unobstructed passage for the exhaust steam to the atmosphere and therefore permitting the compressor to work under most favorable exhaust conditions. When the air pressure again exceeds the predetermined amount, the spring 30 yields and such high pressure air assisted by the spring 31 closes the valve *m* and turns the exhaust steam into pipe *g* and the train heating system, overcoming the check valve 40 on its way. The function of this check valve is to prevent the escape of effective steam from the heating system while the exhaust is turned to the atmosphere. In valve *n* the spindle 33, and consequently spring 30, is adjusted by handle 45 in accordance with the prevailing climatic conditions to cause the valve to close when the pressure in the train heating system exceeds requirements.

The operation of my improved system is as follows:—When the locomotive is being fired up or when the air pressure has been depleted the valve *m* will remain open and the compressor be permitted to work under the best exhaust conditions. As soon as the pressure in the air brake system exceeds the predetermined point to which the valve *m* has been adjusted, this valve will be closed and the steam turned into the train heating system, and just as soon as the steam pressure in the heating system reaches the maximum to which valve *n* has been set this valve will be closed with the result that the air acting upon valve *m* will be cut off and the steam turned from the heating system to the atmosphere. This latter is effected when the air contained in the pipe *l* between the valves *m* and *n* is sufficiently depleted through the leakage joint to reduce the pressure in such pipe *l* below that of the spring 30 in valve *m*. In this manner the air brake system is automatically protected, and the steam heating system automatically regulated.

What I claim is as follows:—

1. The combination with a steam operated air brake system including an air pump, and a train heating system containing a reservoir, of an exhaust pipe conducting the exhaust steam from the air pump to an atmosphere of lower pressure than that within the said exhaust pipe and having a branch communicating with the reservoir; a check valve in the said branch; a valve located in the first mentioned pipe and constructed to normally yieldingly maintain the said pipe open; air operated means operatively connected to the said valve and adapted to overcome the said valve and close it when the air pressure exceeds a predetermined degree; an air pipe leading from such means to the air brake system; a valve located in the said last mentioned air pipe; steam operated means operatively connected to the

last mentioned valve; and a steam pipe leading to the last mentioned means and supplied from the reservoir.

2. The combination with a steam operated air brake system including an air pump, and a train heating system containing a reservoir, of an exhaust pipe conducting the exhaust steam from the air pump to an atmosphere of lower pressure than that within the said exhaust pipe and having a branch communicating with the reservoir; a check valve in the said branch; a valve located in the first mentioned pipe and constructed to normally yieldingly maintain the said pipe open; air operated means operatively connected to the said valve and adapted to overcome the said valve and close it when the air pressure exceeds a predetermined degree; an air pipe leading from such means to the air brake system; a manually adjusted valve located in the said last mentioned air pipe; steam operated means operatively connected to the last mentioned valve; and a steam pipe leading to the last mentioned means and supplied from the reservoir.

3. The combination of an air brake system including a steam-operated air pump, a train heating system, the exhaust-steam mechanism of said air pump discharging into said train heating system or into a zone of low pressure, and automatic means, controlled by variations of pressure within the air brake system, for automatically opening and closing that part of said exhaust-steam mechanism which discharges into said zone of low pressure, said automatic means effecting free communication between said exhaust-steam mechanism and said zone of low pressure when the pressure within the air brake system falls below a predetermined degree.

4. The combination of an air brake system including a steam-operated air pump, a train heating system, the exhaust steam mechanism of said air pump discharging into said train heating system or into a zone of low pressure, automatic means, controlled by variations of pressure within the air brake system, for automatically opening and closing that part of said exhaust-steam mechanism which discharges into said zone of low pressure, said automatic means effecting free communication between said exhaust steam mechanism and said zone of low pressure when the pressure within the air brake system falls below a predetermined degree and automatic means for preventing the back flow of steam from said train heating system.

5. The combination with an air brake system including a steam operated air pump, a train heating system, the exhaust-steam mechanism of said air pump discharging into said train heating system or into a zone of low pressure, and automatic means in communication with and controlled by vari-

ations of pressure within the air brake system for automatically opening and closing that part of said exhaust-steam mechanism which discharges into said zone of low pressure, said automatic means effecting free communication between said exhaust-steam mechanism and said zone of low pressure when the pressure within the air brake system falls below a predetermined degree, and means controlled by variations of pressure

within the heating system for opening and closing the communication between the said automatic means and the air brake system.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLIAM JOHN HATCH.

Witnesses:

WILLIAM P. McFEAT,
FRED J. SEARS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
