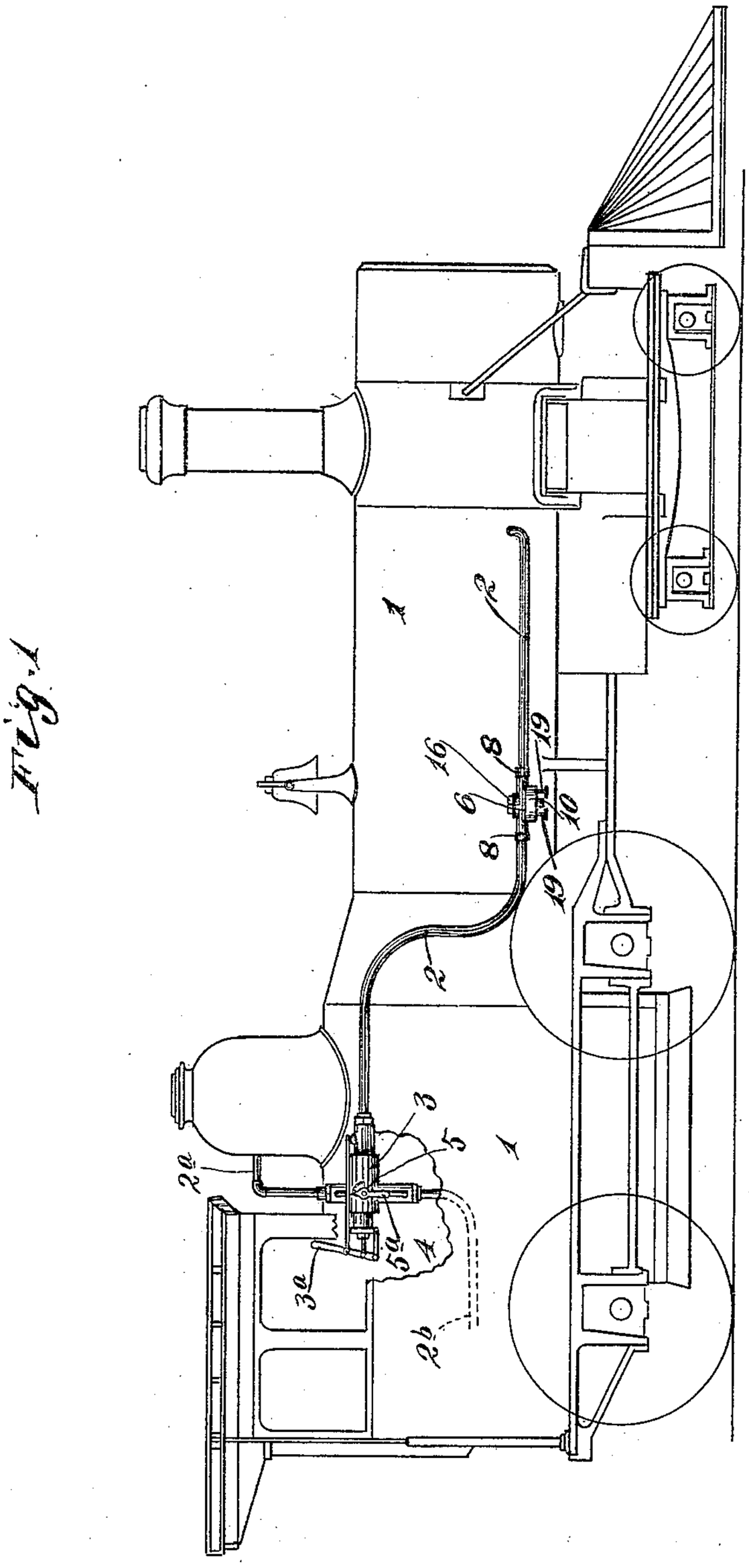
F. M. BARTON.

AUTOMATIC DRAIN AND CHECK VALVE.

APPLICATION FILED JULY 24, 1908.

932,427. Patented Aug. 31, 1909.

2 SHEETS—SHEET 1.



Witnesses.
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Fig. 3

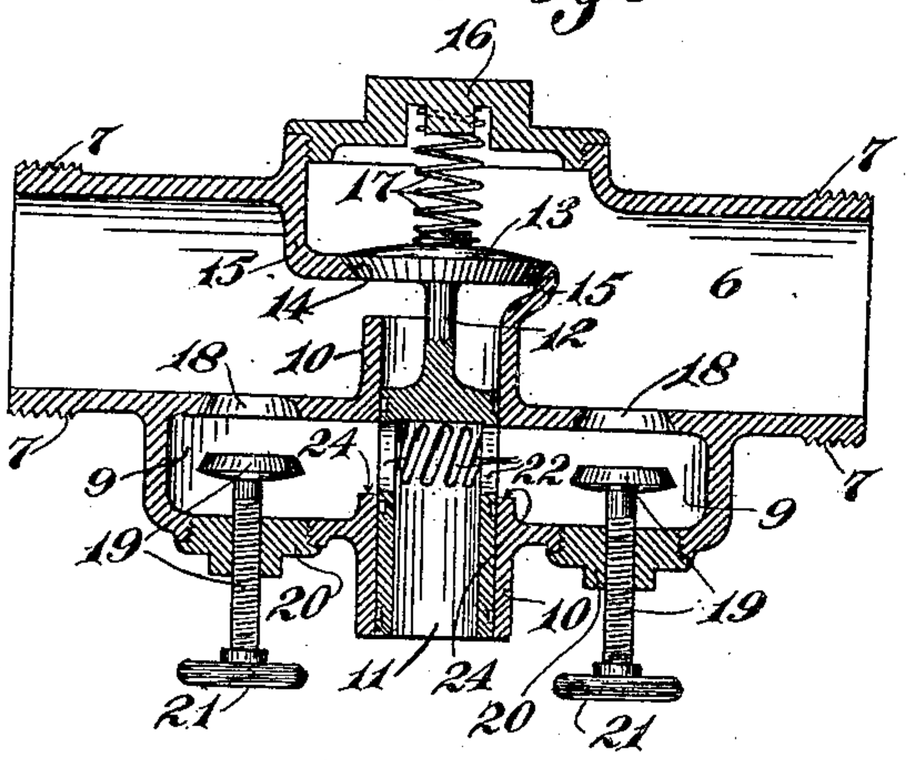


Fig. 2

Fig. 4

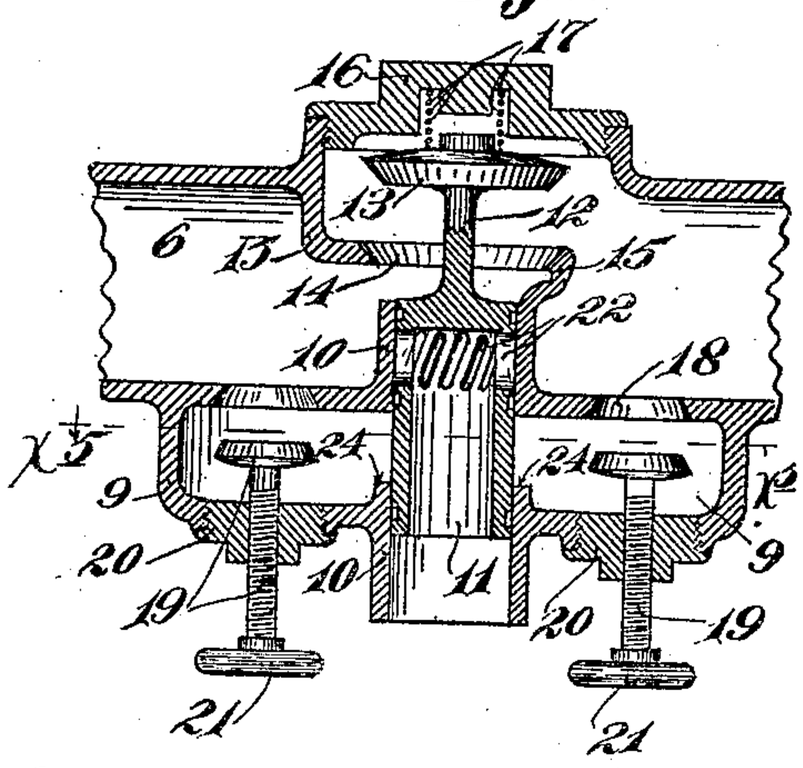


Fig. 5

Fig. 6.

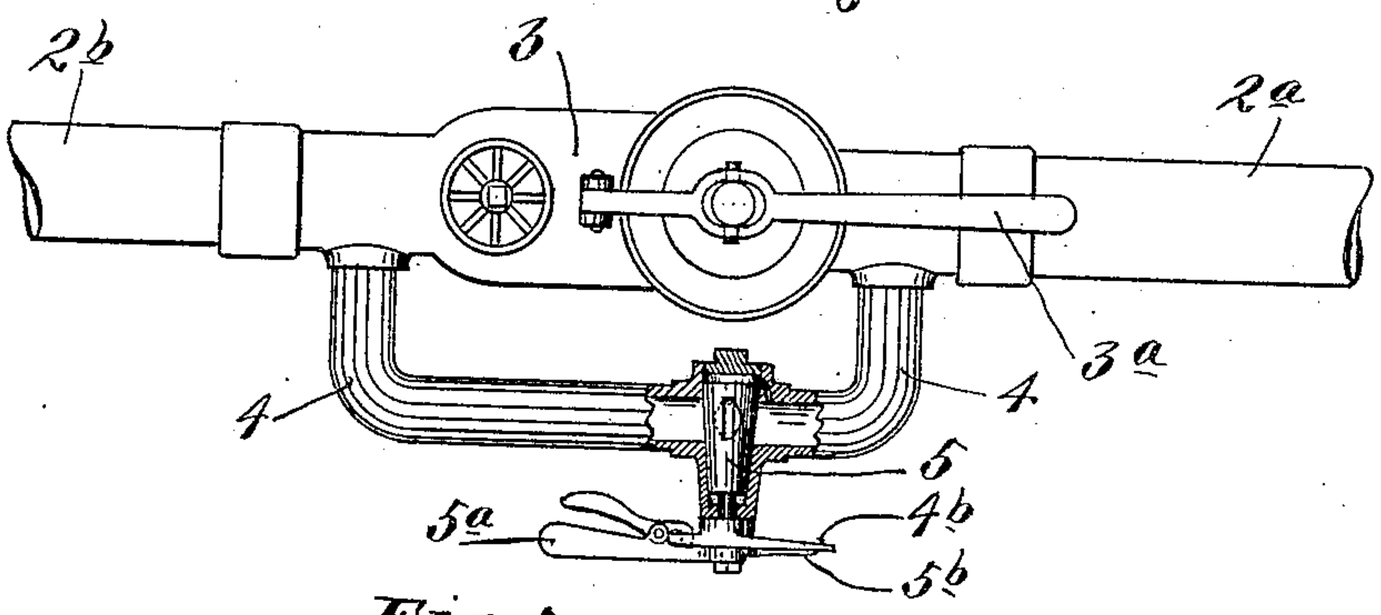
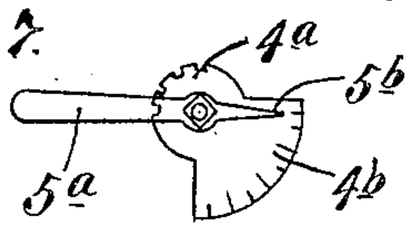


Fig. 7.



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UNITED STATES PATENT OFFICE.

FRANK M. BARTON, OF MAHNOMEN, MINNESOTA.

AUTOMATIC DRAIN AND CHECK VALVE.

932,427. Specification of Letters Patent. Patented Aug. 31, 1909.

Application filed July 24, 1908. Serial No. 445,134.

To all whom it may concern:

Be it known that I, FRANK M. BARTON, a citizen of the United States, residing at Mahnomen, in the county of Norman and State of Minnesota, have invented certain new and useful Improvements in Automatic Drain and Check Valves; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to injectors for locomotives, and the principal feature of the invention is directed to the provision of an improved automatic drain valve mechanism.

To the above end the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings: Figure 1 is a view in side elevation showing a locomotive in diagram, and showing an improved drain valve mechanism and other features of my invention applied to the injector pipe. Fig. 2 is a plan view of the drain valve mechanism removed from the injector pipe. Fig. 3 is a vertical section, taken on the line x^3 x^3 of Fig. 2. Fig. 4 is a view corresponding to Fig. 3, but illustrating different positions of the parts. Fig. 5 is a horizontal section, taken on the line x^5 x^5 of Fig. 4. Fig. 6 is a view in elevation showing the injector and valve equipped by-passage; and Fig. 7 is a detail view in elevation showing the lever and coöperating dial which coöperates with the valve in the injector by-passage.

The numeral 1 indicates a locomotive as entire.

The numeral 2 indicates an injector pipe which leads from the injector 3, of standard construction, into the boiler of the engine and enters the forward portion of the latter below the water level thereof. This injector 3 has a valve of the usual construction which is operated in the customary way by a lever 3^a. A steam supply pipe 2^a leads to the injector from the boiler dome, and a water supply pipe 2^b leads from the water tank on the tender, not shown, and taps the injector in the usual way.

A by-pass pipe 4 connects the steam pipe 2^a to the water pipe 2^b around the injector. In this by-pass pipe 4 is a valve 5, to the projecting stem of which a latch lever 5^a is secured. This latch lever 5^a coöperates with a fixed lock segment 4^a, and it is provided with a pointer 5^b that coöperates with a fixed indicator segment or dial 4^b. The dial and pointer serve to indicate the position of the valve 5, and the latch lever and segment serve to lock the said valve in any of several positions, to-wit, in a closed position, in a wide open position, or in an intermediate position, so that the required amount of steam in cold weather may be delivered from the boiler back through the water supply pipe and into a tank, so as to thereby prevent freezing of the water in said tank and the water supply pipe.

The automatic drain valve mechanism is located in the intermediate portion of the injector pipe 2, and the preferred construction thereof is as follows:—The numeral 6 indicates a tubular or sleeve-like shell which is interposed in the drain pipe 2, the ends thereof, as shown, being threaded at 7 and being connected to the adjacent ends of the sections of said pipe by unions 8. This shell 6 is provided, at its under surface, with a chamber 9 and with a vertically disposed sleeve 10, which latter extends both above and below the said chamber 9 and affords a seat for a tubular piston valve 11. This piston valve 11, as shown, has an upwardly projecting stem 12 to which a check valve 13 is rigidly secured. This check valve 13, when seated as shown in Fig. 3, closes a port 14 formed in a partition 15 that divides the shell 6 longitudinally into two compartments having communication through the said port 14 when said check valve is open, as shown in Fig. 4. The combined check and plunger valve is adapted to be inserted into working position and to be removed therefrom through an opening in the top of the shell 6 that is normally closed by a large cap nut 16. A light coiled spring 17 reacts against the check valve 13 and the cap nut 16 and tends to hold the check valve 13 seated and the plunger valve 11 forced downward, as shown in Fig. 3.

The ports 18, located on opposite sides of the partition 15, connect the two chambers of the shell 6 to the drain chamber 9; and these ports 18 are adapted to be opened and closed, at will, by so-called drain cut-out valves 19, the stems of which, as shown, are threaded through plugs 20 which, in turn, are thread-

ed into seats in the bottom of the chamber 9. Also as shown, the threaded stems of the valves 19 are provided, at their lower ends, with operating wheels or hand-pieces 21. The tubular drain valve 11 is preferably provided, in its sides, with oblique ports 22 which, when the check valve is open, as shown in Fig. 4, are closed by the upper portion of the bearing sleeve 10, and the said valve then cuts off communication between the two extremities of the chamber 9, which chamber 9, it will be noted by reference to Fig. 5, is divided by a vertical partition or web 23. When the check valve 13 is closed and the tubular drain valve 11 is lowered, as shown in Fig. 3, the ports 22 register with ports 24 formed in the partition 23, so that both extremities of said chamber 9, and hence, the injector pipe 2 on both sides of the check valve, will be opened up to the atmosphere through a drain passage afforded by the ports 18, chamber 9, ports 22 and 24 and the interior of the tubular drain valve 11.

In warm weather, or when there is no danger of freezing of the injector pipe, the drain cut-out valves 19 should be both moved so as to close the drain ports 18, and the check valve will then operate to permit the flow of water from the injector into the boiler, but will check a return or reverse flow.

In cold weather, or when the temperature is such that there is danger of freezing the injector pipe, the valves 19 should be opened so as to afford a drain for the injector pipe when the valve is in its normal position, but their adjustment should be such as to give a more or less restricted or retarded escape, this latter feature being necessary in order that the check valve will be automatically opened and the automatic drain valve moved into its closed position, as shown in Fig. 3, when water is forced by the injector toward the boiler or delivery end of the injector pipe 2.

In practice it will be understood that a suitable check valve should be placed at the point where the injector pipe delivers into the boiler, so as to prevent bleeding of the boiler when the automatic drain valve moves into its open position. The chief function of the check valve 13 is to afford a device for automatically moving the so-called automatic drain valve to and from an open position, and, hence, it will be understood that any device thus used for accomplishing this result would be within the scope of my invention.

What I claim is:—

1. In a locomotive, the combination with a water supply pipe extending to the boiler thereof and provided with an intermediate line check valve, of automatic drain valve mechanism arranged to drain said pipe on both sides of said line check valve when the latter is closed, substantially as described.

2. In a locomotive, the combination with a water supply pipe leading to the boiler thereof, of a normally closed line check valve in the intermediate portion of said pipe, said pipe having a drain passage with ports that open into the same on opposite sides of said line check valve, and a normally open drain valve in said drain passage connected to said line check valve, whereby, when said line check valve is moved into an open position said drain valve will be moved into a closed position, and vice versa.

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

FRANK M. BARTON.

Witnesses:

S. B. Olson,

Frank Cojnur.