J. M. CARTER.

RETAINING VALVE FOR AUTOMATIC AIR BRAKES.

APPLICATION FILED JUNE 4, 1908.

916,669.

Patented Mar. 30, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

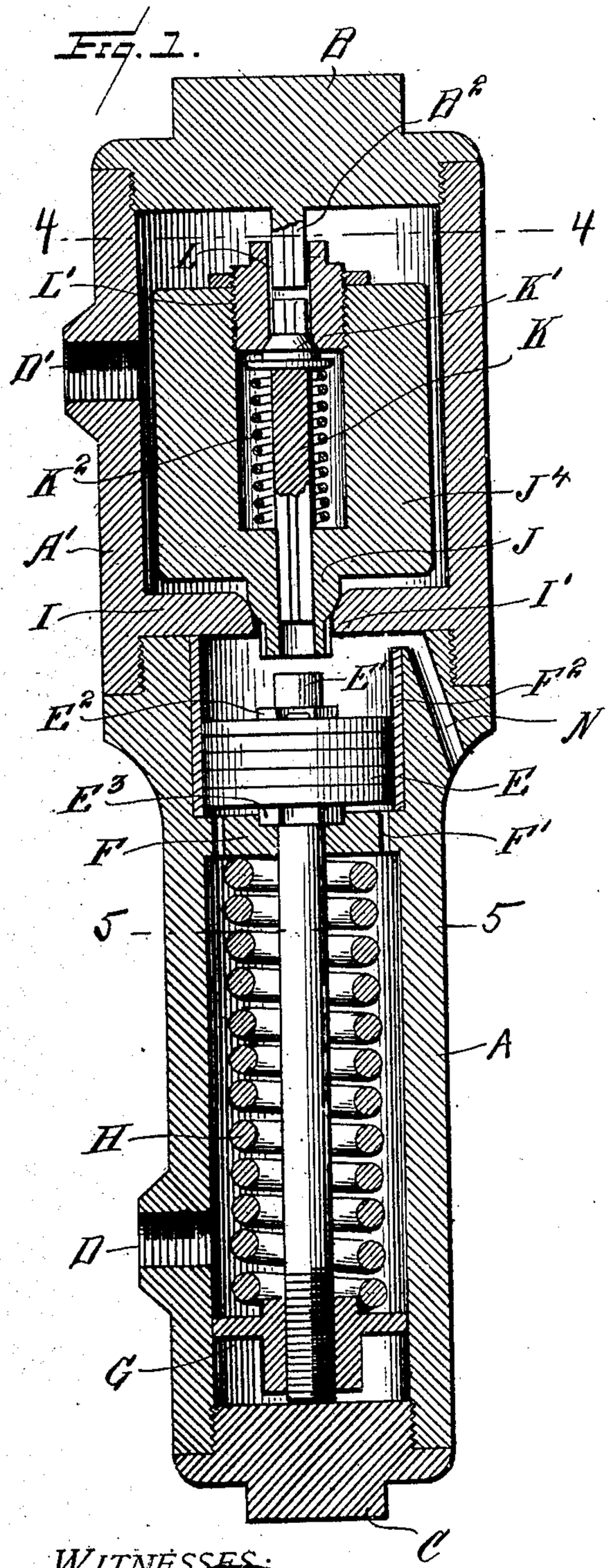
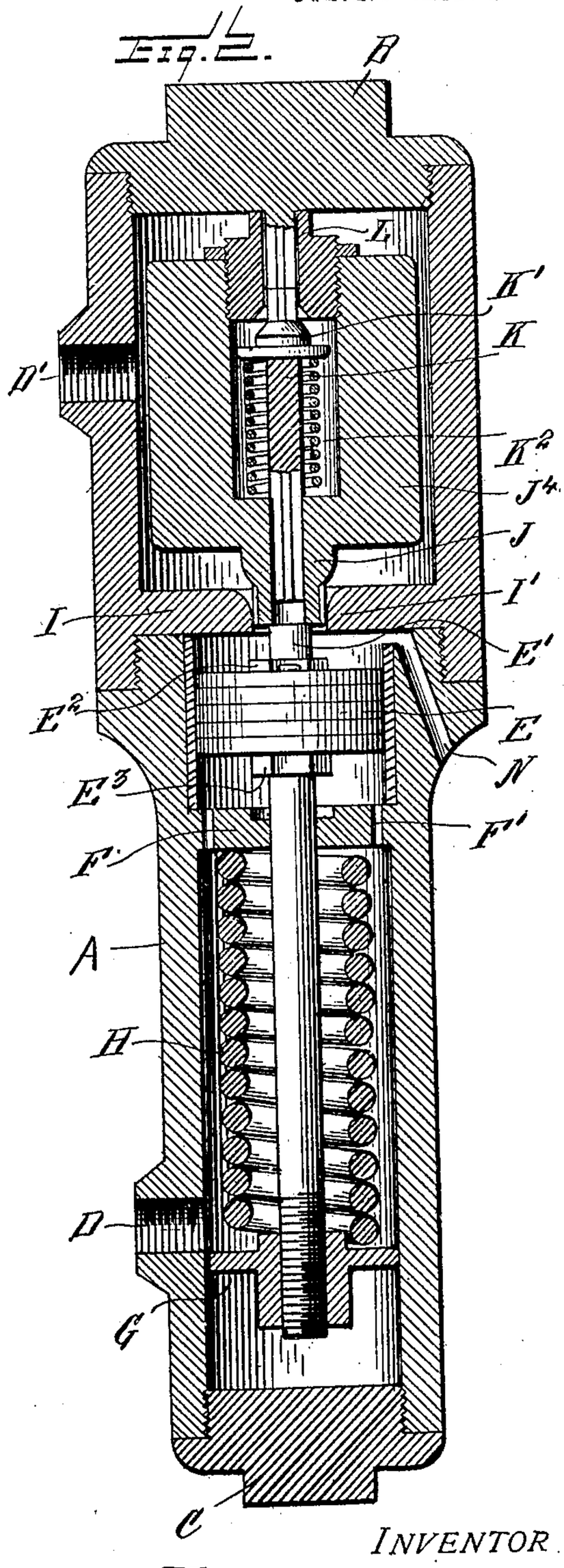


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 4.

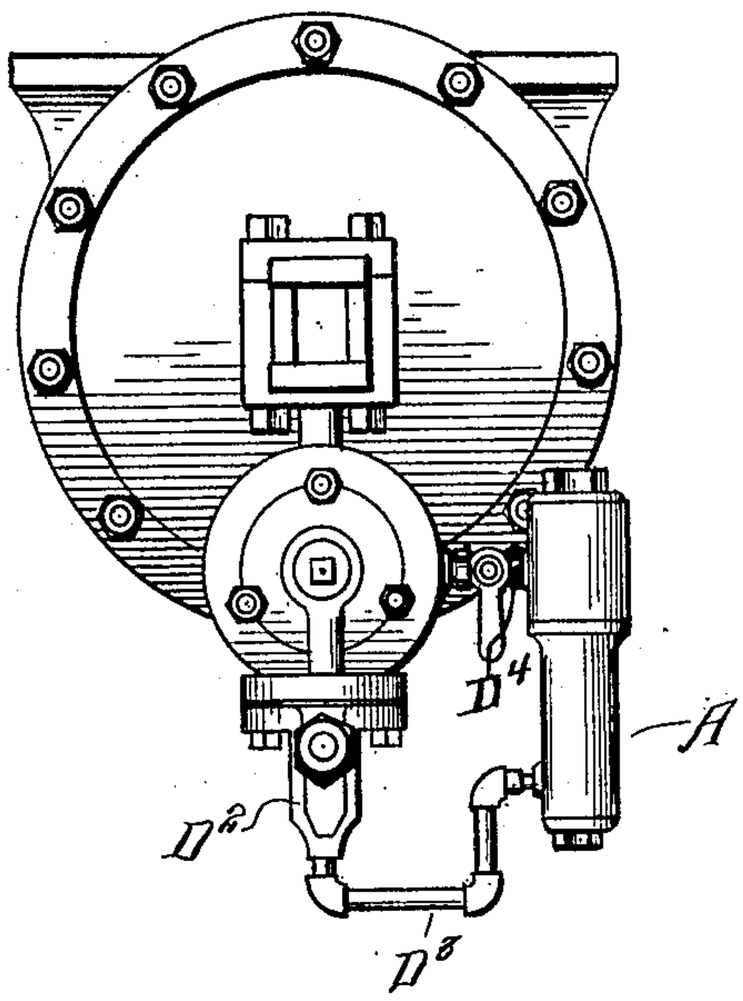


Fig. 5.

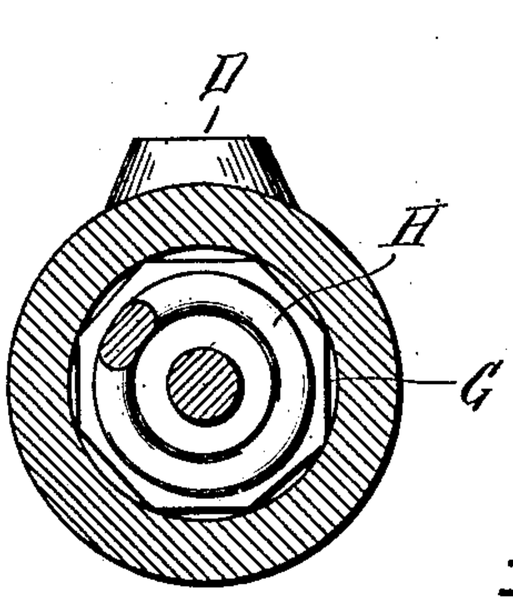
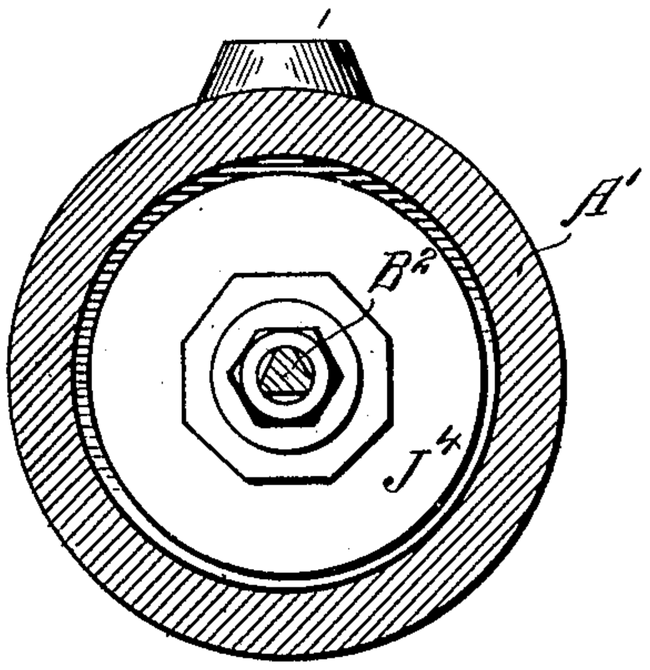


Fig. 6.



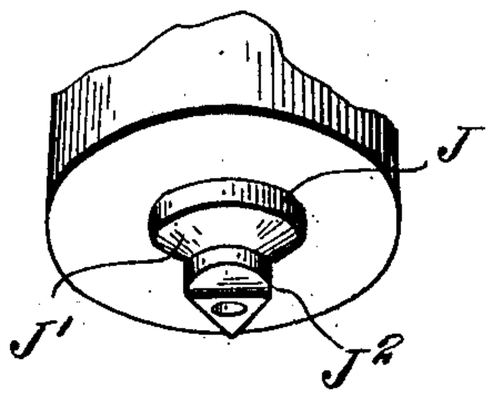


Fig. 7.

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UNITED STATES PATENT OFFICE.

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RETAINING-VALVE FOR AUTOMATIC AIR-BRAKES.

No. 916,669. Specification of Letters Patent. Patented March 30, 1909.

Application filed June 4, 1908. Serial No. 436,665.

To all whom it may concern:

Be it known that I, JOHN M. CARTER, a citizen of the United States, residing at Memphis, in the county of Shelby and State of Tennessee, have invented certain new and useful Improvements in Retaining-Valves for Automatic Air-Brakes; 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in attachments to air brakes and comprises essentially means for holding the pressure in the air brake cylinder while the auxiliary reservoir is being recharged.

With the present air brake appliances, it is necessary to run a pipe from the triple valve which is located about midway of the car underneath to the end of the car and thence to the top of the latter where it may be accessible to a trainman and, when necessary to put the retaining valve in service, it necessitates the trainman passing over the tops of the cars to turn up the handles of the valves now in use in order to throw the valve into service position. As all of the freight cars are equipped with this apparatus and where the cars are used in northern climates, the roofs of the cars become covered with ice and snow which make it dangerous for a trainman to pass from car to car for setting the valves and especially where coal cars, furniture cars, flat cars, box cars, etc., are connected or used in the same train.

By the provision of my invention, the engineer will have complete control of the retaining valve without the necessity of any extra or special appliances upon the engine or without it being necessary for a trainman giving the retaining valve any attention.

The invention comprises various details of construction, combinations and arrangements of parts which will be hereinafter fully described and then specifically defined in the appended claims.

My invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a vertical sectional view through the apparatus showing the valves seated. Fig. 2 is a similar vertical central view through the apparatus with the valves unseated. Fig. 3 is an end view of a brake cylinder showing the apparatus in elevation as applied thereto. Fig. 4 is a cross sectional view on line 4—4 of Fig. 1. Fig. 5 is a cross sectional view on line 5—5 of Fig. 1, and Fig. 6 is a detail perspective view of one end of the retaining valve.

Reference now being had to the details of the drawings by letter, A and A′ designate two sections of a valve casing which have threaded connection with each other and the section A′ is provided with a threaded plug B and with an angled outline wrench receiving portion whereby the plug may be screwed into the section or removed therefrom.

C—C designates a similar plug which is fitted to the threaded end of the section A, as shown clearly in Figs. 1 and 2 of the drawings. Leading from the section A is a port D designed to have connection with the triple valve D^2 at the bottom thereof by first removing the usual drain plug, said connection being designated by letter D^3 in Fig. 3 of the drawings.

D′ designates a port leading through the wall of the section A′, through which communication is had with the exhaust port of the triple valve through the medium of the pipe D^4. The triple valve is of the usual three-way type and is provided for the purpose of cutting the retaining valve out where it is not required in service.

It will be understood that this apparatus is designed for use in connection with any form of brake mechanism, it being readily applied thereto without any special appliances.

Mounted within a hollow chambered portion of the section A is a piston E made up preferably of piston rings and followers of the usual construction and is provided with a stem E′. The upper end of said piston stem E′ is threaded to receive a nut E^2 and a cotter pin *e* is preferably passed through an aperture in the upper portion of the piston stem and adapted to hold said nut E^2 from loosening. Upon said piston stem is an angular outlined shoulder E^3 bearing against the piston head and is adapted to seat in a similarly outlined recess formed in the partition F which is formed within the section A, said partition being provided with ports F′ leading therethrough from the passage of the air under pressure from one portion of the section to the other and for a purpose which will

presently be described. The portion of the section A in which the piston E works is provided with a bushing F^2 in order to make an airtight fit.

Mounted upon the lower threaded end of the piston stem is a nut G having an angular outlined circumference, as shown clearly in Fig. 5 of the drawings. The upper face of the nut G has a boss G′ which is circular in outline, and H designates a coiled spring, the lower end of which rests upon the nut G and about the circumference of said boss which holds the spring in place. The upper end of the coiled spring bears against the under surface of the partition F, as shown clearly in Figs. 1 and 2 of the drawings.

The upper section A′ has a partition I therein with a central partition I′, the wall of which is beveled and forms a seat for the valve J, a detail perspective view of which is shown in Fig. 6 of the drawings, and consists of a valve seat J′ and a stem J^2 which, at its end, is triangular in cross section and is hollow for the reception of a valve stem K which is also angular in cross section, as shown clearly in Fig. 4 of the drawings. It will be understood that said valve stem K needs only to be angular in cross section adjacent to its end where it is desired to allow the air under pressure to pass through the openings at the ends of the hollow valve stem J and the opening L in the threaded plug L′ which is fitted into the upper threaded end of the chamber of the valve J. It will be noted that the valve J has a weighted portion J^4 which tends, when the valve is in service, to hold the valve seated under its own weight. Said valve stem K has an integral auxiliary valve K′ adapted to be held against a valve seat upon the plug L′ by means of a coiled spring K^2 which bears between the inner end of the chambered portion of the weighted part of the valve J and said valve, as shown clearly in Figs. 1 and 2 of the drawings. Projecting from the plug B is a guide stem B^2 which is angular in cross section, as shown in Fig. 4 of the drawings, and is adapted to guide the valve J by entering the aperture in the valve plug L′. Leading through the wall of the upper portion of the section A is an exhaust port N through which air passes from the exhaust port of the triple valve to the atmosphere.

In operation when the train line pressure is turned into the train pipe from the engine, the air under pressure from the train pipe goes through the port D into the chambered portion of the section A. The spring H may be adjusted to any desired tension by means of the nut G on the end of the piston stem G′. As the train line pressure at full charge is seventy pounds, the tension of the spring H should be set at from sixty to sixty-five pounds. When the train line pressure in the chamber of the section A is raised until it overcomes the tension of the spring H, the air flowing from the chamber in the section A through the ports F′ will cause the piston E to rise and, as the upper end of the stem E′ comes in contact with the lower end of the valve J, the latter will be unseated and allow a free passage from the exhaust port in the triple valve to the atmosphere through the opening D′ past the retaining valve seat I′ and through the port N to the atmosphere. The train line pressure in the chamber of the section A being greater than the tension of the spring H forces the piston E up and holds the valve J off its seat and prevents any leakage from the exhaust port of the triple valve from causing the brakes to set.

In service when the train is descending grades and the train line pressure is reduced by application of the brake below the pressure at which the spring H is set, the spring H overcomes the pressure under the piston E and the latter is drawn back to its seat, allowing the retaining valve J to seat and close the passageway from the exhaust port of the triple valve to the atmosphere. The piston E and the valve J remain seated until the train line pressure is raised sufficiently to overcome the tension of the spring H, when the piston E will rise and the valve J will be released. At the time the train line pressure is being raised, the auxiliary reservoir pressure will also be raised so that, when the retaining valve J stands at released positions, the auxiliary reservoir will be nearing full charge.

If the engineer does not want the brakes released after the auxiliary reservoirs have been recharged, it is only necessary for him to place the engineer's brake valve in lap position and the brakes will not release. This action prevents the main reservoir pressure from flowing into the train line and raising the pressure under the piston E sufficiently to overcome the tension of the spring H. If it is found necessary to release the brakes before the auxiliary reservoirs have time to recharge, the engineer's brake valve should be placed in full released position and held there for a few seconds when the main reservoir pressure flowing into the train line will force the piston E up and release the valve J and allow the pressure in the brake cylinder to flow to the atmosphere through the port N. In recharging the auxiliary reservoirs with the retaining valve in service, the engineer's brake valve should stand at running position.

In descending long grades where it is not necessary to hold full pressure in the brake cylinders to control the train but is necessary to hold a part of the pressure in the brake cylinders to control the train when the auxiliary reservoirs are being recharged, a means of reducing pressure it is desired to retain is provided in the valve K′ which is contained

in the weighted valve J. The valve K′ is held to its seat by means of the spring K² and the said valve K′ may be set at any pressure it is desired to retain by screwing down the threaded plug or nut L′ against which the valve K′ seats. The guide stem B² upon the plug B and the top and bottom portions of the stem K are preferably angular in cross section, as shown in cross section in Figs. 4 and 5 of the drawings. When the engineer's brake valve is placed in running position to allow the auxiliary reservoirs to recharge, the triple valve then stands at released position and the weighted valve J is then seated, closing communication between the brake cylinder and the atmosphere. The amount of air pressure in the brake cylinders in excess of the pressure at which the valve K′ is set then exhausts to the atmosphere by way of the guide stem B², the valve stem K, the hollow passageway in the lower end of the stem of the valve J through the port N to the atmosphere. After pressure in the brake cylinder is reduced to the pressure at which the valve K′ is set, the valve K′ seats and retains the pressure in the brake cylinder until the auxiliary reservoirs recharge, after which the piston K′ rises and unseats the weighted valve J and allows the brake to release in full. The valve J then remains unseated until a further reduction is made in the train line pressure, sufficient to reduce the train line pressure below the pressure at which the spring H is set, at which time the piston E is moved back to its seat and the valve J goes into service or seats, retaining pressure in the brake cylinder as described.

What I claim to be new is:—

1. In combination with a brake cylinder, triple valve, auxiliary air reservoir and train line of an air brake system, a valve retaining casing made up of sections, one of said sections having a spring-actuated valve controlling the communication through each section, a pipe communicating between one of said sections and the check valve casing of the triple valve, a pipe communicating between the other section and the exhaust port of the triple valve, and means actuated by the engineer's brake valve for operating the valves in said valve retaining casing, as set forth.

2. In combination with a brake cylinder, triple valve, auxiliary air reservoir and train line of an air brake system, a valve retaining casing made up of sections, a weighted valve mounted in one of said sections and adapted to control the passageway leading through a partition therein and having communication with the exhaust port of a triple valve, a spring-pressed piston mounted in the other section of the valve retaining casing, a pipe communicating between the valve casing containing said piston and the check valve casing of the triple valve, said valves in the retaining valve casing adapted to be actuated automatically by the engineer's brake valve, as set forth.

3. In combination with a brake cylinder, triple valve, auxiliary air reservoir and train line of an air brake system, a valve retaining casing made up of sections, a weighted valve in one of said sections adapted to control a passageway therethrough, said weighted valve being chambered, a plug in the end of said chamber, a spring-pressed valve mounted within said chamber and adapted to seat against said plug and having a stem which is angular in cross section and projects through an opening in the end of said valve, means for guiding said valve, a pipe communicating between the section of the casing containing the weighted valve and the exhaust port of a triple valve, a spring-pressed piston mounted in the other section of the valve retaining member, a pipe communicating between the latter section and the check valve casing of the triple valve, the mechanism within said retaining valve casing adapted to be actuated automatically from the engineer's brake valve, as set forth.

4. In combination with a brake cylinder, triple valve, auxiliary air reservoir and train line of an air brake system, a weighted chambered valve mounted in one of said sections adapted to regulate a passageway leading through a partition wall therein, a plug in the end of the chamber of said valve, a spring-pressed valve mounted within said chamber and adapted to seat against said plug, stems projecting from said valve and adapted to have a play in the apertures in the end of said weighted valve and plug, said stems being angular in cross section, means for guiding the weighted valve, a pipe communicating between the chamber containing the weighted valve and the exhaust port of the triple valve, a piston mounted in the other section of the valve retaining casing, the latter being provided with an exhaust port, and having a stem adapted to contact with the end of the weighted valve to unseat the same, a spring designed to normally hold the piston seated, a pipe communicating between the port of the valve retaining casing and the check valve casing of the triple valve, the mechanism within said retaining valve casing adapted to be actuated automatically by the engineer's brake valve, as set forth.

5. In combination with a brake cylinder, triple valve, auxiliary air reservoir and train line of an air brake system, a weighted chambered valve mounted in one of said sections adapted to regulate a passageway leading through a partition wall therein, a plug in the end of the chamber of said valve, a spring-pressed valve mounted within said chamber and adapted to seat against said plug, stems projecting from said valve and

adapted to have a play in the apertures in the end of said weighted valve and plug, said stems being angular in cross section, means for guiding the weighted valve, a pipe communicating between the chamber containing the weighted valve and the exhaust port of the triple valve, a piston mounted in the other section of the casing, a stem passing through said piston, the upper end of the stem adapted to unseat said weighted valve, an angular outlined shoulder upon the stem of said piston adapted to seat in a recess in a partition of the casing, a spring adapted to normally hold said piston seated, a pipe communicating between the portion of the casing below said piston and the check valve casing of the triple valve, said mechanism in the valve retaining casing designed to be actuated automatically from the engineer's brake valve, as set forth.

6. In combination with a brake cylinder, triple valve, auxiliary air reservoir and train line of an air brake system, a weighted chambered valve mounted in one of said sections adapted to regulate a passageway leading through a partition wall therein, a plug in the end of the chamber of said valve, a spring-pressed valve mounted within said chamber and adapted to seat against said plug, stems projecting from said valve and adapted to have a play in the apertures in the end of said weighted valve and plug, said stems being angular in cross section, means for guiding the weighted valve, a pipe communicating between the chamber containing the weighted valve and the exhaust port of the triple valve, a piston mounted in a chambered portion in the other section of the valve retaining casing, a stem passing through said piston, the upper end of the stem adapted to unseat said weighted valve, an angular outlined shoulder upon the stem of said piston adapted to seat in a recess in a partition of the casing, the lower end of the piston being threaded, a nut mounted thereon and having an angular outlined circumference, a spring bearing between said nut and an apertured partition in the section of the retaining casing in which said piston is mounted and designed to normally hold said piston at its lowest throw, a pipe communicating between the lower portion of the valve retaining casing and the check valve casing of the triple valve, said mechanism within the retaining valve casing being adapted to be actuated automatically by the engineer's brake valve, as set forth.

7. In combination with a brake cylinder, triple valve, auxiliary air reservoir and train line of an air brake system, a weighted chambered valve mounted in one of said sections adapted to regulate a passageway leading through a partition wall therein, a plug in the end of the chamber of said valve, a spring-pressed valve mounted within said chamber and adapted to seat against said plug, stems projecting from said valve and adapted to have a play in the apertures in the end of said weighted valve and plug, said stems being angular in cross section, means for guiding the weighted valve, a pipe communicating between the chamber containing the weighted valve and the exhaust port of the triple valve, a piston mounted in a chambered portion in the other section of the valve retaining casing, a stem passing through said piston, the upper end of the stem adapted to unseat said weighted valve, an angular outlined shoulder upon the stem of said piston adapted to seat in a recess in a partition of the casing, the lower end of the piston being threaded, a nut mounted thereon, said nut having a boss projecting from its upper face, a coiled spring, one end of which engages said nut and about said boss, its other end bearing against an apertured partition within the portion of the casing containing said piston, a pipe communicating between the portion of the valve retaining casing below said triple valve, the mechanism within said retaining valve casing being adapted to be actuated automatically from the engineer's brake valve, as set forth.

8. In combination with a brake cylinder, triple valve, auxiliary air reservoir and train line of an air brake system, a weighted chambered valve mounted in one of said sections adapted to regulate a passageway leading through a partition wall therein, a plug in the end of the chamber of said valve, a spring-pressed valve mounted within said chamber and adapted to seat against said plug, stems projecting from said valve and adapted to have a play in the apertures in the end of said weighted valve and plug, said stems being angular in cross section, a threaded plug fitted in the end of the section of the casing containing said weighted valve, an angular stem projecting from said plug and engaging an aperture in the latter, a pipe communicating between the chamber in the section of the casing in which the weighted valve is mounted and the exhaust port of the triple valve, a spring-pressed piston mounted in the lower section of the retaining valve casing, an exhaust port in said section of the casing containing the piston, a pipe communicating between the retaining valve casing below said piston and the check valve casing of the triple valve, said mechanism within the retaining valve casing being adapted to be actuated automatically from the engineer's brake valve, as set forth.

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

JOHN M. CARTER.

Witnesses:
O. W. Brown,
Gus. A. Lavison.