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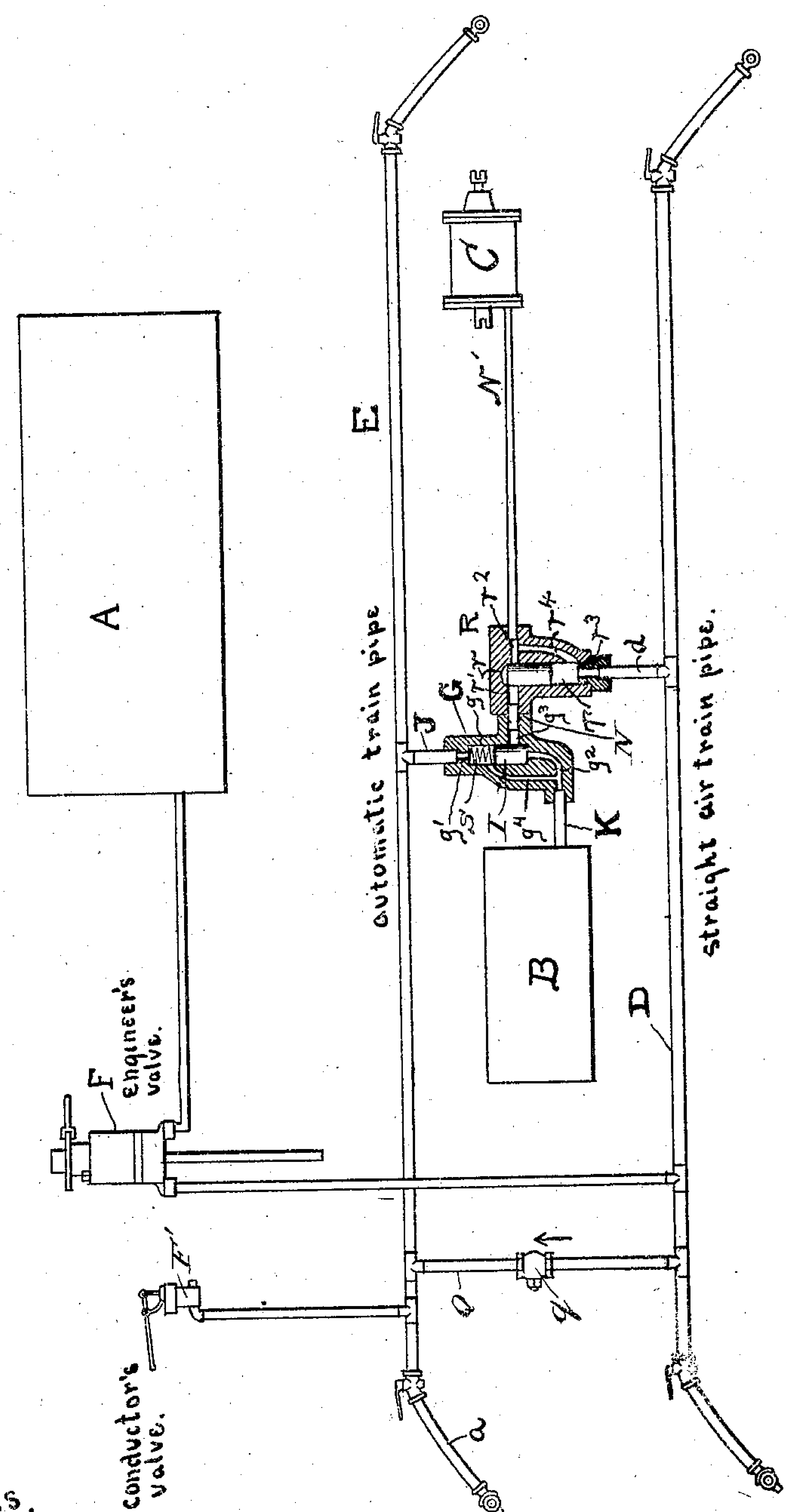
H. N. RANSOM.

AIR BRAKE SYSTEM.

APPLICATION FILED JULY 10, 1905.



Witnesses.

J. M. Woodward

E. B. Gilchrist

Inventor

Henry N. Ransom

By Thurston & Bates

Attorneys.

UNITED STATES PATENT OFFICE.

HENRY N. RANSOM, OF CLEVELAND, OHIO, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

AIR-BRAKE SYSTEM.

No. 867,533. **Specification of Letters Patent.** **Patented Oct. 1, 1907.**

Application filed July 10, 1905. Serial No. 268,923.

To all whom it may concern:

Be it known that I, HENRY N. RANSOM, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Air-Brake Systems, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention is an improved air brake system, by which the brakes may be operated either by straight air pressure controlled by an operator, or will act automatically, in an emergency, when the pressure in the automatic train pipe is reduced either by breaking of the couplings, or the opening of the valve, automatically or otherwise.

The invention consists in the construction and combination of parts as shown in the drawing and hereinafter described and definitely pointed out in the claims.

In the drawing Figure 1 is a diagrammatic view of an air brake system embodying the invention.

Referring to the parts by letters A represents the main reservoir; B the auxiliary reservoir; C the brake cylinder; D the straight air train pipe, and E the automatic air train pipe. The straight air train pipe is connected with the main reservoir through an engineer's valve F of familiar form. The automatic air train pipe is fed from the straight air system through a pipe Q which connects the two train pipes and contains a check valve at q opening toward the automatic train pipe E.

G represents a valve casing containing a valve chamber g and having three ports g', g^2, and g^3,—of which the two former lead from the ends of the valve chamber and are connected respectively with the pipes J and K which are in turn connected with the train pipe E and reservoir B. The port g^3 leads from one side of the valve chamber, and near one end thereof,—said port being in a position that it is covered by the valve I when the latter is at one end of the valve chamber. There is also a passage connecting the train pipe E with the cylinder B, so that air may flow from the former to the latter; but means should be provided for preventing the air flowing in the reverse direction. For convenience this passage way may be a small duct g^4 in the valve casing. A check valve is not necessary in the duct, although it would do no harm, because the duct may be very small, and it communicates with the valve chamber g at a point where it will be covered by valve I almost immediately after said valve is moved from its normal position. Said normal position is that shown in the drawing, where the valve is closing ports g^2, g^3, and is uncovering port g' and the duct g^4, and the valve may be held in that position by a light spring S.

A valve casing R substantially like that which is shown in my prior patent No. 780,813, is connected, as by pipe N, with the port g^3 above mentioned. This casing contains a cylindrical valve chamber r having at one end two ports r' and r^2 with which the pipe N and pipe N′ are respectively connected, the latter pipe being connected directly with the brake cylinder C. This valve casing has another port r^3 at the opposite end of the chamber r, which is connected by a pipe d with the straight air train pipe. It also contains a port r^4 which connects the port r^2 with that end of the valve chamber at which is the port r^3. This valve chamber contains a sliding valve T whose normal position is in that end of the valve chamber r from which the ports r' and r^2 lead. And it may always be moved to that position by allowing a little air to flow into the valve casing from the straight air train pipe.

Ordinarily the straight air train pipe does not contain air under pressure, but the automatic train pipe E does. Air will always flow into the automatic train pipe through pipe Q when the straight air train pipe is full of air, as it is when the brakes are applied by straight air. The air from the train pipe E will now flow through the pipe J into the valve chamber g and thence by way of the duct g^4 into the auxiliary reservoir. Wherefore the pressure in said reservoir and train pipe E will become equal to the air pressure in reservoir A. When air is allowed to escape from the straight air pipe, the check valve at q holds the air in.

To set brakes by the straight air, one operates the engineer's valve F. The air will flow through the train pipe D into the valve casing R, where it will move the valve T so that port r^4 will be uncovered, wherefore the air will flow through said port r^4 to the brake cylinder. The pressure in the brake cylinder is relieved by the operation of the valve F. Now, to set the brake by automatic air, the pressure in the automatic train pipe is reduced. This may be accomplished by means of the conductors or emergency valve F′, or by the breaking of the coupling a, or in any other way. The pressure being thus reduced, the superior pressure in the auxiliary reservoir B will cause the valve I to move in the valve chamber g so as to cover the opening of the small duct g^4 into said chamber, and to uncover the port g^3, whereupon air will flow into the pipe N and thence into the valve chamber R, causing the valve T to move to the other end of the valve chamber, and then the air will pass out of the port r^2 into pipe N′ and to the brake cylinder.

To release the brakes, when set by the automatic air, and to restore the automatic air system to operative condition, the pressure therein is made superior to the pressure in reservoir B. The valve I will then move to the position shown in the drawing and air will flow through the duct g^4 into the auxiliary reservoir B until the pressure therein is the same as the pressure in said train pipe. The automatic system is now ready for use again. The air is then allowed to escape from the straight air train pipe by moving valve F, and simultaneously the air will escape from the brake cylinder.

The reference characters employed in the claims are not used for the purpose of limiting the claims to the specific constructions shown, but merely for convenience in determining what points are referred to.

Having thus described my invention, I claim:

1. In an air brake system, the combination of the main reservoir, the automatic train pipe, connection between said reservoir and pipe, a check valve in said connection opening toward the automatic train pipe, an auxiliary reservoir, a valve casing interposed between the automatic train pipe and auxiliary reservoir, said casing containing a valve chamber which has two ports leading from opposite ends of said valve chamber and are respectively connected with the automatic train pipe and auxiliary reservoir, and has also a port leading from the side of said valve chamber, a brake cylinder, a connection between said brake cylinder and the last named port, a valve in said valve casing, a spring normally moving said valve so as to cover the side port and that end port which is connected with the auxiliary reservoir, said valve casing also containing a small duct connecting the port which is connected with the auxiliary reservoir with the side of that end of the valve chamber which is connected with the automatic train pipe.

2. In an air brake system, the combination of the brake cylinder, the main reservoir, the automatic train pipe, with the auxiliary reservoir, a valve casing containing a valve chamber and having three ports of which the ports g', g^2 lead from opposite ends of said valve chamber and are connected with the automatic train pipe and the auxiliary reservoir respectively, and the port g^3 leads from one side of the valve chamber and is connected with the brake cylinder, and a sliding valve fitted to said valve chamber and adapted when in one end thereof to cover the ports g^2, g^3 and when in the other end of said chamber to uncover both of said ports, said valve casing containing a duct g^4 connected at one end with the side of said valve chamber at a point where it is uncovered when the valve is covering the ports g^2, g^3 and vice versa,—which duct at its other end is in communication with the auxiliary reservoir.

3. In an air brake system, the combination of a main reservoir, a straight air train pipe, a valve controlled connection between said pipe and reservoir, an automatic train pipe, a connection between said two train pipes, which connection contains a check valve opening toward the automatic train pipe, an auxiliary reservoir, and a brake cylinder, with a valve casing G containing a valve chamber and having ports g', g^2 leading from said valve chamber at opposite ends thereof and connected respectively with the automatic train pipe and the auxiliary reservoir, and having also a port g^3 leading from the side of said valve chamber, at a point where it will be closed when the contained valve is at that end of the valve chamber from which the port g^2 extends, and having also a duct through which the auxiliary reservoir is connected with the side of said valve chamber at a point where it will not be covered by the contained valve when the ports g^2 and g^3 are closed thereby; a valve casing R containing a valve chamber having two ports g' and g^2 which lead from one end of said valve chamber and are respectively connected with the port g^3 and with the brake cylinder, and a port r^3 leading from the other end of said chamber and connected with the straight air pipe, and two freely movable valves located respectively in said valve chambers.

4. In an air brake system, the combination of the main reservoir, the straight air train pipe, the automatic train pipe, and valved connection between said pipes and said reservoir, an auxiliary reservoir, and a brake cylinder, with a valve casing G containing a valve chamber and having ports g' g^2 leading from said valve chamber at opposite ends thereof and connected respectively with the automatic pipe and the auxiliary reservoir, and having also a port g^3 leading from the side of said valve chamber, a valve casing R containing a valve chamber having two ports r', r^2 which lead from one end of said valve chamber and are respectively connected with the port g^3 and with the brake cylinder, and a port r^3 leading from the other end of said chamber and connected with the straight air train pipe, and a duct r^4 which leads from the last named end of the valve chamber and is in communication with the brake cylinder, two freely movable valves located in said two valve chambers, and a passage-way which permits air to flow from the automatic train pipe to the auxiliary reservoir when ports g^2 and g^3 are closed by the valve in casing G.

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

HENRY N. RANSOM.

Witnesses:

ALBERT H. BATES,

N. L. BRESNAN.