No. 780,813. PATENTED JAN. 24, 1905.

H. N. RANSOM.

AIR BRAKE MECHANISM.

APPLICATION FILED MAY 19, 1904.

2 SHEETS—SHEET 1.

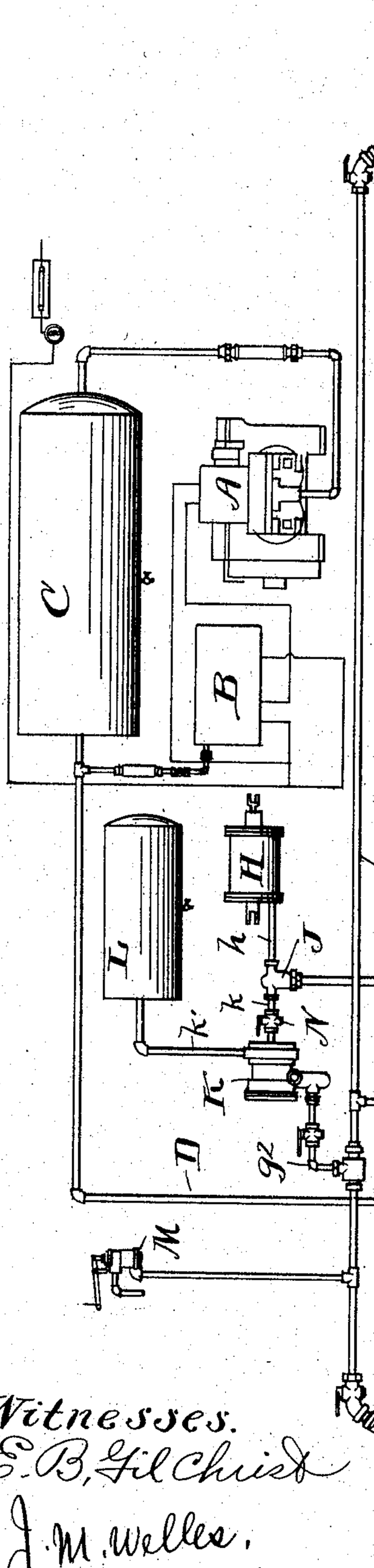

Fig. 1.

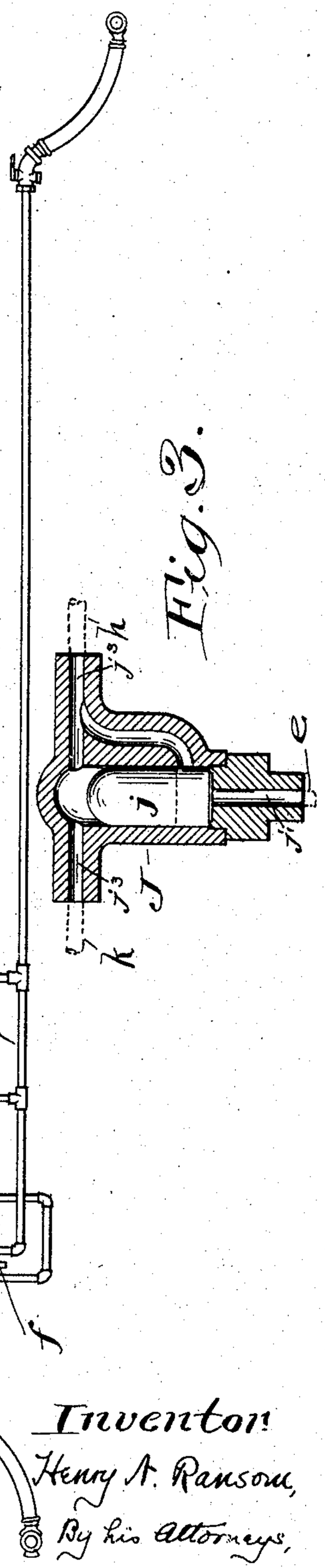

Fig. 3.

Witnesses.
E. B. Gilchrist
J. M. Welles.

Inventor:
Henry N. Ransom,
By his attorneys,
Thurston & Bates.

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2 SHEETS—SHEET 2.

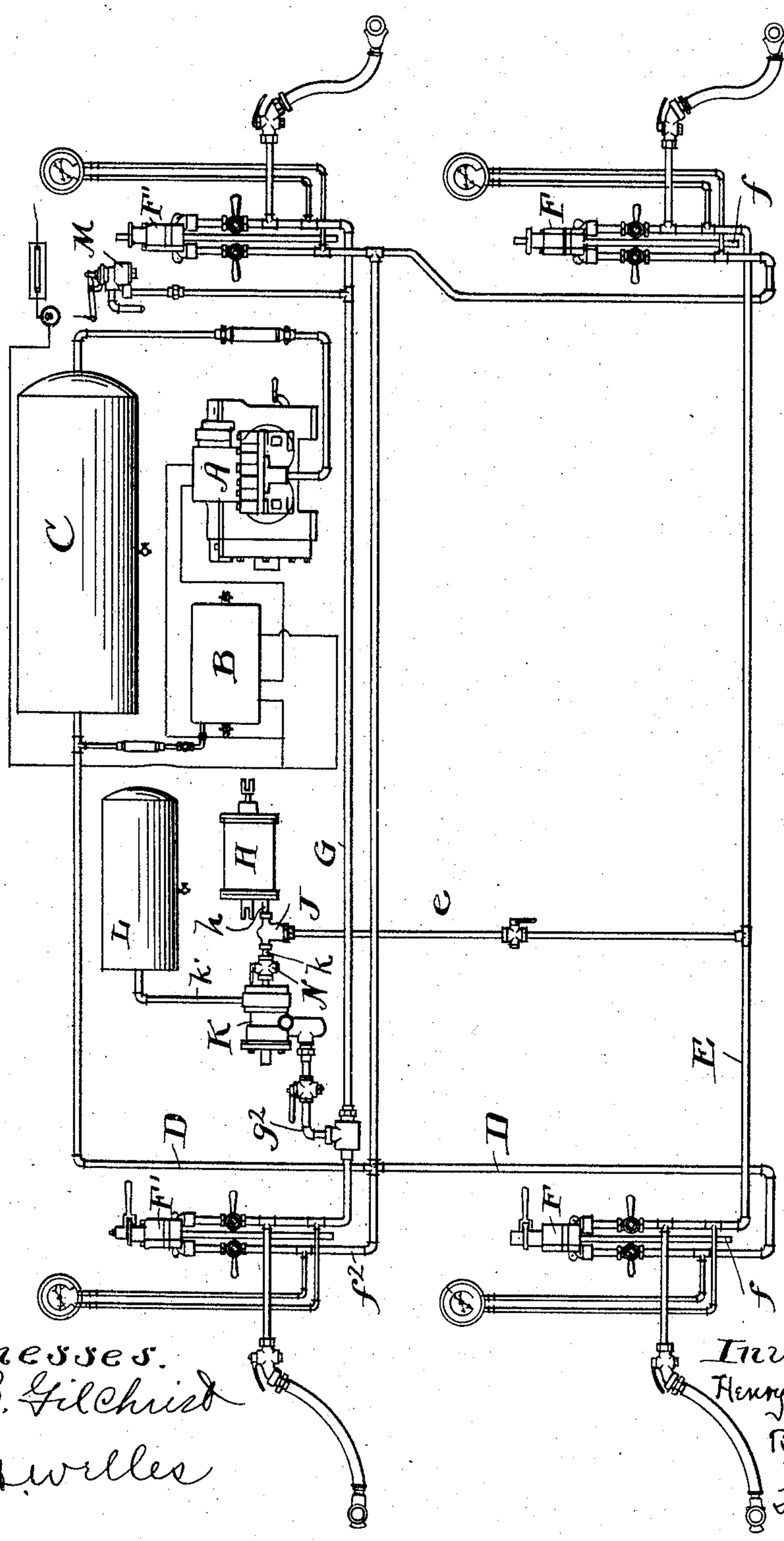

Fig. 2.

Witnesses.
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No. 780,813. Patented January 24, 1905.

UNITED STATES PATENT OFFICE.

HENRY N. RANSOM, OF CLEVELAND, OHIO.

AIR-BRAKE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 780,813, dated January 24, 1905.

Application filed May 19, 1904. Serial No. 208,642.

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 Mechanism, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

Two systems using compressed air for braking cars are in every-day use—to wit, the "straight-air" and the "automatic-air" systems. Under some conditions of practical use one system is the better, and under other conditions the other system is the better. These conditions are so well understood that any extended reference to them here is unncessary. It will perhaps suffice to say that when a considerable number of cars are connected together to form a train the automatic-air system is generally to be preferred and that when a car is run separately the straight-air system is better. There may be some differences of opinion as to what intermediate conditions are best subserved by the one or the other of these two systems, but there is little, if any, difference of opinion in respect to the extremes above referred to. In the use of electrically-propelled cars especially operating conditions frequently arise in which it is at times necessary to run cars singly and at other times to couple the same cars together to form a train of greater or less length. The desirability of being able to employ either of the two air-braking systems above referred to when the existing conditions require them is so well recognized that it is a not uncommon practice to equip each car with both systems. This, however, is an expensive practice, which it is the object of the present invention to render unnecessary.

The present invention is an equipment for railway-cars of such a character that their brakes may be set, according to circumstances, by either the automatic or straight air systems, and this result is accomplished by considerably less than is involved in the instalment on each car of the two systems complete.

In the drawings, Figure 1 is a view of an air-brake equipment embodying my invention, and Fig. 2 is a view of a modified form of said invention. In both figures the various parts of the apparatus are arranged diagrammatically rather than in the exact positions in which they will preferably be placed in use. Fig. 3 is a sectional view of the valve mechanism.

Referring to the parts by letters, A represents the air-compressor, and B the governor, these parts being shown diagrammatically, because they may be of any suitable construction and may be located at any suitable point.

C represents the main compressed-air reservoir, which is supplied with air under the proper pressure by the air-compressor A, controlled by the governor B.

There is a single reservoir-pipe D, which conducts air from the main reservoir to the engineer's valve F, which is of familiar construction and adapted to admit air to the straight-air train-pipe E or to permit air to escape from said train-pipe to the atmosphere through the relief-pipe *f*.

The automatic-air train-pipe G is connected with the straight-air train-pipe by means of a pipe *g*, in which there is a check-valve *g'*, which permits air to flow in one direction only—viz., into the pipe G. The straight-air train-pipe is connected by pipe *e* with the casing J of an automatic valve, which casing is also connected by a pipe *h* with the brake-cylinder H. The automatic train-pipe G is connected by the pipe g^2 with the usual quick-acting triple valve K. The construction of the triple valve is so well understood that no description is here necessary. It is connected, by means of the pipe *k*, with the valve-casing J, and it is also connected, by means of a pipe *k'*, with the auxiliary reservoir L.

The valve in the casing J must be of such a character that if air flows to the casing through the pipe *k* the valve *j* will so move as to close the port connected with the pipe *e* and to open the port connecting with the pipe *h*. In other words, air which is allowed to flow from the triple valve into valve-casing J will so move the valve therein as to permit that air to pass to the brake-cylinder H and to prevent it from

passing into pipe *e*. On the other hand, if air flows to this valve-casing J from the pipe *e* the valve *j* therein must automatically so move as to prevent air from flowing into pipe *k* and to permit air to flow into the pipe *h*. The precise form of this valve is immaterial; but in Fig. 3 is shown a valve which is adapted for the purpose. It contains a cylindrical valve-chamber in which a cylindrical valve *j* is movable. One end of the valve and the corresponding end of the casing are of hemispherical form approximately, and the port with which the pipe *k* connects is through the corresponding hemispherical wall of the valve-casing. The port with which the pipe *e* is connected is through the opposite end of the valve-casing and with which the pipe *h* is connected, and through the side of the valve-casing are two branches j' j^2 of a port j^3. When the valve is at either end of the valve-chamber, it opens one of these branch ports and covers the other, so that air can flow from either pipe *k* or pipe *e* into the pipe *h*, but cannot flow from pipe *k* into pipe *e*, or vice versa. A valve M of some sort is provided for allowing air to escape from the automatic train-pipe G.

Now to put this apparatus in such condition that the brakes may be set by either the automatic or straight air system one may turn the engineer's valve F so as to admit air to the train-pipe E. It will also flow to the train-pipe G through pipe *g* and thence through the pipe g^2 and triple valve to the auxiliary reservoir L. This will cause the setting of the brake by the straight-air system, because the air also flows through pipe *e* to valve-casing J and thence to the brake-cylinder. The engineer's valve is then turned so as to allow air to escape from the train-pipe E, and this releases the brake, but leaves the auxiliary reservoir L and train-pipe H charged with air under the same pressure as the air in the main reservoir C. To set and relieve the brakes by the straight-air system, one has only to operate the engineer's valve in the usual manner; but if the pressure in the automatic train-pipe G is reduced, whether by opening the valve M or by opening any other valve in said pipe or by the breaking of the pipe or the coupling which connects it with the train-pipe of an adjacent car, the superior pressure from the auxiliary reservoir L will operate the triple valve and permit air to flow from reservoir L into the triple-valve casing and thence through pipe *k* into the valve-casing J and thence through pipe *h* into the brake-cylinder H. To release the brakes thus set by the automatic system, one may open the cock N and preferably at the same time open the engineer's valve F, so as to admit air into the straight-air train-pipe E and into the automatic train-pipe G. The pressure in the train-pipe G will very soon become superior to the pressure of the air in the auxiliary reservoir L and will operate the triple valve, closing communication between it and the valve-casing J and permitting air to flow from the train-pipe G through triple valve to the auxiliary reservoir and build up the pressure therein, or one may operate a petcock—as, for example, the petcock M—which will bleed the air from the brake-cylinder and from the auxiliary reservoir L.

The construction shown in Fig. 2 is different from that shown in Fig. 1 in that an engineer's valve F′ is provided for the automatic-air system. When it is so provided, the reservoir-pipe D may be connected by means of the pipe f^2 with said engineer's valve, and the automatic train-pipe G may also be connected with this same engineer's valve. In this figure also duplicates of the engineer's valves F and F′ are provided for the opposite end of the car; but this obviously is merely a convenience and not a necessity in any embodiment of my invention. To charge the auxiliary reservoir and the automatic-air train-pipe G in the construction shown in Fig. 2, one has to open the engineer's valve F′, and he may reduce the pressure in the train-pipe by operating this valve in the opposite direction, permitting escape of air from said pipe until the superior pressure from the reservoir K will operate the triple valve and allow air to flow to the brake-cylinder.

The difference above noted between the two embodiments of the invention is not as great as might at first appear. In each case the automatic air-pipe G is connected with the reservoir-pipe through an engineer's valve. In the construction shown in Fig. 1 there is only one engineer's valve, and when it is turned in one direction it allows air to flow into both train-pipes. In the construction shown in Fig. 2 one engineer's valve controls the flow of air to the straight-air train-pipe, and another engineer's valve controls its flow to the automatic train-pipe, the air combining in both cases from the same reservoir-pipe D.

It will be understood from the foregoing that the brakes may be applied by the straight-air system whenever it is desirable to do so and that the automatic system is always in readiness to set the brakes in case of accident, as the breaking apart of the train and the consequent breaking of the air-pipe connections or when any emergency arises where it is desirable to set them quicker than can be done by the straight-air system.

I claim—

1. The combination of a straight-air system comprising a reservoir, a reservoir-pipe, a train-pipe, a valve connection between said pipes, and a brake-cylinder connected with the train-pipe, with the train-pipe of an automatic-air system, a connection between said two

train-pipes, a valve in said connection, an auxiliary reservoir, a triple valve between said auxiliary reservoir and automatic train-pipe, and connections between said triple valve and said brake-cylinder.

2. The combination of a straight-air system comprising a reservoir, a reservoir-pipe, a train-pipe, a valved connection between said pipes, and a brake-cylinder connected with the train-pipe, with the train-pipe of an automatic-air system which is suitably connected with the straight-air train-pipe, an auxiliary reservoir, a triple valve between said auxiliary reservoir and automatic train-pipe, a pipe connection between said triple valve and said brake-cylinder, and automatic valve mechanism which prevents the flow of air between the straight-air train-pipe and the discharge end of the triple valve but which permits air to flow into the brake-cylinder from said triple valve or straight-air train-pipe.

3. The combination of a straight-air system comprising a reservoir, a reservoir-pipe, a train-pipe, and a valve connection between said pipes, with the train-pipe of an automatic-air system, a pipe connecting said train-pipe with the train-pipe of the straight-air system, there being in said connecting-pipe a check-valve which permits the flow of air in one direction only, to wit, from the straight-air train-pipe to the automatic-air train-pipe, an auxiliary reservoir, a triple valve connected with the auxiliary reservoir and with the automatic-air train-pipe, and pipes connecting the straight-air train-pipe and the triple valve with the brake-cylinder.

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

HENRY N. RANSOM.

Witnesses:

E. B. GILCHRIST,

E. L. THURSTON.