J. R. RENIFF.

DRAINAGE VALVE.

APPLICATION FILED NOV. 1, 1913.

1,127,282.

Patented Feb. 2, 1915.

2 SHEETS—SHEET 1.

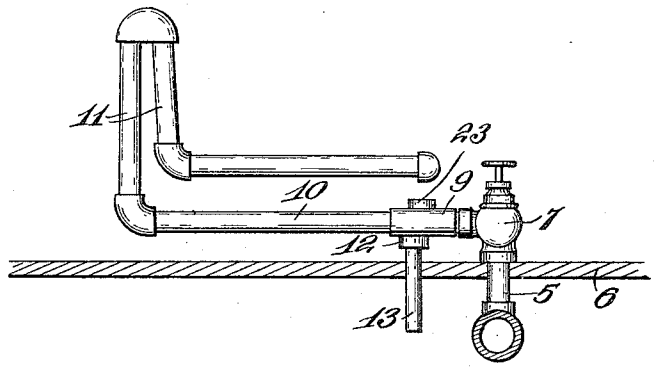


Fig. 1.

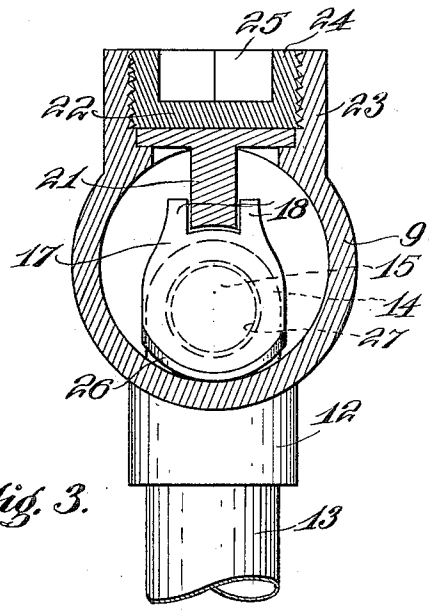


Fig. 3.

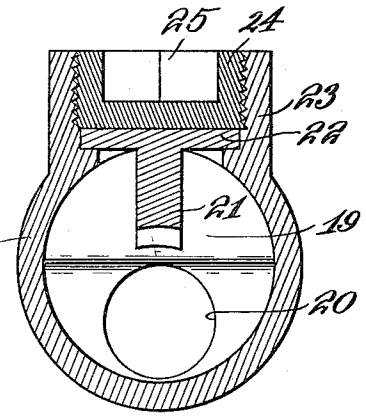


Fig. 4.

Inventor

James R. Reniff.

Witnesses

H. L. Batchelor

S. J. Lehrer

By Wilson Thomas & Co.

Attorneys

J. R. RENIFF.

DRAINAGE VALVE.

APPLICATION FILED NOV. 1, 1913.

1,127,282.

Patented Feb. 2, 1915.

2 SHEETS—SHEET 2.

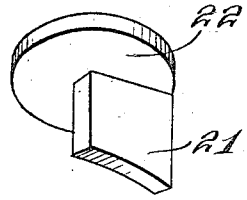


Fig. 5.

Fig. 2.

Inventor

James R. Reniff.

Witnesses

H. J. Batchelor

S. J. Lehrer

By Miller & Thomson Co.

Attorneys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES R. RENIFF, OF CHICAGO, ILLINOIS.

DRAINAGE-VALVE.

1,127,282. Specification of Letters Patent. Patented Feb. 2, 1915.

Application filed November 1, 1913. Serial No. 798,700.

To all whom it may concern:

Be it known that I, JAMES R. RENIFF, 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 Drainage-Valves, of which the following is a specification.

The drainage valve which is the subject matter of the present application for patent is designed more particularly for use in connection with the steam heating-apparatus of railway-cars.

In all railway-car heating-apparatus it is of the utmost importance to dispose of the waters of condensation in the radiator pipes after steam has been shut off. Steam is admitted to, and cut off from, the radiator pipes by means of what is commonly called an angle-valve. When this valve is open, steam passes to the radiator pipes, and thence through a trap, and from the latter to the atmosphere. However, if there is not enough steam supply to force its way through the radiator pipes, the steam condenses and fills the radiator pipes with water, which is liable to freeze and thus result in bursting of the pipes. Angle-valves very frequently leak, and thus admit a small quantity of steam into the radiator pipes from which it cannot escape, resulting in the pipes filling up with water, and to prevent this the present invention has been designed, the same comprising an automatic drainage-valve which is located between the angle-valve and the radiator. Thus, if the angle-valve leaks, the steam and condensation are allowed to escape to the atmosphere without entering the radiator pipes.

The invention also has for its object to provide a simple and efficient drainage-valve, the same comprising a novel and improved combination and arrangement of parts to be hereinafter described and claimed.

In order that the invention may be better understood, reference is had to the accompanying drawings, in which—

Figure 1 is an elevation showing the application of the invention; Fig. 2 is a central longitudinal section of the drainage-valve; Fig. 3 is a cross section on the line 3—3 of Fig. 2, looking in the direction of the arrow; Fig. 4 is a section on the same line looking in the opposite direction, and Fig. 5 is a detail in perspective showing the valve guide.

Referring specifically to the drawings, 5 denotes a branch pipe leading from the steam main and extending through the floor 6 of the car. Inside the car, close to the floor, an ordinary angle-valve 7 is connected to the pipe 5, the outlet end of which valve is connected by a short pipe 8 to the steam inlet end of the drainage-valve casing 9, the steam outlet end of said valve casing being connected by a pipe 10 to the radiator pipes 11. The drainage-valve is thus located between the angle-valve and the radiator pipes, and steam cannot pass to the radiator pipes without passing through the drainage-valve casing. Between the steam inlet and outlet ends of the valve-casing 9, the latter has an outlet 12 for the waters of condensation, to which outlet is connected a discharge pipe 13 passing downward through the floor 6 of the car to discharge into the atmosphere.

From the outlet 12 a curved neck 14 extends into the valve-casing 9, said neck having a passage 15 which communicates at one end with the outlet, and at the opposite end with the interior of the valve-casing. The neck points toward the steam inlet end of the valve-casing and it terminates in a vertical seat 16 for a valve 17 which latter is a flat wing having at its top edge two laterally spaced ears 18.

In the valve-casing 9 between the valve 17 and the steam-inlet is a partition 19, the lower half of which slants in the direction of said valve and has a port 20. In front of this partition is a guide rib 21 depending from a disk 22 which seats in a neck 23 at the top of the valve-casing. The disk is held in place by a plug 24 screwed into the neck against the top of the disk, and having a wrench socket 25 to facilitate its application and removal. Upon removing the plug, the disk and its guide rib can be removed from the valve-casing, after which the valve 17 is also removable, without disturbing the valve casing or any of the piping. The rib 21 has its lower edge curved to correspond to the arc which the top edge of the valve 17 describes when it moves toward and from the seat 16 and the ears 18 straddle the rib, whereby the valve is guided. The rib is in front of the partition 19, and the latter serves as a stop to limit the swing of the valve to open position. The valve is free to swing back off its seat until its upper end strikes the partition. The bottom edge of

the valve is beveled to form a knife-edge 26 on which the valve swings. When the valve 17 is seated, steam passes through the port 20 into that portion of the valve-casing 9 into which the guide rib 21 depends, and then passes along opposite sides of said rib to the steam outlet.

In operation, the valve 7 being open, steam passing through the valve-casing 9 strikes the valve 17 and holds it tightly against its seat 16. The steam therefore cannot escape through the passage 15, and it passes to the radiator pipes 11, from which it escapes to the atmosphere through the usual trap, which latter has not been shown as it forms no part of the present invention. When steam is shut off by closing the valve 7, there is no pressure against the valve 17, so that it now swings back off its seat 16 until stopped by the partition 19, as shown by dotted lines in Fig. 2. The passage 15 is now opened to the interior of the valve-casing 9, and if the valve 7 should leak, steam and condensation following such a small quantity of steam will quickly escape to the atmosphere through the passage 15 and the discharge pipe 13. This opening also admits more or less air which hastens the condensation of the steam. This operation also immediately follows when the valve 7 is closed.

It is a common every-day practice to ship baggage or express cars over long distances, loaded with merchandise which must be kept cool. In such cases the angle-valve is closed, but if it leaks steam—not sufficiently to heat the car, nor enough to pass through the radiator pipes to the atmosphere—steam condenses and freezes in the radiator pipes, leaving the latter full of ice and burst, and thus necessitating new radiator pipes before the car can be serviceable again. The same may be said of passenger cars, when steam is shut off and the angle-valve leaks. This difficulty is entirely eliminated by the herein described drainage-valve, and the same is efficient and reliable in operation.

It is not the intention to make a tight joint between the valve 17 and the partition 19, but on the contrary, the roughness of the partition as it is cast, will make a joint loose enough to allow steam from a leaking angle-valve to pass and enter the outlet passage 15 without effecting the closure of the valve 17. However, the seat 16 must be steam-tight, and the face side of the valve 17 will be constructed to make a steam-tight closure when seated. If necessary a weak spring 27 may be provided to assist the unseating of the valve. It will be noted that the side of the valve which engages the seat 16 has a portion projecting from said seat and facing the steam outlet end of the valve casing 9, or that end which communicates with the radiator. Thus, the projecting portion of the valve is exposed to the condensation pressure, and the opening movement of the valve is assured.

While I have shown and described the preferred embodiment of my invention, it will be understood that many changes in the structural details may be made without departure from the spirit and scope of the invention as hereinafter claimed.

I claim:

1. The combination of a radiator, a steam supply conduit thereto, a valve controlling the steam supply, a drainage outlet in the supply pipe on the outside of the radiator, said drainage outlet having a valve seat, and a valve engageable with said seat, the back of the valve facing that end of the conduit to which the controlling valve is connected and being exposed to the steam supply pressure, said valve being closed by the pressure against the back, and that side of the valve which engages the drainage outlet seat having a portion facing that side of the conduit which leads to the radiator, and being exposed to the condensation pressure in the radiator.

2. The combination of a valve casing having a drainage outlet intermediate its inlet and its outlet, said drainage outlet having a valve seat, and a valve engageable with said seat, the back of the valve facing the inlet end of the valve casing and being exposed to the inlet pressure to hold the valve closed, and the side of the valve which engages the drainage outlet seat having a portion which faces the outlet end of the valve casing, and is exposed to the back pressure of the drainage.

3. The combination of a valve casing having a drainage outlet intermediate its inlet and its outlet, said drainage outlet having a valve seat, and a valve engageable with said seat, the back of the valve facing the inlet end of the valve casing and being exposed to the inlet pressure to hold the valve closed, and the side of the valve which engages the drainage outlet seat having a portion which faces the outlet end of the casing, and is exposed to the back pressure of the drainage, said valve opening in the direction of the inlet end of the valve casing.

4. The combination of a valve casing having a drainage outlet intermediate its inlet and its outlet, the drainage outlet having a vertical valve seat opening to the inlet side of the valve casing, a valve engageable with said seat, and a ported partition in the casing behind the valve engageable thereby at the limit of its swing away from its seat.

5. The combination of a valve casing having a drainage outlet intermediate its inlet and its outlet, the drainage outlet having a vertical valve seat opening to the inlet side of the valve casing, a valve engageable with said seat, said valve having spaced ears at

the top, a guide in the casing straddled by said ears, and means for limiting the swing of the valve away from its seat.

6. The combination of a valve casing having a drainage outlet intermediate its inlet and its outlet, the drainage outlet having a vertical valve seat opening to the inlet side of the valve casing, a valve engageable with said seat, said valve having its lower edge seating on the bottom of the valve casing, guide means for the top of the valve, and means for limiting the swing of the valve away from its seat.

In testimony whereof I affix my signature in presence of two witnesses.

JAMES R. RENIFF.

Witnesses:
MARIE LAUPER,
H. G. BATCHELOR.

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