No. 620,126. Patented Feb. 28, 1899.

G. W. HAYDEN.

TRIPLE VALVE MECHANISM.

(Application filed Nov. 30, 1896.)

(No Model.)

Fig. 1

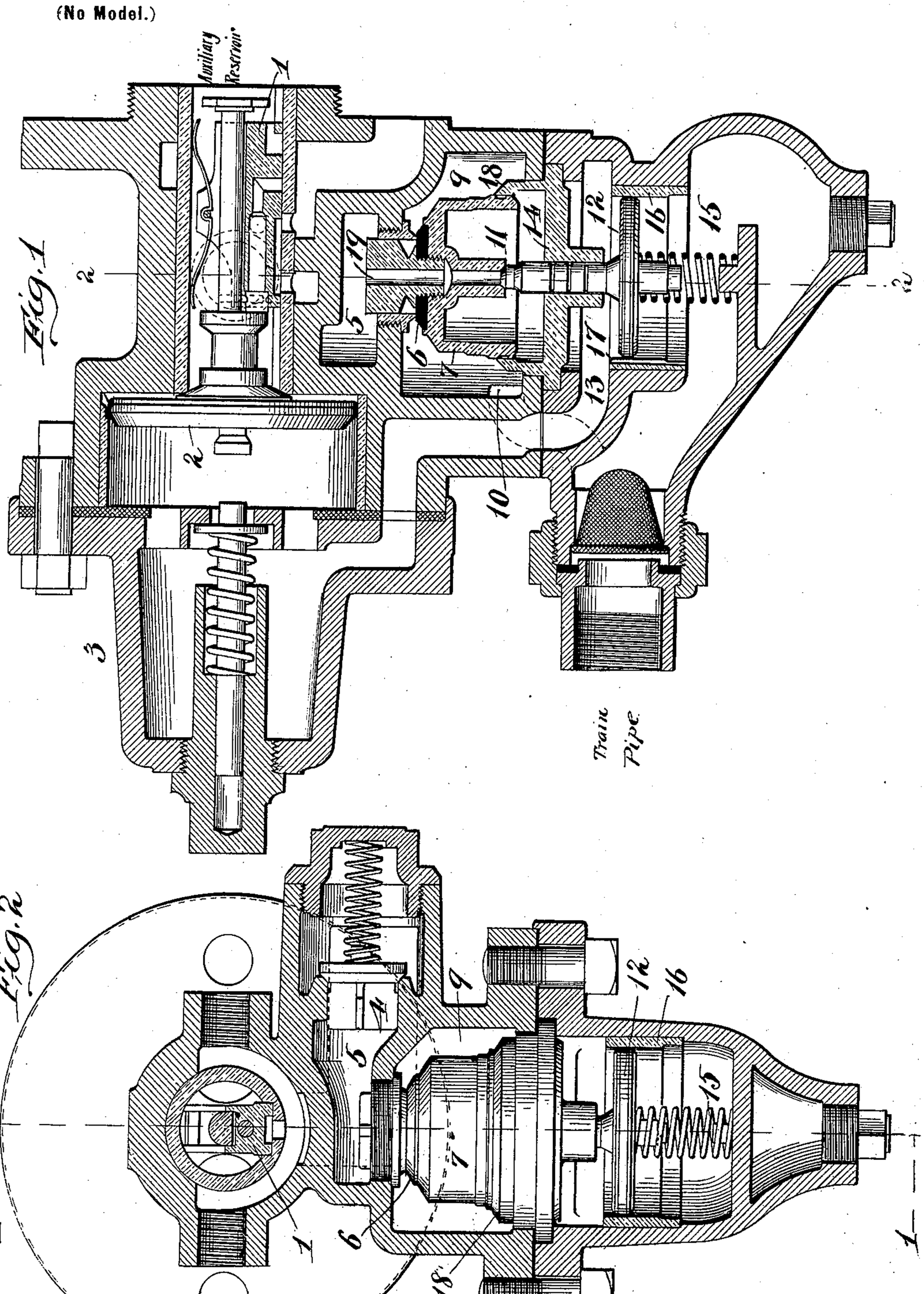

Fig. 2

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TRIPLE-VALVE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 620,126, dated February 28, 1899.

Application filed November 30, 1896. Serial No. 613,960½. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. HAYDEN, a citizen of the United States, residing in Oak Park, Cook county, Illinois, have invented certain new and useful Improvements in Triple-Valve Mechanism, of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates particularly to the part of the air-brake triple valve which is known as the "quick-action mechanism;" and it consists, primarily, in certain improvements over the form of construction shown in Patent No. 496,200, issued to J. T. Hayden April 25, 1893. The form of construction shown in the patent referred to has been found to give some trouble in an opening of the emergency-valve and exhaust therefrom when a heavy inrush of air from the train-pipe takes place and the spring above the emergency-piston is weak or the by-pass port which supplies air to the upper side of the same is not amply large. In other words, in the form of valve referred to, in order to prevent the emergency-valve from being opened at every heavy inrush of air from the train-pipe (as when the brake is first cut in or when it is released) it is necessary to make the spring above the emergency-piston very heavy and the by-pass port, through which the pressure above the piston is designed to be equalized with that below the piston, very large, and these two things necessarily interfere somewhat with the rapid and sensitive action which is so desirable in a valve for this service. These difficulties I overcome in the practice of my present invention by placing the supplemental piston and valve in line with the emergency piston and valve and constructed to seat against the latter and by making the supplemental piston of larger diameter than the emergency-piston proper. This arrangement simplifies the construction by eliminating one of the springs and also makes it possible to make the valve act much more sensitively than has been heretofore possible. The supplemental piston and spring in my present construction not only seat the supplemental valve, but by their action they also help to seat the emergency-valve, and the supplemental piston being made of larger diameter than the emergency-piston it prevents any sudden inrush of air from the train-pipe from unseating the emergency-valve. The present arrangement having all the parts in line is obviously cheaper to make than that previously proposed.

For the better understanding of my invention I will now proceed to describe it in connection with the accompanying drawings, in which—

Figure 1 is a vertical section of a triple valve embodying my improvements, said section being taken on a line 1 1 of Fig. 2. Fig. 2 is another vertical section taken on the line 2 2 of Fig. 1.

The connections to the train-pipe, auxiliary reservoir, and air-brake cylinder are marked on the drawings, and these, together with the main slide-valve 1, piston 2, and the cap 3, are substantially identical with the form of construction now in most common use and will therefore not need any detailed explanation here.

Referring now more particularly to Fig. 1, it will be seen that communicating with the connection to the brake-cylinder past the check-valve 4 (shown in Fig. 2) is a cavity 5, into which opens the port which is controlled by the emergency-valve 6. Attached to the emergency-valve 6 is an emergency-piston 7, operating within a cylindrical chamber and exposed on its upper side to pressure in a cavity 9, which is in direct and open communication with the train-pipe through a passage 10. Through the center of the emergency-piston 7 is a port leading into the cavity 5 and thence to the brake-cylinder, and controlling this port is a small valve 11 on the end of the stem of a supplemental piston 12 of larger diameter than the emergency-piston, the supplemental piston being interposed between the train-pipe pressure and the chamber connecting with the main-piston cavity through the passage 13. Integral with the cylindrical port 8 is formed a dividing-partition 14, through the center of which the stem of the piston 12 operates. Under the piston 12 I provide a spring 15, adapted to hold the various parts in the position shown. In the

bushing 16, in which the piston 12 operates, I provide a by-pass opening 17, through which air passes in and out between the train-pipe and the main-piston cavity to operate the brakes in what is known as "ordinary" or "service" application, this by-pass or opening being made of sufficient size to prevent any movement of the emergency parts for slight reductions in train-pipe pressure.

From an examination of the drawings it will be readily seen that between the emergency-piston 7 and the partition 14 is a closed cavity or chamber supplied with air by leakage past the packing-ring 18 and having as an outlet the port 19, controlled by the valve 11. If now it be desired to make an emergency application of the brakes, a heavy and sudden reduction is made in the train-pipe pressure. This causes the air above the piston 12 to move said piston downward and open the port 19, permitting the escape of the pressure within the confined cavity between the emergency-piston and the partition 14, and the resistance from the under side of the piston 7 being thus removed the train-pipe pressure upon its upper side, supplied through the passage 10, forces said piston 7 downward, pulling the emergency-valve off its seat and opening communication directly from the train-pipe to the brake-cylinder through the cavity 5 and past the check-valve 4. As soon as the pressure above the piston 12 and in the closed cavity below the piston 7 equalizes with that in the train-pipe the parts are returned to the normal position (shown in the drawings) by the spring 15. The arrangement thus described places the emergency-piston 7 and its connected parts and also the supplemental valve 11 in a position, as it were, apart from or out of the main line of communication between the train-pipe and the main-piston cavity, and therefore these parts are less subject to disturbance from lodgment of dirt or gum in and around the same. By placing the emergency-piston proper and the supplemental piston 12 and their connected valves in the position shown, all having the same center line, I secure a construction which is easy and cheap to make, which can be readily taken apart and replaced, and which requires but a single spring 15, whereas if the emergency-piston 7 and the supplemental piston 12 were differently placed a separate spring would be required for each, as is the case in a construction previously patented by me.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In triple-valve mechanism for automatic air-brakes, the combination of a chamber or casing having an emergency-port, an emergency-valve controlling said port, an emergency-piston for operating said valve exposed on its under side to pressure in a confined cavity, and on its upper side to the train-pipe pressure, a passage through said emergency-piston leading to the brake-cylinder, a valve for controlling said passage and a piston for operating said valve which is interposed between the train-pipe pressure and the pressure in the main-piston cavity; substantially as described.

2. In emergency-valve mechanism for air-brake triple valves, the combination with the emergency-valve of a piston for operating the same; a supplemental valve controlling a port through said piston and a supplemental piston for operating said supplemental valve; substantially as described.

3. An emergency-valve mechanism for air-brake triple valves comprising a chamber or casing having an emergency-port, an emergency-valve controlling said port, an emergency-piston for operating said valve exposed on one side to pressure in a confined cavity and on its other side to train-pipe pressure, an exhaust-passage for discharging air from said confined cavity, a supplemental valve controlling said exhaust-passage, and a piston for operating said supplemental valve, said piston being arranged in position to aid in seating the emergency-valve.

4. In emergency-valve mechanism for air-brake triple valves, the combination with an emergency-valve, emergency-piston, a supplemental valve and a supplemental piston, of a confined chamber on one side of said emergency-piston having an opening leading to a brake-cylinder through said emergency-piston, controlled by said supplemental valve; substantially as described.

5. An emergency-valve mechanism for air-brake triple valves containing an emergency valve and piston, and a supplemental valve and piston, said supplemental valve and piston bearing against said emergency valve and piston so as to aid in keeping the same seated during any sudden inflow of air-pressure.

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