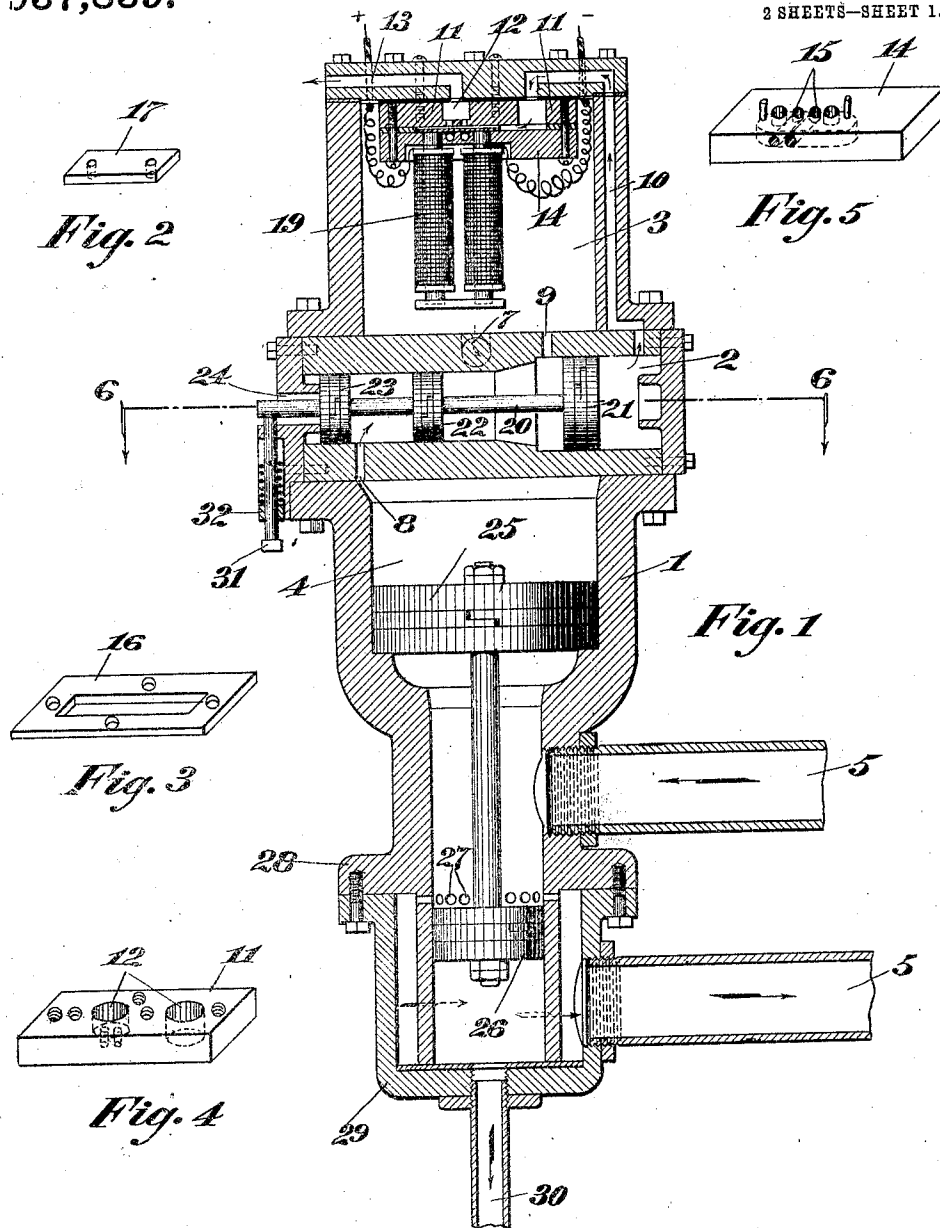


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AIR BRAKE.
APPLICATION FILED JULY 14, 1909.

Patented Oct. 26, 1909.

2 SHEETS—SHEET 1.

937,839.



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2 SHEETS—SHEET 2.

937,839.

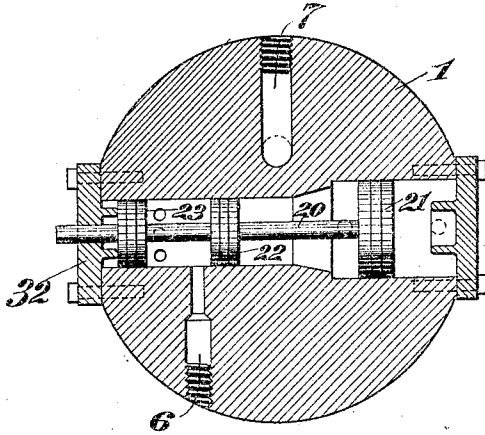


Fig. 6

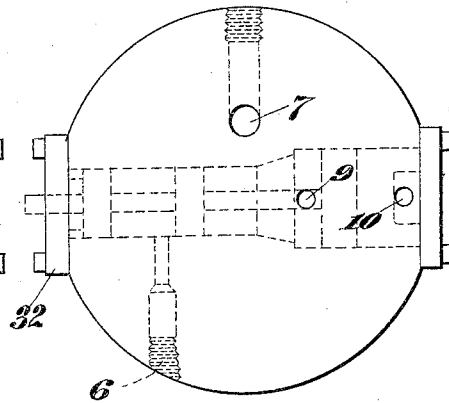


Fig. 7

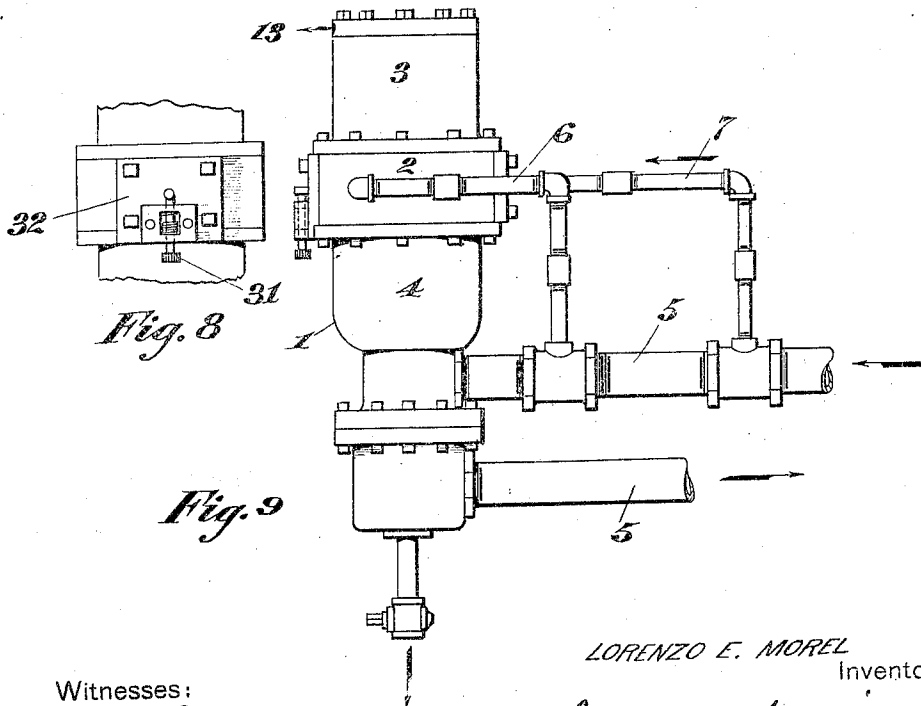


Fig. 9

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UNITED STATES PATENT OFFICE.

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937,839.

Specification of Letters Patent.

Patented Oct. 26, 1909.

Application filed July 14, 1909. Serial No. 507,470.

To all whom it may concern:

Be it known that I, LORENZO E. MOREL, a subject of the King of Great Britain, residing at 83 Ste. Marguerite street, St. Hyacinthe, in the county of St. Hyacinthe, in the Province of Quebec, Canada, have invented certain new and useful Improvements in Air-Brakes; and I do hereby declare that the following is 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.

The invention to be hereinafter described relates to air brakes and more particularly to an automatic air brake for railway trains and the like.

Broadly speaking it comprises a valve casing, valves mounted therein and adapted to normally maintain the pressure in the casing at a predetermined point, and electrically operated means for automatically actuating the valve controlling the exhaust from the casing.

In order to more clearly disclose the construction, operation and use of the invention, reference should be had to the accompanying drawings forming part of the present application.

Throughout the several figures of the drawings, like reference characters designate the same parts.

In the drawings:—Figure 1 is a central vertical section through the valve; Fig. 2 is a perspective of the armature adapted to act as a valve in governing the exhaust; Fig. 3 is a perspective of the washer for separating the two valve port plates; Fig. 4 is a like view of the upper port plate; Fig. 5 is a like view of the lower port plate; Fig. 6 is a horizontal cross section on line 6—6 of Fig. 1; Fig. 7 is a top plan view of the chamber 2; Fig. 8 is a detail front elevation of the stop; and, Fig. 9 is a side elevation of the invention complete and showing its application.

The present invention makes use of an electrically operated exhaust controlling valve for actuating the air brakes and consequently may be operated from any point of the train by a simple system of wiring.

In the preferred form of the invention, a valve casing 1 is provided having air chambers 2, 3 and 4. The chamber 2 is adapted to receive compressed air from the train line 5 through a branch pipe 6, while the chamber 3 receives compressed air from the train line through a branch 7, and acts

as an equalizing chamber. Consequently, the air pressures in the two chambers are equal. The upper part of chamber 4 communicates with chamber 2 through the passage 8 while the lower part thereof communicates with both branches of the train line. Consequently, the air pressures in the chambers 2, 3 and 4 under normal conditions, will be the same. Chambers 2 and 3 communicate with each other through passages 9 and 10. The passage 9 leads direct from one chamber to the other through the separating partition while the passage 10 leads from the rear end of chamber 2 around through the wall of the casing 1 and down through a port formed in the lower face of the top of the casing at approximately its center. Directly below this port is detachably secured, to the inner face of the top, a valve port plate 11 having the two ports 12. The passage 10 is continued across through the cover of the casing as an exhaust passage 13. The inner port of the passage 13 lies adjacent the inner port of passage 10 and the two ports 12 of the port plate 11 are adapted to register with these adjacent ports, as shown in Fig. 1. Below this top port plate is secured a second or bottom port plate 14 having ports 15 adapted to establish communication between the chamber 3 and the port 12 communicating with the exhaust passage 13. Between the edges of the adjoining faces of the port plates 11 and 14 is placed a washer 16 forming a slight rectangular space between the plates and establishing communication between the passages 10 and 13 through the ports 12. The passage 13 communicates directly with the atmosphere. Consequently, it is necessary, under normal conditions, to prevent communication between this passage and the chamber 3. To this end a thin disk or metal plate 17 has been provided. This plate is placed in the space between the plates 11 and 14. When the whole device is first installed the pressure throughout will be simply atmospheric. When the increased pressure of the train line enters chamber 3 it will pass upward through the ports 15 in the port plate 14 and against the face of the disk 17, forcing the disk upward to completely close the port 12 which communicates with the passage 13. The compressed air then passes around through the remaining port 12 and down through passage 10 to the rear end of the

chamber 2. As long as the pressure is maintained in the chamber 3 the disk will be forced to operative position.

In order to operate the brakes of the train it is, of course, necessary to reduce the pressure in the train line. This is done by reducing the pressure in chamber 3 which communicates with the train line. In order to effect such reduction in chamber 3, it is necessary, of course, to draw the disk 17 downward against the pressure of air in the chamber. This is effected by an electromagnet 19 suspended within the chamber 3 with its poles projecting through openings in the plate 14 and directly beneath the disk 17. As soon as the magnet is energized, the disk 17 will be drawn against the air pressure in chamber 3. As the plate 17 is drawn down the compressed air in the passage 10 will rush through the ports 12, the space between the port plates, and out through passage 13 to the atmosphere, the ports 15 being at the same time tightly closed by the plate 17. Consequently, the pressure in chamber 3 and the forward part of chamber 2 is greater than the pressure in the passage 10 and the rear part of chamber 2. This difference in pressure is used to operate a reciprocable valve 20 in the chamber 2. This valve is constructed as a piston comprising a single piston rod and several piston heads 21, 22 and 23. These piston heads are adapted to close or open ports or passages leading into and out of the chamber 2 to control the admission and exhaust of compressed air to and from the same. The head 21, normally, lies between the passages 9 and 10 while the head 23 normally lies between the passage 8 and an exhaust port 13 in which the outer end of the piston rod plays. Consequently when the air pressure in the passage 10 and in the rear of the chamber 2 falls below the pressure in chamber 3, the valve 20 will be driven rearwardly. As it moves rearwardly the passage 8 and exhaust port 24 will be brought into communication and the air in the upper part of chamber 4 will escape. The reduction of pressure in the upper part of chamber 4 is utilized to operate a second reciprocable valve, controlling the passage of air to and from the train line system through chamber 4. This valve comprises a piston rod and upper and lower piston heads 25 and 26. The lower piston head 26 is adapted to cut off communication between the branches of the train line and a port or a plurality of such ports 27 formed in the wall of the lower part of the chamber 4. A peripheral flange 28 is formed on the body of the chamber 4 just above the port or ports 27 and to this flange is detachably connected a cup 29 which coöperates with the exterior wall of the chamber to form an annular space. The bottom of the cup is drawn tightly

against the lower open end of the chamber to close the same. The two branches of the train line communicate respectively with the chamber 4 proper and with the annular space between the chamber 4 and the cup 29. The lower end of the cup is provided with a passage adapted to receive an exhaust pipe 30. Consequently as the reciprocable valve in the chamber 4 rises, the piston head 26 will pass above the port or ports 27 and lie between the valve and the inlet of the upper branch of the train line. In this position the air in the lower branch will escape, flow into the annular space between the cup 29 and the exterior wall of chamber 4, pass through the port or ports 27 below piston head 26, and exhaust through the exhaust pipe 30. In this way all brakes on the lower branch of the train line 5 will be set. Preferably the device will be placed in the engineer's cab so that the whole train pipe line may be used as a lower branch.

It is desirable to keep the brakes set for a considerable length of time. In order to accomplish this result, a spring actuated pin 31 is mounted in a casting or bracket 32 adjacent the exhaust passage 24 and is adapted to rise behind the end of the valve rod 20 to hold it in retracted position. Of course, as long as the reciprocable valve is held in its inward or retracted position, the passages 8 and 24 will be in communication and the air will be allowed to escape from chamber 4, thus causing the setting of the brakes in such part of the train line as is connected to the annular space formed between the cup 29 and the lower end of the chamber 4.

It is thought that the operation and application of the invention will be clear from the preceding detail description.

Changes may be made in the construction, arrangement and disposition of the several parts of the invention without in any way departing from the field and scope of the same, and it is meant to include all such within this application, wherein only a preferred form has been disclosed.

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

1. A device of the character described comprising a casing divided into compressed air, equalizing, and train line chambers; a train line, a branch pipe connecting said train line and said compressed air chamber; a second branch pipe connecting the train line and said equalizing chamber, an exhaust passage leading from said equalizing chamber about said compressed air chamber, means for establishing communication between the compressed air chamber and the exhaust passage, means actuated by the air pressure within the compressed air chamber and adapted to normally maintain communi-

cation between said chamber and the aforesaid exhaust passage, and an automatic device for withdrawing said means to cut off such communication.

5 2. A device of the character described comprising a casing divided into compressed air, equalizing, and train line chambers; communicating passages between said chambers, an exhaust passage leading from said
10 equalizing chamber directly into the atmosphere, a second exhaust passage leading from the rear of said chamber through the compressed air chamber and indirectly into the atmosphere, a reciprocable valve mounted
15 in said equalizing chamber and adapted to open exhaust communication between the train line chamber through the equalizing chamber, and electrically operated means for controlling exhaust through the aforesaid
20 second exhaust passage.

3. A device of the character described comprising a casing divided into compressed air, equalizing, and train line chambers; communicating passages between said chambers, an exhaust passage leading from said
25 equalizing chamber directly into the atmosphere, a second exhaust passage leading from the rear of said chamber through the compressed air chamber and indirectly into the atmosphere, a reciprocable valve mounted
30 in said equalizing chamber and adapted to open exhaust communication between the train line chamber through the equalizing chamber, electrically operated means for controlling exhaust through the aforesaid
35 second exhaust passage, and means for locking said reciprocable valve in operative position.

4. A device of the character described
40 comprising a casing divided into compressed air, equalizing, and train line chambers; communicating passages between said chambers, an exhaust passage leading from said equalizing chamber directly into the atmosphere, a second exhaust passage leading from the rear of said chamber through the compressed air chamber and indirectly into the atmosphere, a reciprocable valve mounted
45 in said equalizing chamber and adapted to open exhaust communication between the train line chamber through the equalizing chamber, electrically operated means for controlling exhaust through the aforesaid second exhaust passage, train line branches
50 connected to the aforesaid train line chamber, an exhaust passage leading from said chamber, a by pass adapted to establish com-

munication between the branches of said train line or between one branch thereof and said exhaust passage selectively; and a reciprocable valve mounted in said train line chamber and adapted to be actuated by the
60 varying pressure within the chamber to allow exhaust through the by pass and said exhaust passage or to establish communication between the branches of the train line.

5. A device of the character described comprising a casing, a train line chamber formed therein, means for varying the air pressure within said chamber, train line
70 branches connected to said chamber, an exhaust passage leading from said chamber, a by pass adapted to establish communication between said train line branches or between one of said branches and said exhaust passage selectively, and a reciprocable valve
75 mounted in said chamber and adapted to establish communication between said train line branches through the by pass or to establish communication between one of said branches and the exhaust passage by way
80 of the by pass.

6. A device of the character described comprising a casing, a train line chamber formed therein, a cup secured about the
85 lower end of the chamber and adapted to form therewith an annular space, a train line branch connected to said chamber, a second train line branch connected to said cup, an exhaust passage leading from said
90 chamber, a by pass adapted to establish communication between said chamber and the aforesaid annular space between the cup and the lower end of the chamber, and a reciprocable valve slidably mounted in said chamber and adapted to govern passage of air
95 through the by pass.

7. In a device of the character described, a casing, an equalizing chamber therein, a reciprocable valve in said chamber, a train
100 line chamber communicating with said equalizing chamber, a passage for exhaust of air from said train line chamber through said equalizing chamber, said reciprocable valve mounted in said equalizing chamber
105 and adapted to control such exhaust, and means for locking said valve in operative position.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

LORENZO E. MOREL.

Witnesses:

T. MYNARD,
E. J. GANVIN.