(No Model.) 2 Sheets—Sheet 1.

C. R. DAELLENBACH.

AIR BRAKE.

No. 442,019. Patented Dec. 2, 1890.

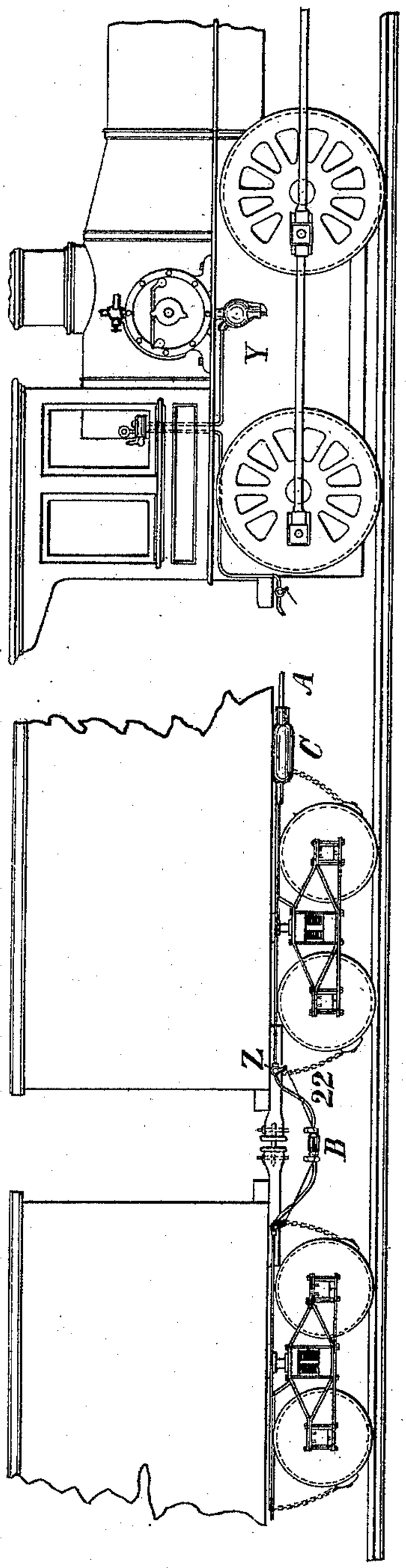


Fig. 1.

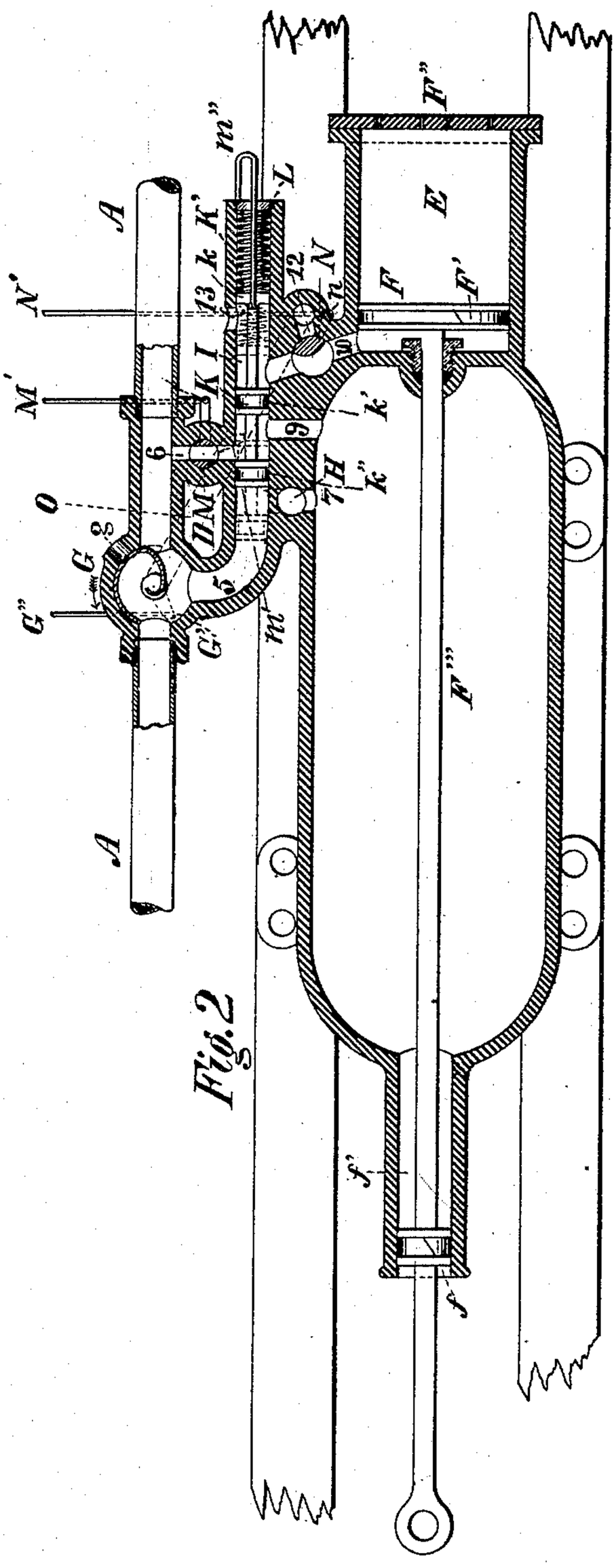


Fig. 2.

WITNESSES:

Lindsay Little

H. C. Johnson

INVENTOR:

Chas. R. Daellenbach

BY

Higdon & Higdon

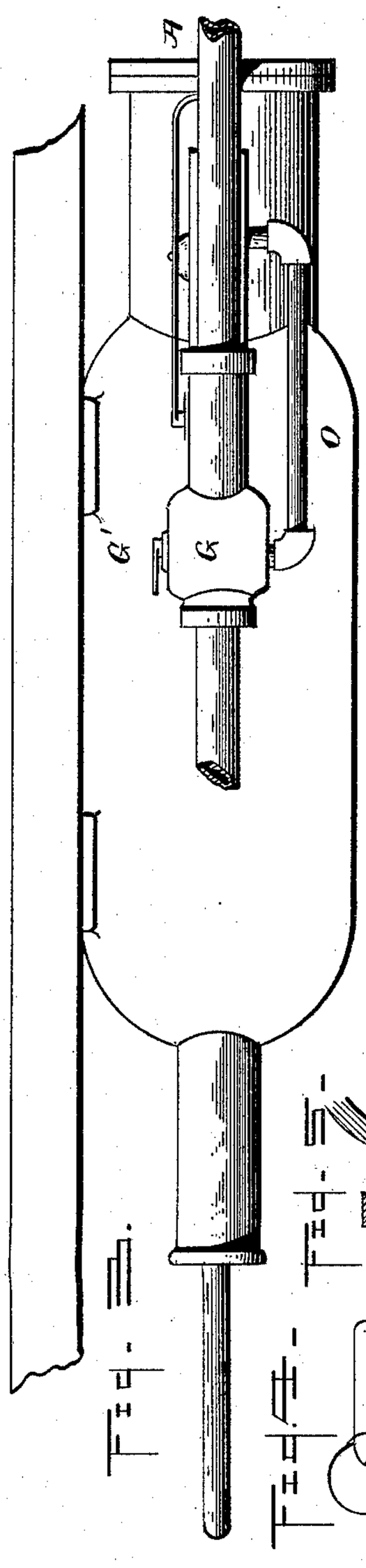
ATTORNEYS

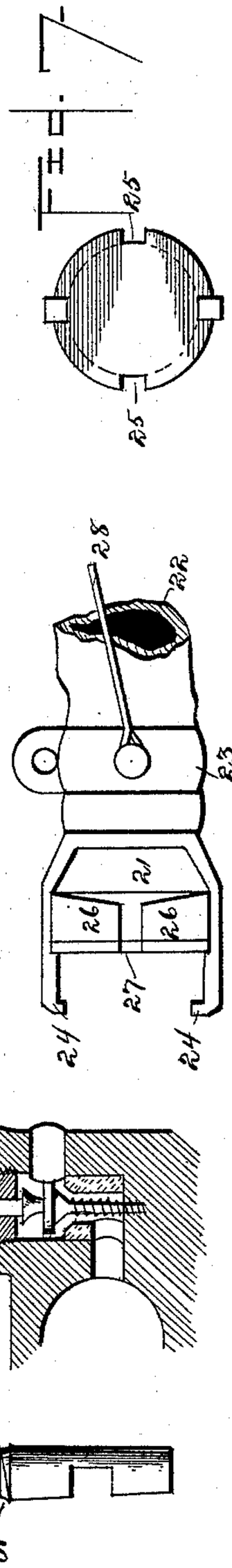
(No Model.) 2 Sheets—Sheet 2.

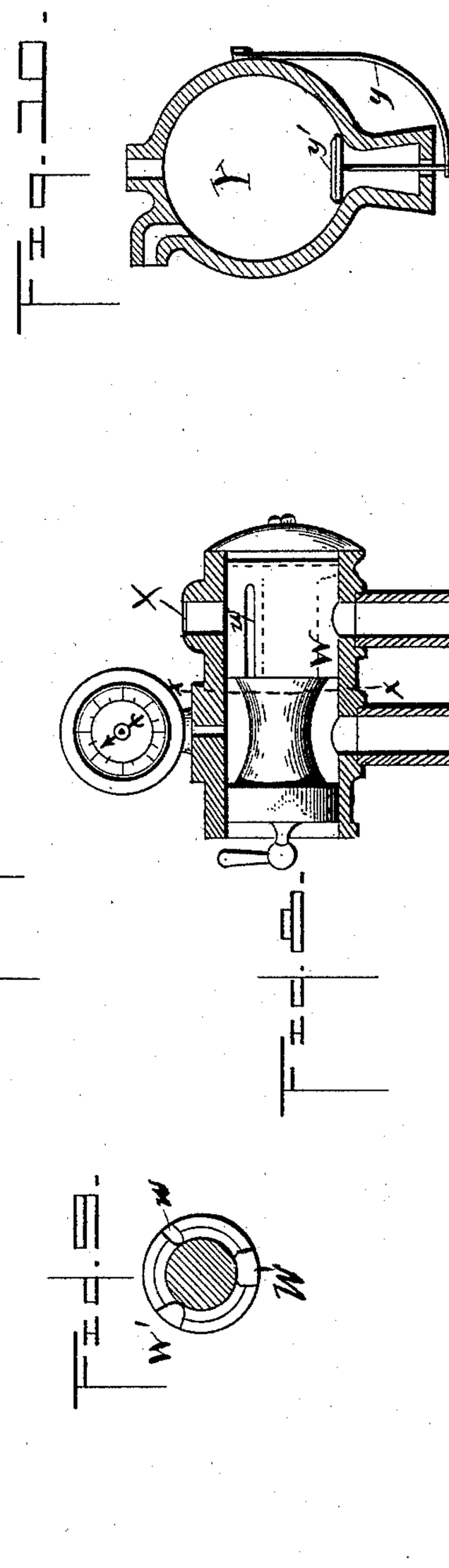
C. R. DAELLENBACH.

AIR BRAKE.

No. 442,019. Patented Dec. 2, 1890.







Witnesses:
Als Bishop.
L. J. Higdon

Inventor:
Chas. R. Daellenbach,
By his Attorneys.
Higdon & Higdon

UNITED STATES PATENT OFFICE.

CHARLES R. DAELLENBACH, OF ALLEGHENY, ASSIGNOR OF THREE-FOURTHS TO RUDOLPH GLASSER, HENRY SCHOENEFELDT, AND WILLIAM H. CROSBY, ALL OF PITTSBURG, PENNSYLVANIA.

AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 442,019, dated December 2, 1890.

Application filed January 18, 1890. Serial No. 337,326. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. DAELLENBACH, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Air-Brake; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain improvements in automatic air-brakes for railroad-trains; and it consists in the arrangement, construction, and combination of the parts of which it is composed, as will be hereinafter more fully described and claimed.

With these objects in view the invention consists in a certain novel construction and combination of devices which are fully described hereinafter in connection with the accompanying drawings, and specifically pointed out in the claims hereto appended.

In the drawings, Figure 1 is a general side view of a train provided with the improved brake and indicating a locomotive carrying the pump, and the engineer's indicator and engineer's valve, and also indicating the adjacent ends of two coupled cars to show the general arrangement of the brake-operating mechanism. Fig. 2 is an inverted sectional plan view in detail of the auxiliary reservoir and the automatic valve mechanism. Fig. 3 is a side view of the same. Fig. 4 is a rotary spring-valve which is arranged in the inlet to the cylinder. Fig. 5 is a detail view of the spring-valve which controls the inlet to the tank or drum. Fig. 6 is a side view of one member of the coupling between the air-conducting pipes. Fig. 7 is a face view of the same. Fig. 8 is a detail sectional view of the engineer's operating-valve and indicator. Fig. 9 is a transverse sectional view on the line *x x* of Fig. 8, and Fig. 10 is a detail sectional view of the waste-reservoir which is designed to receive the accumulation of water and dirt.

In Fig. 1 the train-pipe or air-conducting tube A is shown extending from the locomotive and passing along beneath the floor of the cars, the adjacent ends of the pipes belonging to different cars being connected by a coupling B, the construction of which will be hereinafter described. The train-pipe is connected at intervals to auxiliary reservoirs or drums C, as shown clearly in Figs. 2 and 3, by means of a series of valves D, and to one end of said auxiliary reservoir or drum is connected a brake-cylinder E, in which operates a piston-head F, provided with suitable air-tight packing F′. The outer end of this cylinder is closed by a head F″, which is provided with a series of perforations to permit the air in the cylinder to escape when the piston-head advances. The piston-rod F‴, which is connected to the said piston-head and operates longitudinally in the tank or drum, is provided at the opposite end of the latter with a smaller piston-head *f*, which operates in an open-ended cylinder *f′*, which is connected directly to the auxiliary reservoir or drum. It will be understood that when the piston-head F is forced forward by the pressure of air against its rear surface the smaller piston-head is also drawn toward the auxiliary reservoir or drum, and when the pressure of air in rear of piston F is relieved the pressure of air within the tank or drum will operate the smaller piston, and thereby draw the piston F back to its normal position and release the brakes.

The train-pipe is provided with a rotary valve G, having an arm G′, to which is connected the cord G″, and the case of the said valve is provided with an outlet-opening *g*, which is normally closed, thereby permitting a free circulation of air through the pipe. When the valve is turned in the direction indicated by the arrow in Fig. 2, the said outlet-opening is opened and the pressure of air in the pipe is relieved.

The auxiliary reservoir or drum is provided with a passage 7, which is connected to the train-pipe (or the casing of the valve G, as shown in Fig. 2) through the pipe or passage 5, and in the passage 7 is arranged a small spring-valve H, (shown in Fig. 5,) which op-

erates automatically, permitting air to enter the auxiliary reservoir or drum from the train-pipe, but preventing the escape of air therefrom. A continuation of the passage 5 beyond the inlet-passage 7 forms a chamber I, in which operates the triple slide-valve K, having the three connected heads or disks *k k' k''*. These three disks are connected to a single stem K', which is in turn connected at the end of the chamber to an operating-spring L.

A passage 9 connects the auxiliary reservoir or drum to the chamber I, and a similar passage 10 connects the brake-cylinder to said chamber, whereby when the slide-valve K is in the position indicated in dotted lines in Fig. 2 communication is established between the tank or drum and the cylinder. A tube 6 connects the chamber I between the disks *k' k''* with the train-pipe, and when the pressure of air in the train-pipe is sufficient the slide-valve is repressed thereby against the strength of the spring L, which is thus held under tension. If the pressure in the pipe is relieved, the spring will operate the slide-valve, and thereby open the connection between the auxiliary reservoir or drum and the brake-cylinder, thereby causing the compressed air within the former to enter the latter and operate the piston, thereby applying the brakes. A rotary valve M is arranged in the tube 6 to control the passage of air therethrough, and it is provided with an arm *m*, having an operating-cord M' attached thereto, and an arm *m'*, which is connected to the slide-valve by a curved rod *m''*. When the brake is applied and the slide-valve is in the position shown in dotted lines in Fig. 2, to release the brake it is simply necessary to draw the cord M', thereby causing the arm *m'* (shown in dotted lines, Fig. 2) to draw the slide-valve back by means of the rod *m''*, upon which latter the disks *k'* and *k''* are mounted. When the valve reaches the position shown in full lines in Fig. 2, the pressure of the air against the disks *k'* and *k''*, which enters the chamber I through passages 5 and 6, holds said valve in its retracted position.

In the passage 10 is arranged a rotary valve N, (shown in detail in Fig. 4,) which, when arranged in the position shown in Fig. 2, opens the said passage and permits the brake to be applied automatically; but when said valve is turned by means of its arm *n* and operating-cord N' the passage 10 is closed and communication is established between the brake-cylinder and the passage 12, which communicates with a tube O running to the train-pipe. Thus by turning the valve, as indicated, (namely, by pulling the cord N',) direct communication is established between the train-pipe and brake-cylinder. If the brake is applied, this operation having been brought about by removing the pressure in the train-pipe, as hereinbefore described, and it is desired to release the brakes, it is simply necessary to open communication between the brake-cylinder and the train-pipe, as indicated, and the air will escape from the former into the latter.

As above described, the brakes may be applied by relieving the pressure in the train-pipe by opening the valve G; but this applies the brakes gradually, and as it is sometimes preferable to apply the brakes at once, as in case of an accident, more direct means would be of advantage. The brakes may be applied quickly and firmly by opening the valve N and establishing direct communication between the line-pipe and the cylinder through the pipe O. In this case the pressure in the train-pipe acts directly on the piston-head without first passing into the auxiliary reservoir or drum, as in the other method. Of course in neither case will the brakes be applied suddenly, as the pressure of air in the auxiliary reservoir or drum acting on the smaller piston-head will prevent the larger piston-head from moving too rapidly. When the brakes have been applied in this direct way and it is desired to release them, it is accomplished by releasing the valve N (which is provided with an actuating-spring N'', shown in Fig. 4, to normally hold it in the position shown in Fig. 2) and permitting the air in the brake-cylinder to escape through the passage 10, chamber I, and outlet-opening 13.

The coupling between the adjoining ends of the train-pipe consists of the mouth-piece 21, which carries the hooked engaging arms 24 24, arranged on diametrically-opposite sides thereof, and is provided with the diametrically-opposite notches 25 25 to receive the hooked arms of the opposing mouth-piece. Inclined shoulders 26 26 are arranged on opposite sides of each of the said notches, whereby when the hooked arms are inserted in the notches and the mouth-pieces are turned in opposite directions the hooks on the ends of said arms engage the shoulders, and thereby draw the faces of the mouth-pieces firmly together. The faces of the mouth-pieces are provided with elastic cushions or washers, as seen at 27, in order to form an air-tight connection.

The flexible tube 22, which forms a part of the train-pipe, is connected directly to the mouth-piece, and a metallic clasp 23, which is arranged on said flexible tube close to the mouth-piece, is connected by means of rods 28 to the arm of the safety-valve Z. When the coupling between two cars breaks, the connection between the parts of the train-pipe is extended, thereby turning the valve Z in the direction indicated by the arrow in Fig. 1 and allowing the air in the train-pipe to escape gradually, thereby gradually applying the brakes. The stretching or extension of the train-pipe connection causes the hooked arms to slide from the inclined shoulders, thereby detaching the members of the train-pipe coupling. The above-described coupling, however, forms no part of my present invention.

Any desired form of air-pump may be used,

and I do not therefore limit myself in respect to any one construction thereof.

The engineer's valve, which is shown on the locomotive in Fig. 1, and is also seen in Fig. 8, is inserted in the train-pipe, as shown, and is provided with an indicator to apprise the engineer of the amount of pressure in the line-pipe. The plug or body of the valve is provided with a passage W, which, when arranged as shown in Figs. 8 and 9, establishes communication between the portion of the pipe which runs from the pump and that portion which runs to the brake. Said plug or body is also provided with a small groove *w*, which when aligned with the exit-opening X permits the air in the train-pipe to escape slowly, thereby slowly applying the brakes, and this plug or body is further provided with a larger groove W′, which when aligned with said exit-opening permits the air in the train-pipe to escape rapidly.

Y represents a relief-reservoir, which is attached to the line-pipe at any suitable point or points, as immediately below the pump, Fig. 1, and it is provided at its bottom with a small valve *y′*, connected to a spring *y*, the tendency of which is to raise or open the valve. The pressure of air in the line-pipe normally holds the said valve closed; but when the pressure is removed the valve is opened and the accumulation of water and dirt is blown out.

From the foregoing description it will be seen that my improved brake may be operated from the engineer's position by the manipulation of the engineer's valve, or it may be operated, either slowly or quickly, by pulling the cord G″ or N′, both of which extend through the entire length of the train, or the brake may be operated automatically by the separation of two of the cars. It will further be seen that instead of using a spring to return the piston to its normal position I employ a supplementary piston. One advantage of this construction is that the strain on the piston-rod is always tensile or pulling in either direction that it is moved, and therefore said rod may be made very much lighter than in brakes now in use. Another advantage of this construction is that the backward strain on the main piston, caused by the pressure of the air in the auxiliary reservoir on the supplementary piston, is constant, whereas when a spring is employed the strain on the piston increases as the piston advances, owing to the fact that the spring is flexed to a greater extent.

The safety-valve hereinbefore referred to, to which the line-pipe couplings are attached, is merely an ordinary rotary valve having an outlet to permit the air to escape.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In an air-brake, the combination, with a train-pipe, of an auxiliary reservoir or drum, a brake-cylinder connected thereto by suitable passages, an automatic valve controlling said passages, an open-ended cylinder communicating directly with the auxiliary reservoir or drum, and the piston-heads operating in said brake-cylinder and in the open-ended cylinder and carried by a common piston-rod, substantially as specified.

2. The combintion, with a train-pipe, of the tank, the chamber I, communicating with the train-pipe and connected to the tank by the valved passage 7 and by the passage 9, the brake-cylinder having a piston and connected by passage 10 to the said chamber, the triple spring-actuated slide-valve operating in the chamber, the tube connecting the train-pipe to the chamber between the heads or disks of said slide-valve, and the rotary valve arranged in said tube, substantially as shown and described.

3. The combination, with a train-pipe, of the auxiliary reservoir, the chamber connected to the auxiliary reservoir and to the train-pipe, the brake-cylinder connected to the chamber, the spring-actuated valve operating in chamber and adapted to automatically establish communication between the auxiliary reservoir and the brake-cylinder, and the rotary valve arranged in a connecting-tube 6 between the train-pipe and the chamber and connected by a rod to the spring-valve, substantially as and for the purpose specified.

4. The combination, with a train-pipe, of a chamber I, communicating at one end therewith and having an exhaust-opening 13, the auxiliary reservoir or drum communicating with the chamber through a valved inlet-passage 7, and also connected thereto by passage 9, the brake-cylinder connected to the chamber by a passage 10, the triple spring-actuated slide-valve K, operating in the chamber, and the valved tube 6, connecting an intermediate point of the chamber to the train-pipe, substantially as specified.

5. The combination, with a train-pipe, of an auxiliary reservoir or drum connected thereto by an inlet-valve, a brake-cylinder connected to the auxiliary reservoir or drum by passages 9 and 10, the automatic slide-valve to connect said passages, and the rotary valve arranged in the passage 10 between the brake-cylinder and the auxiliary reservoir and adapted to control the communication between the brake-cylinder and a tube leading to the train-pipe, substantially as and for the purpose specified.

6. The combination, with the train-pipe, of a chamber I, spring slide-valve K, auxiliary reservoir or drum C, connected to the chamber, brake-cylinder containing a piston and connected to the chamber, valved passage 12, connected by a tube to the train-pipe, the valved tube 6, and the rotary valve arranged in the train-pipe and provided with an exhaust, substantially as specified.

7. In an air-brake, the combination, with a train-pipe having a relief-valve G, of a chamber connected at one end to the train-pipe and having an exhaust, the spring-actuated slide-

valve operating in the chamber, the auxiliary reservoir or drum, and the brake-cylinder connected to the chamber, as described, and the passage 6, connecting an intermediate point of the chamber to the train-pipe between the valve G and the outlet end of said pipe, substantially as and for the purpose specified.

8. In an air-brake, the combination, with a train-pipe, of the chamber I, the automatic slide-valve operating therein, the tank and brake-cylinder connected to said chamber, and the rotary spring-valve arranged in the passage between the brake-cylinder and the chamber and communicating with a tube leading directly to the train-pipe, this valve being provided with an operating-cord which extends through the train, substantially as specified.

9. In an air-brake, the combination, with a train-pipe, of an engineer's valve inserted therein, and consisting of a cylindrical body having a peripheral groove around one end thereof and having longitudinal grooves connected with the said peripheral groove, and a casing for the said valve having exhaust-openings adapted to register with the longitudinal grooves in the valve upon a rotation thereof, and having an aperture for the ingress of the air, the said aperture being contiguous to the peripheral groove in the valve, as described.

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

CHARLES R. DAELLENBACH.

Witnesses:
RUDOLPH GLASSER,
CHARLES LARGE.