

(No Model.)

T. J. HOGAN.

QUICK ACTION VALVE MECHANISM FOR AIR BRAKES.

No. 519,908.

Patented May 15, 1894.

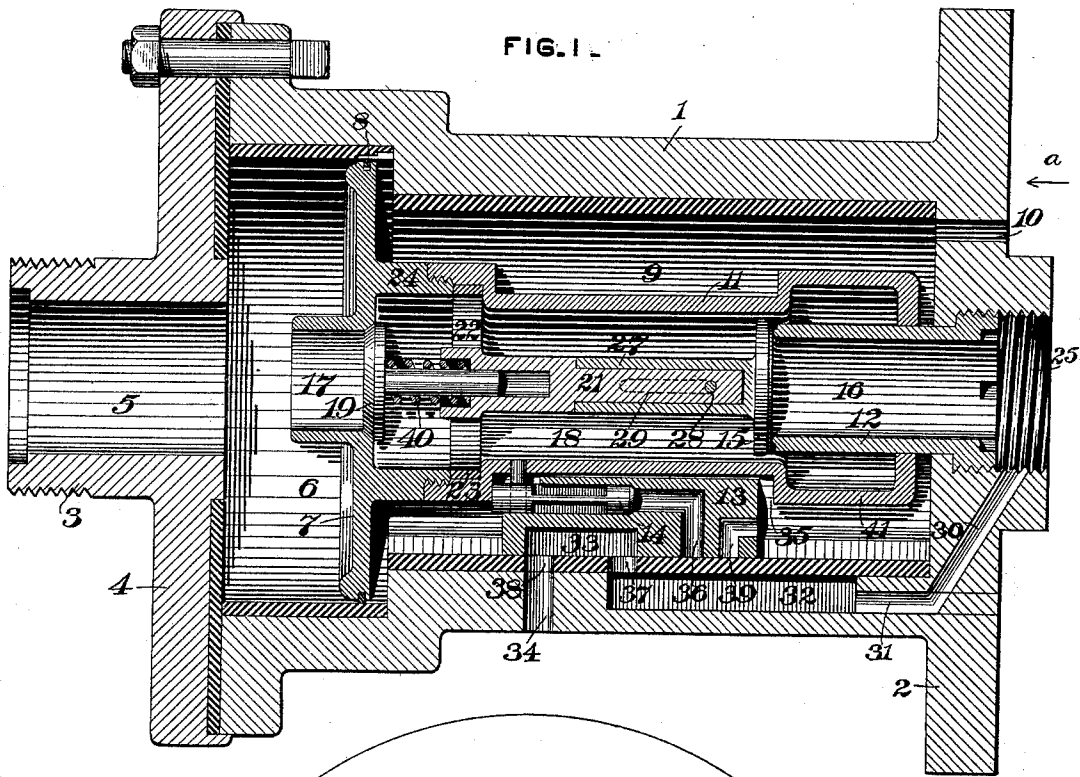
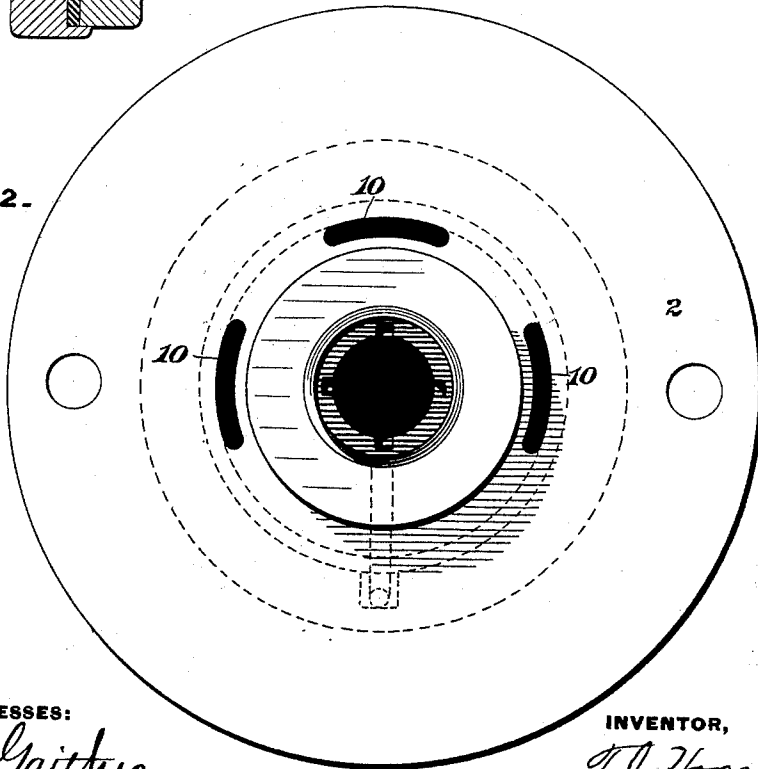


FIG. 2.



WITNESSES:

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THOMAS J. HOGAN, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF SAME PLACE.

QUICK-ACTION-VALVE MECHANISM FOR AIR-BRAKES.

SPECIFICATION forming part of Letters Patent No. 519,908, dated May 15, 1894.

Application filed February 3, 1894. Serial No. 499,002. (No model.)

To all whom it may concern:

Be it known that I, THOMAS J. HOGAN, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a certain new and useful Improvement in Quick-Action-Valve Mechanism for Air-Brakes, of which improvement the following is a specification.

The object of my invention is to provide means for producing a quick and powerful application of the brakes on the cars of railway trains provided with automatic fluid pressure brake systems; and to this end it consists of new and improved valve mechanism for locally releasing fluid under pressure from the train pipe in making applications of the brakes and the combination of such mechanism with a triple valve device.

In the accompanying drawings, which illustrate my invention, Figure 1 is a central section showing my improvement in combination with a triple valve device of the slide valve type; Fig. 2, an end view of the casing looking in the direction shown by the arrow marked *a*.

The casing, 1, is adapted to be secured in position by being bolted, through the flange, 2, to the brake cylinder head or to the auxiliary reservoir. Connection to the train pipe or to a branch therefrom is made by means of the screw threaded nipple, 3, which projects from the cap, 4. Fluid under pressure, from the train pipe, flows through the passage 5 into the piston chamber, 6, and moves the piston, or movable abutment, 7, to the right, into the position shown in the drawings. When the piston is in this position the feed passage 8 is uncovered so as to permit the fluid to flow into the chamber 9, which is always in communication with the auxiliary reservoir through the passages 10. Within the chamber 9 is located the slide valve 13 and graduating valve 14, which are operated by the movement of the piston 7, and which control the passage of fluid from the auxiliary reservoir to the brake cylinder and from the brake cylinder to the atmosphere. A tubular stem 11 projects from the piston 7 into the chamber 9 and at one end is fitted around a tubular projection 12, secured to

the casing, which serves as a guide on which the end of the tubular stem, 11, slides as the piston, 7, moves back and forth. A passage, 17, through the piston 7, connects the train pipe side of the piston 7 with the interior of the tubular stem 11, and the passage 16 through the tubular projection 12 connects the interior of the tubular stem 11 with the brake cylinder, through the passage 25. A direct communication from the train pipe to the brake cylinder is thus formed through the passages 17, 18, 16, and 25. This communication is normally closed by means of the check valve 19, which serves to prevent a return flow of fluid to the train pipe, and by means of the valve 15 which, when the piston 7 is in release position, or in position to make a service application of the brakes, is seated on the end of the tubular projection 12 and closes communication between the passage 16 and the passage 18 through the tubular stem 11. The end of the tubular stem 11 is closely fitted around the tubular projection 12 in such a manner as to prevent communication between the interior passage 18 of the tubular stem 11 and the auxiliary reservoir space or chamber 9, except such as may occur through leakage due to wear. If preferred the sliding joint thus formed may be packed by means of a packing ring fitted in the end of the tubular stem 11, or by means of some simple form of stuffing box. By means of this construction a substantially unbroken passage is formed from the train pipe side of the movable abutment to the brake cylinder connection, whereby the fluid released from the train pipe may pass directly to the brake cylinder without entering the chamber 9. By an unbroken passage I mean a passage which is inclosed throughout its length by a surrounding, or inclosing, wall, such as the tube 11, which has no considerable opening through it or around its end, or practically none, for the passage of fluid between the passage 18 and the chamber 9 in making emergency applications of the brakes.

Of course leakage or small holes which are practically useless would not involve a material change from that described and claimed herein. Thus, the end of the tube 11 may be so fitted around the tubular projection 12 as

to permit a slight leakage of fluid between the chamber 9 and the interior of the tube 11, as already stated, or a small opening may be formed in the side of the tube 11 or around its end without departing from my invention. My invention is, therefore, not limited to a construction in which there is absolutely no communication between the passage 18 and the chamber 9.

At the same time that the auxiliary reservoir is being charged through the passage 8, the interior of the tubular stem 11 is charged, through the passage 17, with fluid under pressure from the train pipe which lifts the check valve 19 against the pressure of the spring 40. As soon as the pressure in the passage, or chamber, 18, is nearly equal to that in the train pipe, the check valve closes, and at any time when the excess of train pipe pressure over that in passage 18 is greater than the pressure of the spring 40 the check valve will be unseated and permit fluid from the train pipe to enter the passage or chamber 18, so that the difference in the pressures in the chamber 18 and in the train pipe will usually be that due to the amount required to lift the check valve against the pressure of the spring 40.

The valve 15 has a hollow stem 27, which fits over a stem 21 and forms a sliding connection therewith. At one end the stem 21 is integrally connected by means of bars or webs, 22, with a ring 23 which is clamped in place by a screw connection 24 in such a manner as to rigidly secure the stem 21 to the tubular stem 11. A pin, 28, passes through the stem 21, and its ends project into slots 29, (shown in dotted lines in Fig. 1,) formed in the opposite sides of the hollow stem 27. By means of this connection the stem 21 may have an independent movement, relative to the valve 15 and its stem 27, equal to the length of the slot 29 minus the diameter of the pin 28.

When the brakes are released and the train is in running order, the parts are in the positions shown in Fig. 1, the train pipe and auxiliary reservoir are charged to their normal pressures, and the brake cylinder is in open communication with the atmosphere through the passages 25, 30, 31, 32, port 37, exhaust cavity 33, exhaust port 38 and passage 34.

In making graduated or service applications of the brakes, by comparatively slight reductions of train pipe pressure, the pressure in the auxiliary reservoir moves the piston 7 to the left, and unseats the graduating valve 14; the shoulder 35 on the tubular stem 11 then comes in contact with the end of the slide valve 13 and moves the slide valve to the left until the passage 36 registers with the port 37. Fluid from the auxiliary reservoir then flows through the passage 36, port 37, and passages 32, 31, 30, and 25, to the brake cylinder. When the pressure in the

auxiliary reservoir has become sufficiently reduced to permit it, the pressure in the train pipe will move the piston 7 to the right and seat the valve 14, thereby cutting off the flow of fluid from the auxiliary reservoir to the brake cylinder. The valve 14 may again be unseated, by a further slight reduction of train pipe pressure, to admit an additional quantity of fluid from the auxiliary reservoir to the brake cylinder; and this additional admission will be cut off as before by the seating of the graduating valve when the auxiliary reservoir pressure is sufficiently reduced by the flow into the brake cylinder. This operation may be repeated as often as desired, or until the pressures in the auxiliary reservoir and brake cylinder are equalized. When the slide valve 13 is moved to the left in making service, or graduated, applications of the brakes by slight reductions of train pipe pressure, the ends of the pin 28, which project from each side of the stem 21, come in contact with the left hand ends of the slots 29 in the stem 27, at the same time that the passage 36 in the valve 13 registers with the port 37, and further movement of the piston and slide valve to the left is prevented by the fluid pressure acting on the back of the valve 15 which holds the valve 15 to its seat. The pressure on the back of the valve 15 will be sufficient to check the movement of the piston and slide valve to the left, but of preferred a graduating spring may also be employed, in the manner common in triple valves, to check the movement of the piston or to assist in doing so. When a sufficiently great and rapid reduction of train pipe pressure is produced, the piston 7 and slide valve 13 will be moved to the limit of their travel to the left; the ends of the pin 28 coming in contact with the ends of the slots 29 will unseat the valve 15 and the port 39 in the slide valve will register with the port 37 in the slide valve seat. The unseating of the valve 15 will exhaust the fluid from the passage 18 to the brake cylinder and permit the train pipe pressure to unseat the check valve 19. The fluid from the train pipe will then flow through the passages 17, 18, 16, and 25 to the brake cylinder; and at the same time fluid from the auxiliary reservoir will flow through ports and passages 39, 37, 32, 31, 30, and 25 to the brake cylinder. As soon as the pressures in the train pipe and brake cylinder have equalized, or nearly so, the check valve 19 will be seated and thereby prevent a return flow to the train pipe, and the flow from the auxiliary reservoir to the brake cylinder will continue until the auxiliary reservoir and brake cylinder pressures are equalized.

The end 41 of the tubular stem 11 is enlarged for the purpose of forming a passage of sufficient area around the edges of the valve 15, when the parts are in the emergency position, to correspond with the cross sectional area of the passage around the check

valve 19 when open and with the area of the passage through the intermediate portion of the tubular stem 11, so that the passage, through which the fluid flows from the train pipe to the brake cylinder, will have substantially the same cross sectional area throughout its length.

It will be obvious that the piston 7, tubular stem 11, valve 15, and a similar arrangement of passages through the piston may be employed as an emergency device, with or without the check valve 19, or with a different arrangement of the check valve, to exhaust fluid under pressure from the train pipe to the brake cylinder, to the atmosphere, or to a chamber or space other than the brake cylinder. When employed as a separate emergency device, independent of the triple valve proper, or disconnected from it, the chamber 9 may communicate with the usual auxiliary reservoir, or with a separate reservoir, or it may form a reservoir by itself, the essential feature being that the chamber or space 9 shall be charged with a fluid under pressure which shall be operative on a reduction of train pipe pressure to open the passage for the release of fluid from the train pipe.

The check valve 19 may, if preferred, be placed in the passage 16 to the right of the emergency valve 15 instead of being located as shown since its principal function is to prevent a return flow of fluid from the brake cylinder to the train pipe.

I claim as my invention and desire to secure by Letters Patent—

1. In an automatic fluid pressure brake system, the combination with a movable abutment exposed on one side to train pipe pressure and on the other side to the pressure in a chamber which is separated from the train pipe by the movable abutment, of a passage through the movable abutment which is unconnected with the chamber, and a valve controlling the release of fluid from the train

pipe through the passage, substantially as set forth.

2. In an automatic fluid pressure brake system, the combination with a movable abutment exposed on one side to train pipe pressure and on the other side to pressure in an auxiliary reservoir of a passage through the movable abutment which passage extends substantially unbroken thence to the brake cylinder connection a valve controlling the release of fluid from the train pipe through the passage and a check valve which prevents a return flow of fluid to the train pipe.

3. In an automatic fluid pressure brake system, the combination with a movable abutment exposed on one side to train pipe pressure and on the other side to auxiliary reservoir pressure of a passage through the movable abutment which passage extends substantially unbroken thence to the brake cylinder connection a valve controlling the release of fluid, through the passage, from the train pipe only and a valve for releasing fluid from the auxiliary reservoir to the brake cylinder, substantially as set forth.

4. In a triple valve device, the combination with a movable abutment of a tubular stem fitting around a tubular projection which is secured to the casing, a passage through the tubular stem and tubular projection through which fluid is released from the train pipe, a valve controlling said passage, a chamber surrounding the tubular stem and separated from the interior thereof, and a valve in the chamber controlling the supply of fluid from the auxiliary reservoir to the brake cylinder, substantially as set forth.

In testimony whereof I have hereunto set my hand.

THOMAS J. HOGAN.

Witnesses:

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F. E. GAITHER.