

W. S. BILBREY.

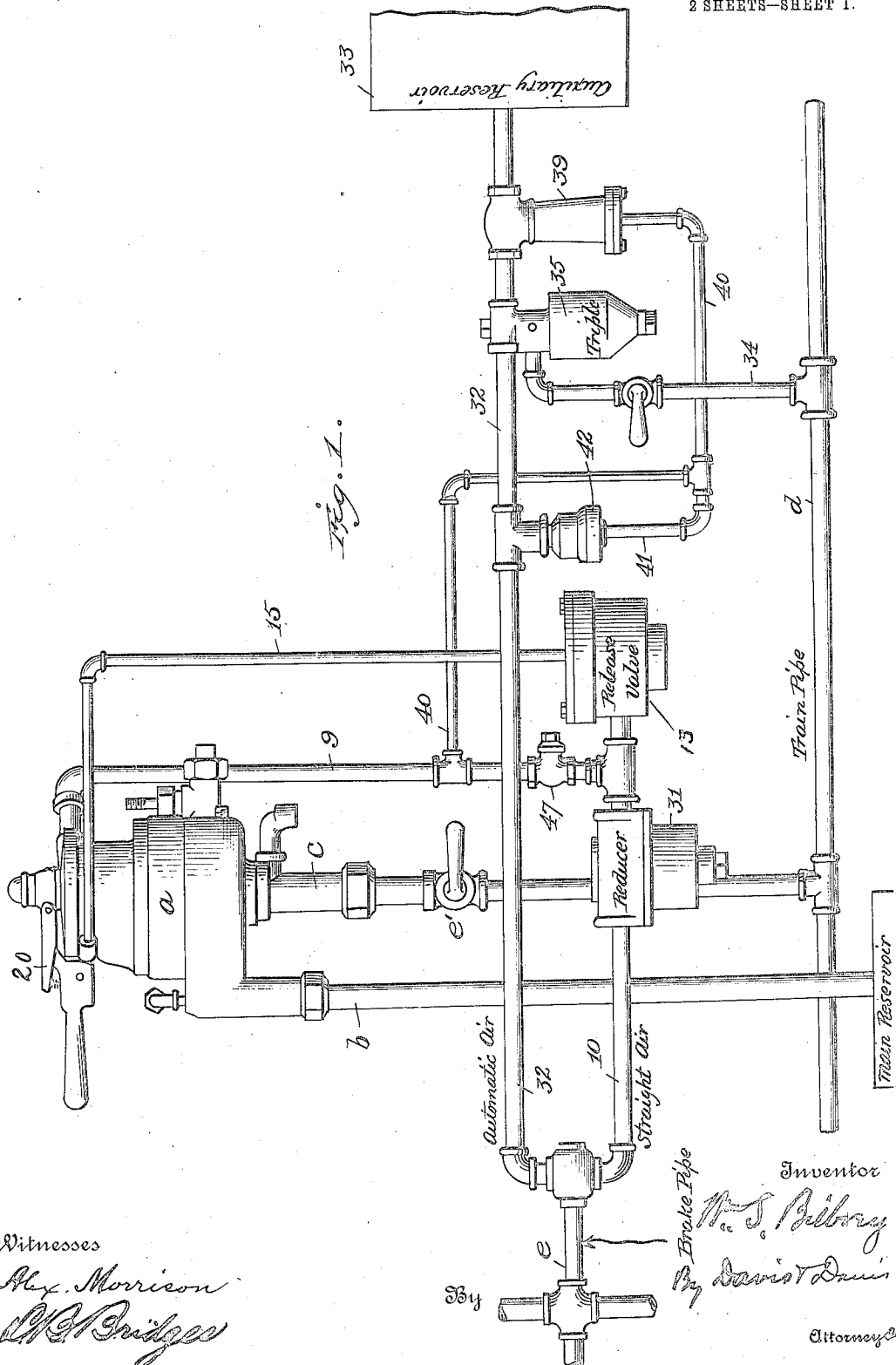
AIR BRAKE.

APPLICATION FILED AUG. 12, 1909.

Patented Mar. 15, 1910.

2 SHEETS—SHEET 1.

952,299.



Witnesses

Alex. Morrison  
C. B. Bridges

Inventor

W. S. Bilbrey

By David Davis

Attorney

W. S. BILBREY.

AIR BRAKE.

APPLICATION FILED AUG. 12, 1909.

Patented Mar. 15, 1910.

2 SHEETS—SHEET 2.

952,299.

Fig. 2.

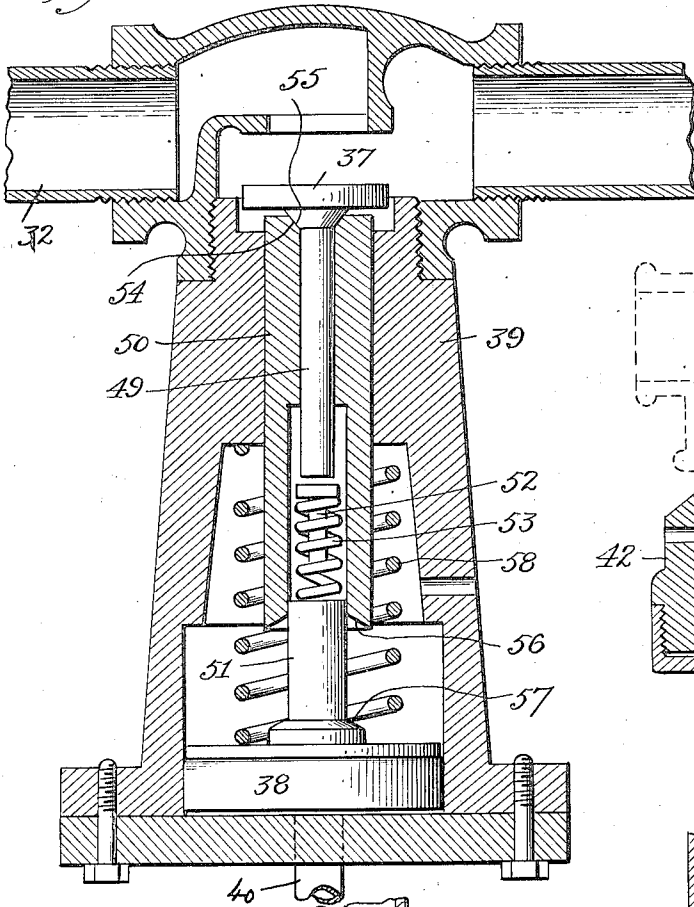


Fig. 3.

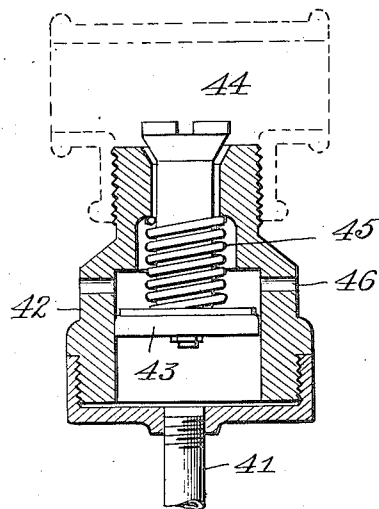


Fig. 4.

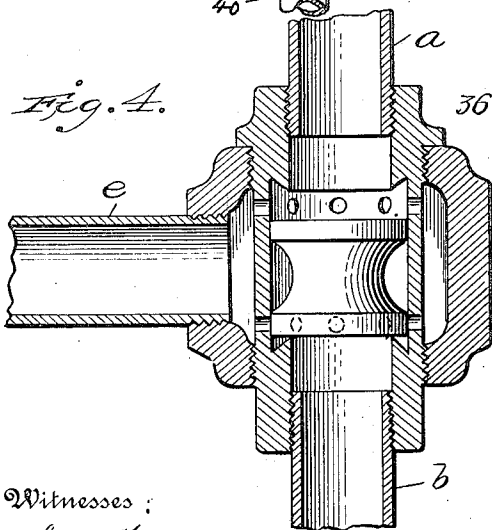
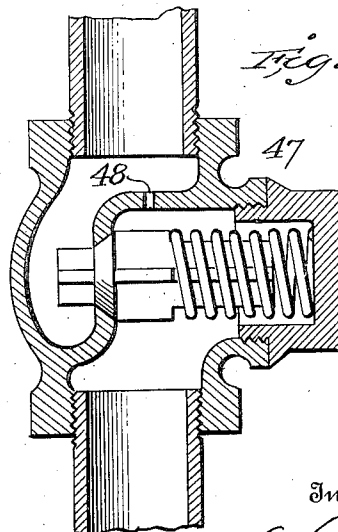


Fig. 5.



Witnesses:

Alex. Morrison

W. B. Bridges

By

Davis & Davis

Attorneys

Inventor

William S. Bilbrey

# UNITED STATES PATENT OFFICE.

WILLIAM S. BILBREY, OF WEST POINT, GEORGIA.

## AIR-BRAKE.

952,299.

Specification of Letters Patent. Patented Mar. 15, 1910.

Application filed August 12, 1909. Serial No. 512,553.

*To all whom it may concern:*

Be it known that I, WILLIAM S. BILBREY, a citizen of the United States of America, residing at West Point, in the county of Troup and State of Georgia, have invented certain new and useful Improvements in Air-Brakes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, in which—

Figure 1 represents a diagrammatic view of my improved apparatus; Fig. 2 a vertical sectional view of the automatic cut-off between the triple valve and the auxiliary reservoir; Fig. 3 a vertical sectional view of the automatic bleed valve between the triple valve and the double check on the engine and the tender; Fig. 4 is a sectional view showing one form of a double check valve located at the juncture of the automatic-air pipe and the straight-air pipe. Fig. 5 is a vertical sectional view of valve 47 the function of which is hereinafter set forth.

In a former patent No. 869,543 granted to me October 29, 1907, I have covered an apparatus which is adapted to be attached to the engineer's valve of a standard air brake equipment, without material change in construction of said valve whereby the engineer may, by manipulation of the usual handle attached to said valve, apply the brakes on the locomotive and tender by straight-air from the main reservoir on the locomotive, the apparatus being adapted to permit the brakes on the locomotive and tender to be applied by straight-air simultaneously with the application of the brakes on the cars by automatic air in the usual way, or to set the engine brakes separately and leave the train brakes unapplied, or to release the engine brakes and leave the train brakes applied, or to release the train brakes and leave the engine brakes applied. This prior apparatus of mine does not interfere with the usual operation of the regular engineer's valve nor necessitate any change in the construction or arrangement of the parts of the same, and by its use loss of air is avoided as there are no auxiliary reservoirs or triple valves on the locomotive or tender to be exhausted or operated. This apparatus also enables the piping on the locomotive to be reduced, which, together with the omission of the usual triple valves and auxil-

iary reservoirs, materially reduces the cost of equipment of the engine. Furthermore the brakes on the engine and tender are more quickly applied and released than with the apparatus theretofore employed. In the practical use of my patented apparatus, however, I have found it desirable that the equipment on the locomotive should be so constructed and arranged that in addition to applying the brakes on the locomotive and the tender by straight-air from the main reservoir, such brakes should be also put under the control, under certain conditions, of the automatic air from an auxiliary reservoir, so that any reduction of pressure in the regular train pipe will automatically apply the brakes on the locomotive and tender, provided such brakes have not already been applied by means of the straight-air devices by the engineer. The provision of such means is desirable especially in order that should the train break in two or a leak should occur in the connecting hose the brakes on the locomotive and tender shall be automatically applied at the same time that the brakes are on the remaining units in the train. It is also desirable when the engine is running tandem to a preceding locomotive which, as is the usual practice, has control of the entire braking apparatus of the train, so that the locomotive and its tender running second shall be subject to the action of the automatic air appliances just as is each one of the other units in the train, as more fully hereinafter set forth.

As my present improvements are especially applicable to the apparatus covered by my former patent I have shown them in connection with a diagram of the apparatus of my patent, and for the sake of clearness I will use the same reference-characters so far as is possible.

In the drawing *a* designates the usual engineer's valve from which a pipe *b* leads to the main reservoir and a pipe *c* to the usual main train-pipe *d*, said pipe *c* being provided with a cut-off of the usual construction to permit the engineer's valve to be rendered inoperative when the engine is running tandem.

*e* is a pipe connected to the brake cylinders on the locomotive and the tender, said pipe being connected to the straight-air pipe 10 which in turn is connected to a pipe 9 lead-

ing from the engineer's valve. The end of pipe 10 beyond its connection to pipe 9 is provided with a release valve 13, such as is shown in my former patent, and this release valve is connected to the engineer's valve by a pipe 15. This arrangement of piping is substantially the same as shown in my former patent, and the engineer's valve is so constructed that when the handle thereof is set to service position, air from the main reservoir will be directed practically simultaneously into both pipes 9 and 15. The air thrown into pipe 9 will pass into the brake cylinders on the locomotive and tender and apply the brakes, while the air that passes into pipe 15 will hold the release valve closed; and when the handle is adjusted back to running position the port leading to pipe 9 will be closed and pipe 15 will be opened to the atmosphere, thus permitting the air in pipe 10 to open the release valve and exhaust the brake cylinders direct to the air and release the brakes. In my present construction I have introduced into pipe 10 a pressure reducer 31, of any ordinary construction, whereby an excess of pressure in the brake cylinders is rendered impossible.

At the juncture of pipe 10 to pipe *e* I join the automatic-air pipe 32, which leads to a plain triple valve 35 and thence to an auxiliary reservoir 33 and is connected to the train pipe *d* through said triple valve by a branch pipe 34. At the juncture of pipes 10, 32 and *e* I place a double check valve 36 of the well known type, so arranged that when air is let into the straight-air pipe 10, the valve will close pipe 32, and vice versa. Between the triple valve and the auxiliary reservoir I attach to pipe 32 an automatic cut-off 37, which normally stands open so as to have normal free communication between the auxiliary reservoir and the triple valve but which is adapted to be closed by means of a piston 38 attached to its valve disk and working in a cylinder 39, which cylinder is connected by a pipe 40 to the aforesaid pipe 9. A branch 41 of this pipe leads to a cylinder 42 in which works a piston 43, which piston is attached to a valve 44, located in pipe 32 at a point beyond the triple valve. This valve 44 is normally held closed by a spring 45 bearing on top of its piston and is adapted to be opened to place said pipe 32 in communication with the atmosphere through ports 46 whenever air is thrown under the piston 43 by means of the branch pipe 41.

In pipe 9, at a point between its connection to pipe 40 and pipe 10, is inserted a check valve 47, which is normally held closed but which is adapted to automatically open after a predetermined pressure has accumulated in pipe 9, the object of this valve being to temporarily check the initial flow of air from pipe 9 to pipe 10, so that before

air enters the brake pipes, a portion of the initial flow will be shunted into pipes 40 and 41 and caused to simultaneously operate the valves 44 and 37.

It will be observed that when the engineer throws straight air into the brake cylinders on the locomotive and tender, the valve 37 will be closed and held closed while the brakes are on, while the valve 44 will be opened and held open while the brakes are on, thus cutting out temporarily the automatic air. The valve 44 is a precautionary device simply, it being designed simply to open pipe 32 between the triple valve and the double check valve 36 to the atmosphere, so that in case automatic air has leaked past the triple valve into pipe 32 it will be exhausted to atmosphere and be thereby prevented from interfering with the closing of the pipe 32 by double check valve 36. The closing of valve 37, cuts out the auxiliary reservoir completely while the brakes are held applied by straight-air on the locomotive and tender, so that a reduction in the main train pipe can have no effect upon the triple valve or the auxiliary reservoir on the locomotive. When the straight-air is exhausted from the brake pipes through release valve 13, as hereinbefore described, valve 44 will automatically close and valve 37 will open and thus restore the automatic devices to operative position. After the flow of air through pipe 9 is stopped and the brakes are fully applied the valve 47 will close, and in order to equalize the pressure on both sides of this valve and to permit the upper portion of pipe 9 to exhaust through release valve 13, I provide a small opening 48 in the partition wall in this valve.

It will be observed that unless the brakes on the locomotive and tender are applied in the manner above set forth, any reduction of pressure in the main train pipe will actuate the triple valve 35 and let air from the auxiliary reservoir into the brake pipes *e*, the passage of air past the double check 36 serving to close the straight-air pipe 10 and thus cut out the straight-air appliances.

The cut off 37 may be constructed in any suitable manner but I prefer constructing it substantially as shown in Fig. 2. To the valve disk 37 is attached a depending stem 49 which works snugly in a bushing-tube 50 which closes the upper end of cylinder 39. Working into the lower end of tube 50 is a stem 51 carried by the aforesaid piston 38, and between the stems 51 and 49 is a pin or rod 52 normally held up against stem 49 by a spring 53. The upper end of tube 50 is beveled at 54 to form a seat for a valve 55, and the lower end of said tube is beveled at 56 to form a seat for valve 57. The piston 38 is normally pressed downwardly by means of a spring 58 and the pin 52 and spring 53 are of such length that when the

piston is down the valve 55 may close tightly against its seat 54 and when the piston is raised and its valve 57 is closed against seat 56 the main valve 37 will be held tightly against its seat. The motion is transmitted by the spring, the pin serving simply as a guide or support for the spring. Supplemental valve 55 prevents leakage down past the stem 49, and the valve 57 prevents leakage when the piston is at the upper extremity of its stroke. This construction therefore is a highly desirable one, but it will be understood that any other form of cut-off may be employed without departing from the spirit of this invention.

It will be understood that should the engineer desire to release the engine and tender brakes immediately after they have been applied automatically in the manner herein set forth and before he has re-charged the train-pipe, he may do so by first moving his brake-valve to straight-air position for just a moment, then to lap and then vent pipe 15 by means of the thumb-lever 20 described in my hereinbefore-mentioned patent. It will be observed also that when the train-line is reduced to apply the train-brakes after the engine and tender brakes have been applied by straight-air, the automatic devices will nevertheless remain cut out until the train-line has been re-charged to a pressure about equal to the pressure which is cut off in the auxiliary reservoir, whereupon the train-line pressure will open cut-out valve 37 and thus automatically cut itself in again in readiness for automatic service.

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

1. In combination with a fluid pressure brake system embodying means for applying the engine brakes by straight air and also by automatic air, of cut out devices adapted to cut out the automatic means when the straight air means are operated, said cut out devices embodying a valve between the triple valve and the auxiliary reservoir on the engine, said valve being normally held open by pressure from the said auxiliary reservoir.

2. In combination with a fluid pressure air brake system, means connected to the engineer's valve for manually controlling the introduction of air from the main reservoir into the brake cylinders on the locomotive and tender, automatic means for introducing air from the auxiliary reservoir on the locomotive into the aforesaid brake cylinders; said means being operable by variation of pressure in the train pipe independently of the engineer's valve, and means for cutting out the automatically controlled means when the manual means are operated, this last named means operating to cut out the auxiliary reservoir only from connection

with the brake cylinders on the locomotive and tender.

3. In combination with a fluid pressure air brake system embodying means for supplying straight-air to the brake cylinders on the locomotive and tender, of means connected to said straight-air devices for automatically introducing air from an auxiliary reservoir into said brake cylinders, for the purposes set forth, said means consisting of a cut off between the auxiliary reservoir and the triple valve on the locomotive and means for operating said cut off when straight air is applied.

4. In combination with a fluid pressure air brake system embodying means for supplying straight-air to the brake cylinders on the locomotive and tender, of means connected to said straight-air devices for automatically introducing air from an auxiliary reservoir into said brake cylinders, and an automatic cut-off between the auxiliary reservoir and the triple valve on the locomotive.

5. In combination with a fluid pressure air brake system embodying means for supplying straight-air to the brake cylinders on the locomotive and tender, of means connected to said straight-air devices for automatically introducing air from an auxiliary reservoir into said brake cylinders, an automatic cut-off between the auxiliary reservoir and the triple valve on the locomotive and an automatic bleed valve beyond the triple valve.

6. In combination with a fluid pressure air brake system embodying means for supplying straight-air to the brake cylinders on the locomotive and tender, of means connected to said straight-air devices for automatically introducing air from an auxiliary reservoir into said brake cylinders, an automatic cut-off between the auxiliary reservoir and the triple valve on the locomotive, an automatic bleed valve beyond the triple valve and means whereby the said cut-off and bleed valve are operated by straight air when straight-air is supplied to the brake cylinders, for the purposes set forth.

7. A cut-off for fluid pressure brake cylinder systems, consisting of a valve casing having attached to it a cylinder, a piston working in said cylinder, a tubular bushing in the cylinder and having a valve seat at each end, a valve in said valve casing provided with a valve seat and a stem working in said bushing, a spring for normally actuating the piston, a valve and stem carried by the piston, for the purposes set forth.

8. A cut-off of the type set forth, comprising a valve casing, a cylinder attached thereto, a valve in the casing, a piston working in said cylinder, a tube between said valve and said piston having a seat at each end, a supplemental valve carried by the aforesaid valve adapted to seat against one

of said seats and a valve carried by the piston and adapted to seat against the seat carried at the other end of said tube.

9. In combination with a fluid-pressure  
5 brake system embodying means for applying the engine and tender brakes by straight air and also by automatic air, of cut-out devices adapted to cut out the automatic  
means when the straight-air means are operated,  
10 ated, said cut-out devices embodying means

whereby the cut-out is maintained operative until effective pressure is restored in the main line.

In testimony whereof I hereunto affix my signature in the presence of two witnesses 15 this 10 day of Aug. 1909.

WILLIAM S. BILBREY.

Witnesses:

AMOS HUYULEY,  
S. M. FULLER.