No. 701,328. Patented June 3, 1902.

E. L. GOSSE.

CONTINUOUS AUTOMATIC AIR BRAKE SYSTEM.

(Application filed Jan. 10, 1902.)

(No Model.)

Fig. 1.

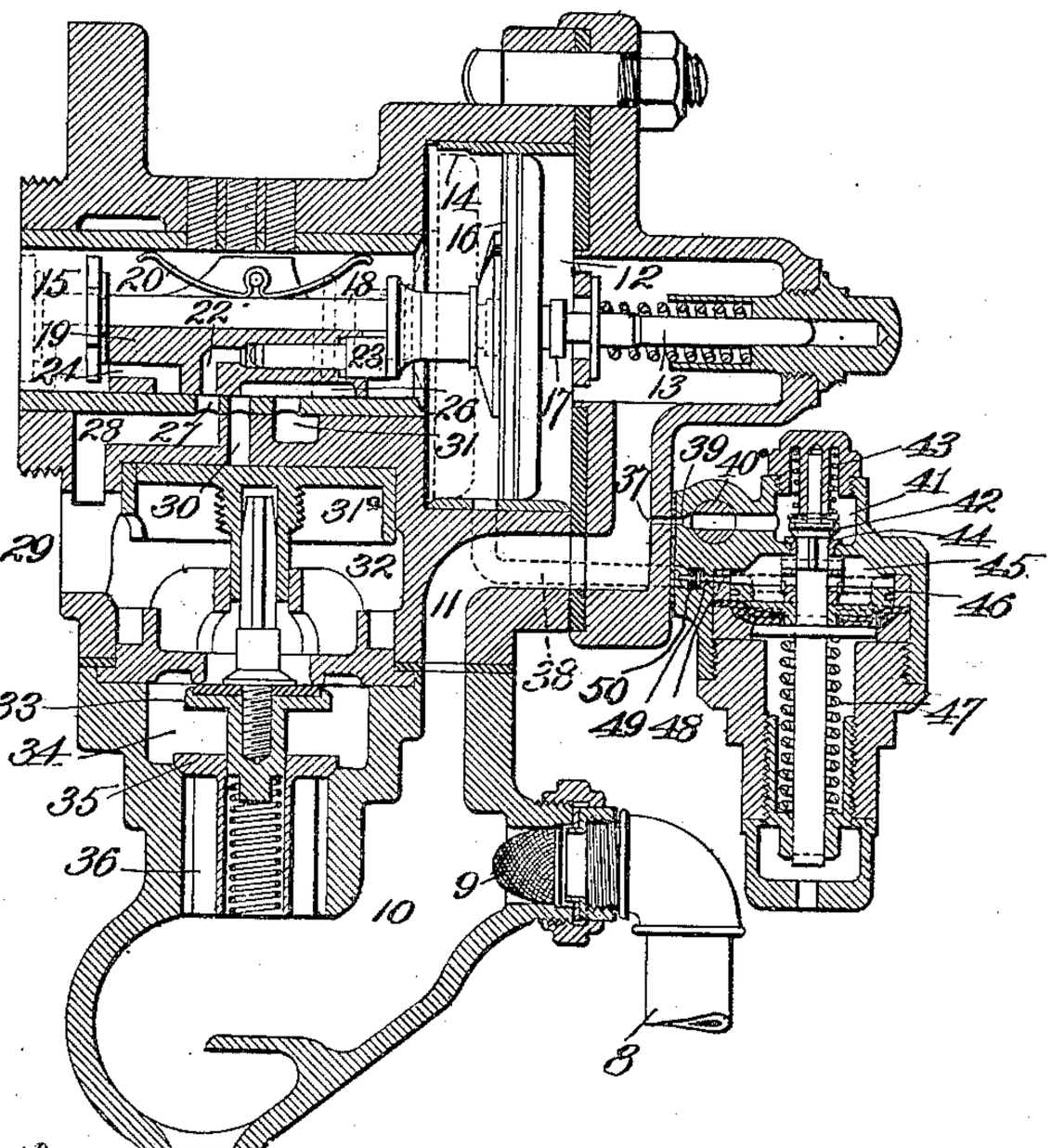


Fig. 2.

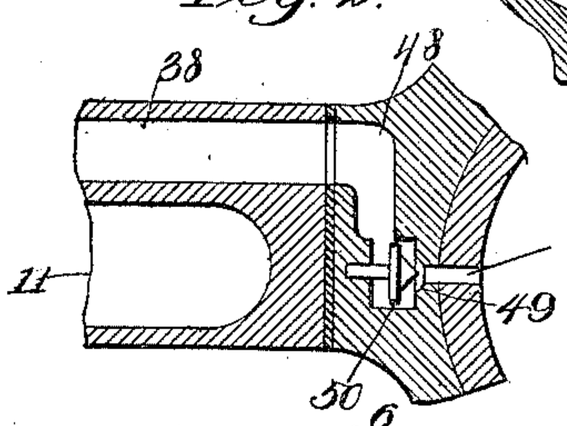


Fig. 3.

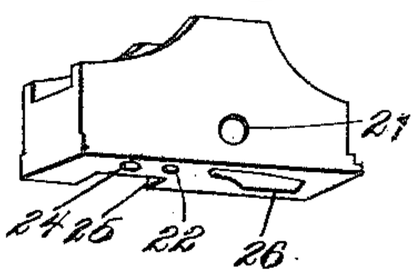
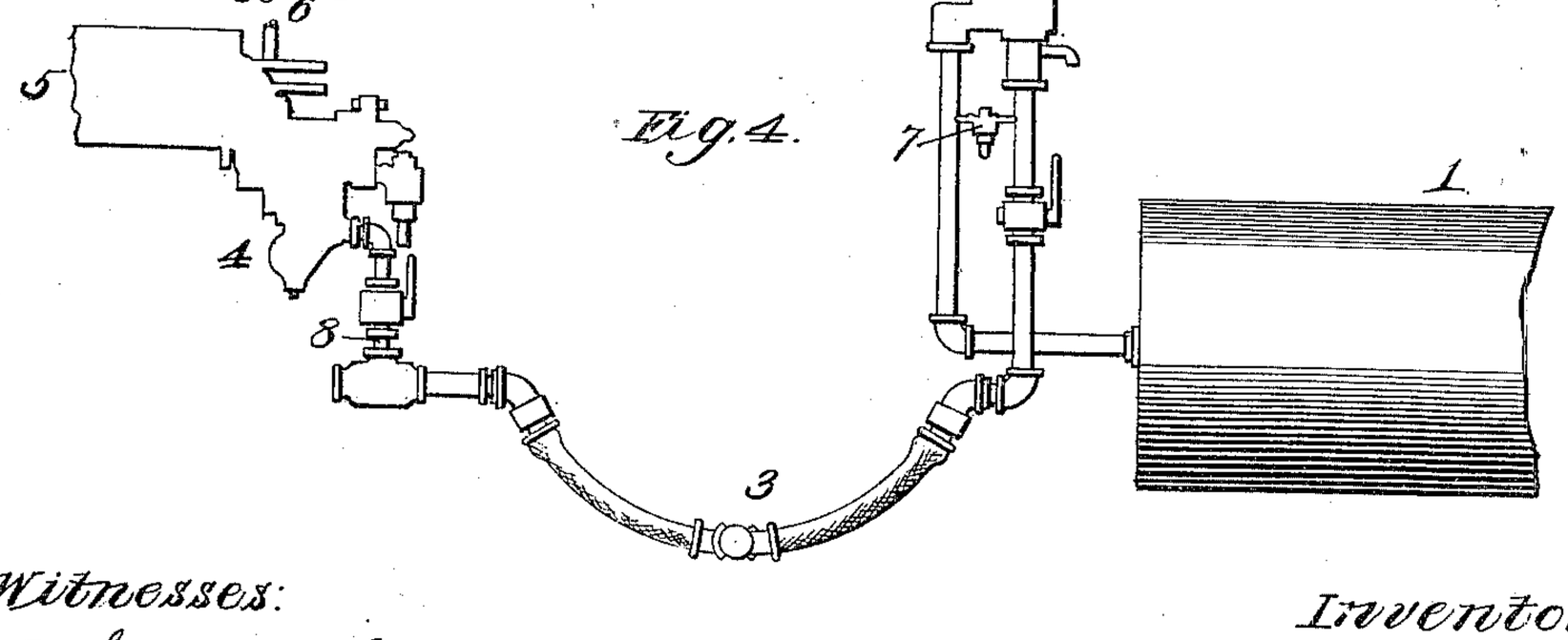


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CONTINUOUS AUTOMATIC AIR-BRAKE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 701,328, dated June 3, 1902.

Application filed January 10, 1902. Serial No. 89,146. (No model.)

To all whom it may concern:

Be it known that I, EDWARD L. GOSSE, a citizen of the United States, residing at Chanute, in the county of Neosho and State of Kansas, have invented certain new and useful Improvements in Continuous Automatic Air-Brake Systems, of which the following is a specification.

My invention relates to that class of fluid-pressure brake apparatus whereby the engineer is enabled to maintain a continuous pressure in the brake-cylinder, although a constant leakage therefrom is taking place, as in the apparatus embodied in my application for patent, No. 80,758, filed November 1, 1901, my object in this connection being to produce an apparatus possessing all of the advantages of that above mentioned and the additional ones of greater cheapness, simplicity, and less liable to get out of order.

A further object is to produce an apparatus which is not brought into service until the train-line pressure has been reduced to set the brakes to full-service position—namely, until the pressure is equalized on the triple-valve piston—after which a further train-pipe reduction is a waste of air. After this full-service position has been attained in the air-brake system embodying this invention the train-pipe air goes direct to the auxiliary side of the triple piston, provided the auxiliary-reservoir pressure is lower than train-pipe pressure, until said pressures are equal. If, however, the pressure was already equal, the attachment stands ready to compensate for leakage and consequent relaxation of the brakes, so as to automatically maintain the pressure required.

A still further object of the invention is to produce an attachment for automatically reinforcing the train-line, auxiliary reservoirs, and brake cylinders with sufficient air from the main reservoir to compensate for loss by leakage should the engineer's brake-valve not be properly adjusted to supply this air, which adjustment necessarily requires the presence of the engineer, whereas this attachment is designed for automatic use when the engineer's attention is centered upon other matters and the train is at rest.

Broadly, the invention consists in the combination, with the triple valve, of a feed-valve attachment like the common reducing-valves, except that it is provided with a check-valve in its discharge-passage. This valve has its supply-passage in communication directly or indirectly with the train-pipe and its discharge-passage in communication directly or indirectly with the brake-cylinder. In its preferred form, however, its supply-port communicates directly with the train-pipe port of the triple valve, while its discharge-port communicates with the triple-valve-piston chamber through a passage drilled or otherwise formed in the triple-valve casing for that purpose. The supply-valve of the attachment is adapted to close with a pressure as low as, say, fifty pounds, so that when the train-line pressure falls below fifty pounds the feed-valve piston is operated and gradually unseats its supply-valve, and thus enables train-line air to pass through the feed-valve to the auxiliary reservoir and brake-cylinder. It will thus be seen that loss by leakage from the brake-cylinder or other point is compensated for from the main reservoir, the pressure of the latter being maintained, because the pump is able to more than compensate for the loss.

The invention also consists in the use of a check-valve in the feed-valve attachment discharge-port, so that when the pressure in the attachment attains fifty pounds and the supply-valve closes and holds the feed-valve-attachment piston unseated the back pressure from the auxiliary reservoir, assuming that the brakes are set, forces the check-valve to its seat and leaves the train-pipe port in communication only with the triple-valve-piston chamber and tending to operate said piston, so as to release the brakes, which action, however, does not occur until the engineer's brake-valve is operated so as to apply the required preponderance of pressure against the side of the piston opposite from the auxiliary reservoir, when the piston moves to "release" position, and the auxiliary reservoir is recharged in the customary manner.

The invention also consists in the use of a reducing-valve or its equivalent between the train-pipe and the main reservoir or a connection thereof for the purpose of automat-

ically reinforcing the train-pipe from the main reservoir with sufficient air to compensate for loss by leakage when the engineer's valve is on lap.

Referring now to the drawings, where like reference-numerals designate corresponding parts, Figure 1 represents a central vertical section of a quick-action triple valve equipped with a reducing feed-valve attachment embodying my invention. Fig. 2 is a horizontal section of a part of the same. Fig. 3 is a detail perspective view of the slide-valve of the triple valve. Fig. 4 is a diagrammatic view of a part of a quick-action air-brake system as equipped with reducing-valve attachments embodying my invention.

Referring now to the drawings in detail, 1 designates the main reservoir; 2, the engineer's brake-valve connected to the main reservoir in the usual manner, and 3 the train-pipe connected to the brake-valve and to the triple valve 4 in the usual manner.

5 designates the brake-cylinder, and 6 the pipe connecting the triple valve to the auxiliary reservoir. (Not shown.)

7 designates a reducing-valve of the usual or any preferred type, which connects the pipe connecting the main reservoir and brake-valve with the pipe connecting the brake-valve and train-pipe, said reducing-valve being adapted under a sufficient reduction of pressure in the train-pipe to automatically reinforce the train-pipe and its connections from the main reservoir, this action taking place only when the brake-valve is on lap. Each branch 8 of the train-pipe is provided at its discharge end with the usual strainer 9 to prevent the entrance of foreign substances into chamber 10 of the triple-valve casing, the usual train-pipe port 11 connecting said chamber with the triple-valve-piston chamber 12, wherein is located the usual spring-advanced stem 13. Said piston-chamber is formed with the usual feed-groove 14 in communication always with the chamber 15 at the auxiliary side of the piston and through the medium of pipe 6 with the auxiliary reservoir. The triple-valve piston 16 is provided at the side opposite from the auxiliary chamber with the usual knob 17 for engagement with spring-actuated stem 13 and at the auxiliary side with stem 18, overlying and adapted to reciprocate in the usual manner the slide-valve 19, held in proper position by spring 20. Said slide-valve is provided with the usual service-ports 21 and 22, controlled by the graduated valve 23, the emergency-port 24, the removed corner 25, and the cavity 26. When the brakes are set, the service-ports are open and communicate through opening 27 with port 28, communicating through opening 29 with the brake-cylinder. At the same time cavity 26 establishes communication between port 30 and port 31 with the atmosphere.

Port 30 communicates with chamber 32, containing piston 31[a] and communicating with the brake-cylinder through opening 29. Said piston when depressed is adapted to unseat the emergency or rubber-seated valve 33 in chamber 34.

35 designates train-pipe check-valve normally closing communication between port 30 and passage 36, communicating at its opposite end with chamber 10.

All of the parts of the triple valve thus far described are of precisely the same type as the quick-action triple valve now in general use, though it is to be understood that my improvement is also adapted for use in connection with what is known as the "plain" triple valve.

37 designates an opening in the valve-casing which taps the train-pipe port 11, and 38 a port formed in the triple-valve casing and communicating at its discharge end with the piston-chamber 12.

The feed-valve attachment, which is secured to the triple valve in any suitable or preferred manner, embodies the usual supply-port 39, connected in this instance to the opening 37 and the plug-cock 40, controlling said port and adapted to close the same, and thereby render the feed-valve attachment functionless. It also comprises the chamber 41, communicating with the opposite end of said port, the supply-valve 42, the spring 43, tending to hold the supply-valve on its seat 44, and therefore closing communication between chamber 41 and the piston-chamber 45. It also comprises the piston 46, the spring 47 to seat the piston, and the discharge-port 48, connected to said piston-chamber. The only novelty in the construction of this feed attachment as thus far described resides in the connection of its ports with opening 37 and port 38, and in the fact that its discharge-port 48 is located in the position most convenient for the new use contemplated.

The feed-valve attachment is also novel in that it is provided in its port 48 with a valve-seat 49 and a check-valve 50, said check-valve being adapted at times to be closed by the back-pressure from the piston-chamber 12.

In practical operation, assuming that there is no air-pressure, it will be apparent that the feed-valve piston is elevated and closes the discharge-port 48, incidentally holding supply-valve 42 from its seat. The pump (not shown) being started, the air passes through train-pipe port 11 to the piston-chamber 12 at the side opposite from the auxiliary reservoir, so as to force piston 16 to full-release position, if not already there, after which the air passes around the piston through feed-groove 14 and the usual piston feed-groove to the auxiliary reservoir, so as to charge the latter. At the same time the train-pipe air entering the attachment unseats piston 46 and equalizes on the check-valve with back pressure through port 38. When the train-pipe and auxiliary pressure reaches, say, fifty pounds, the feed-valve-attachment supply-valve 42 is seated and re-

mains seated while the pressure of the train-pipe increases to, say, seventy pounds, the usual pressure. Should the train-pipe pressure be gradually reduced by the engineer throwing his brake-valve to service position or from any other cause, the preponderance of pressure on the auxiliary side of piston 16 will force the latter in the opposite direction and by so doing first close the feed-groove passage and then open communication between the auxiliary side of the piston and port 38. Should the pressure in the train-pipe not fall below, say, fifty pounds, it is obvious that the supply-valve 42 of the feed-valve attachment remains seated and that the feed-valve attachment is functionless, it being also obvious that the back pressure from the auxiliary reservoir in port 38 holds the check-valve 50 seated. It will thus be apparent that the brakes can be set and released repeatedly without affecting the feed-valve attachment, provided the train-pipe pressure never falls below fifty pounds or other arbitrary pressure.

With the brakes set with the piston in service position, as shown, the pressure at both sides of the piston is equalized at about fifty pounds. Should the brake relax through loss by leakage, it is compensated for instantly from the train-line through the feed-valve attachment, the spring 47 unseating the supply-valve 42 gradually and permitting the air to pass through port 39 to chamber 45 and thence through port 48, unseating check-valve 50, to port 38, from which port it enters the piston-chamber at the auxiliary side of the piston and passes to the auxiliary reservoir and the brake-cylinder. This action is not defeated by movement of the piston toward release position, because it requires an excessive pressure of several pounds to move the piston, which excess pressure is not supplied, because the feed-valve attachment supplies a volume of air to the auxiliary side of the piston equal to that lost by leakage.

The operation above described comtemplates reduction of pressure through the operation of the engineer's brake-valve, and it is obvious that the engineer with his eye on the proper gage (not shown) adjusts the brake-valve to supply sufficient air from the main reservoir to compensate for leakage from the brake-cylinders. It is also obvious that should he leave the brake-valve in "running" position pressure in excess of fifty pounds would soon be stored in the train-pipe and would therefore automatically close the supply-valve 42, this result being followed by the release of the brakes and movement of the train if standing on grade. I have therefore provided a reducing-valve connection between the main reservoir and the train-pipe, so that should the engineer stop his train on a grade he may return the brake-lever to "lap" and leave the train for the purpose of inspecting the engine or otherwise, said reducing-valve serving to automatically reinforce the train-pipe with air from the main reservoir in sufficient volume to compensate for that lost by leakage, the pump, of course, keeping the main reservoir automatically charged to the proper pressure.

It will be apparent that the equipment of the air-brake apparatus now in use with my improvement will insure the continuation of the required pressure on the brakes as long as they are set, an object to be desired on all railways having grades more or less steep and long, and that while I have illustrated and described the preferred embodiment of said invention it is to be understood it can be modified as to location and structure without departing from the principle and scope or sacrificing any of its advantages.

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

1. The combination in an automatic air-brake apparatus, of the triple valve provided with an opening and a port, the former communicating with the triple-valve-piston chamber at the train-pipe side of the piston thereof in its emergency position, and the latter with said chamber at a point between the feed-groove thereof and the service position of the piston, and a feed-valve attachment connected to said opening and port, and adapted when the train-pipe pressure falls below a predetermined standard but still exceeds that of the auxiliary reservoir to receive train-pipe air and deliver it to the said piston-chamber through said port.

2. The combination in an automatic air-brake apparatus, of the triple valve provided with an opening and a port, the former communicating with the triple-valve-piston chamber at the train-pipe side of the piston thereof in its emergency position, and the latter with said chamber at a point between the feed-groove thereof and the service position of the piston, a feed-valve attachment connected to said opening and port, and adapted when the train-pipe pressure falls below a predetermined standard but still exceeds that of the auxiliary reservoir to receive train-pipe air and deliver it to the said piston-chamber through said port, and means for reinforcing the train-pipe pressure in proportion to the loss by leakage.

3. The combination in an automatic air-brake apparatus, of the triple valve provided with an opening and a port, the former communicating with the triple-valve-piston chamber at the train-pipe side of the piston thereof in its emergency position, and the latter with said chamber at a point between the feed-groove thereof and the service position of the piston, a feed-valve attachment connected to said opening and port, and adapted when train-pipe pressure falls below a predetermined standard but still exceeds that of the auxiliary reservoir to receive train-pipe air and deliver it to said piston-chamber through said port, and a reducing-valve in communi-

cation with the main reservoir and the train-pipe and adapted to automatically reinforce the latter from the former to compensate for fall of pressure occasioned in the train-pipe by leakage.

4. The combination in an automatic air-brake apparatus, of the triple valve provided with an opening and a port, the former communicating with the triple-valve-piston chamber at the train-pipe side of the piston thereof in its emergency position, and the latter with said chamber at a point between the feed-groove thereof and the service position of the piston, and a feed-valve attachment connected to said opening and port, and adapted when the train-pipe pressure falls below a predetermined standard but still exceeds that of the auxiliary reservoir to receive train-pipe air and deliver it to the said piston-chamber through said port, and adapted when the train-pipe pressure rises above such predetermined pressure to close communication between the train-pipe and said port.

5. The combination in an automatic air-brake apparatus, of the triple valve provided with an opening and a port, the former communicating with the triple-valve-piston chamber at the train-pipe side of the piston thereof in its emergency position, and the latter with said chamber at a point between the feed-groove thereof and the service position of the piston, and a feed-valve attachment connected to said opening and port, and adapted when the train-pipe pressure falls below a predetermined standard but still exceeds that of the auxiliary reservoir to receive train-pipe air and deliver it to the said piston-chamber through said port, and means to automatically close communication between the train-pipe and said port when the pressure in the auxiliary reservoir exceeds that of the train-pipe.

6. The combination with an automatic air-brake apparatus, of a feed-valve attachment having a supply-port, and a discharge-port, in communication with the triple-valve-piston chamber, and provided with a valve adapted when the pressure of the train-pipe falls below a given standard to permit train-pipe air to pass and enter the triple-valve-piston chamber, and to close such line of communication when the train-pipe pressure rises above such predetermined standard; said attachment also comprising a piston controlling the discharge-port, and adapted to be unseated by air-pressure before the seating of said valve occurs, and a check-valve adapted to be seated by back pressure in said discharge-port, substantially as described.

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

EDWARD L. GOSSE.

Witnesses:
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