(No Model.) 2 Sheets—Sheet 1.

T. H. HABERKORN.

VALVE MECHANISM FOR AIR BRAKES.

No. 413,252. Patented Oct. 22, 1889.

Fig. 2.

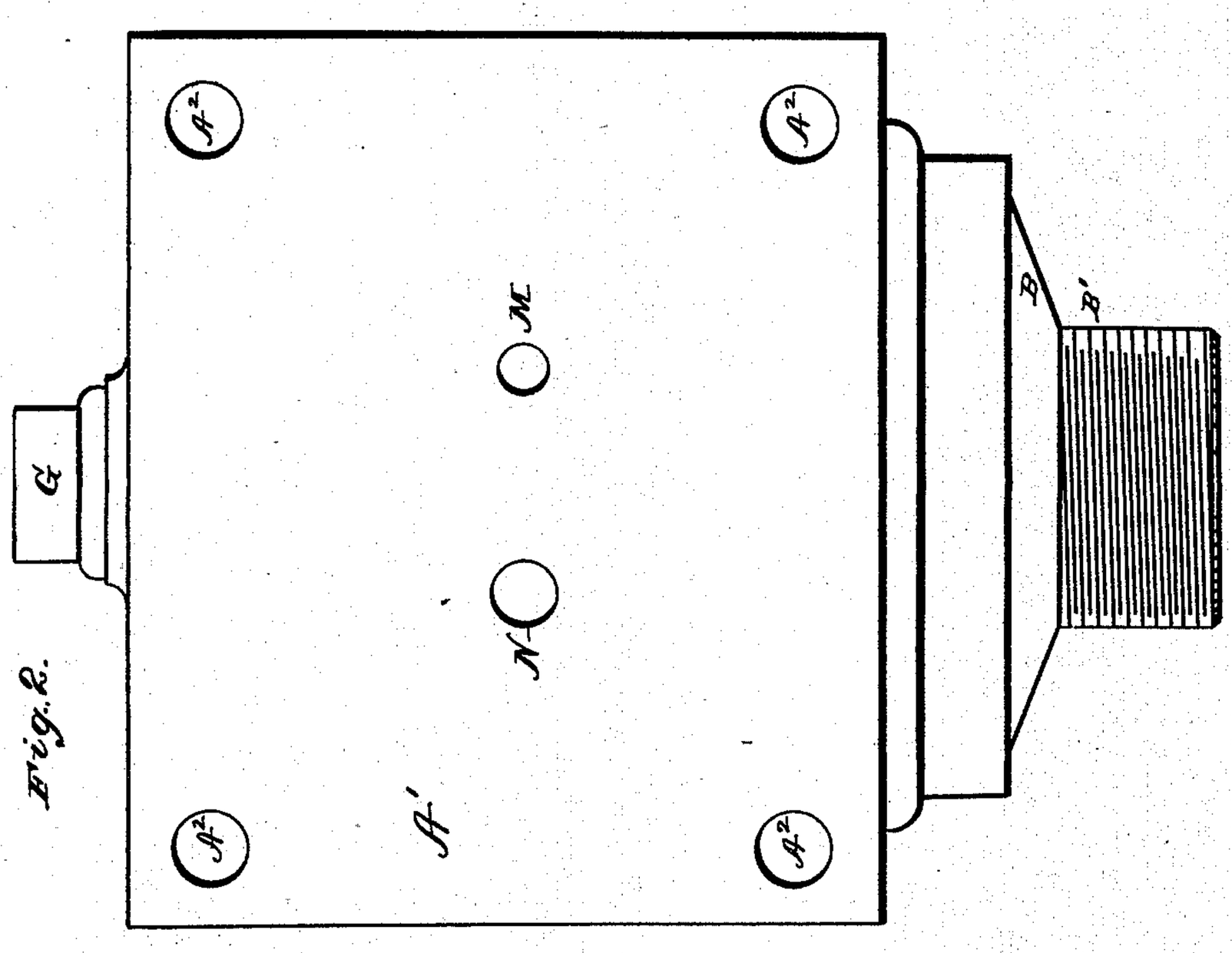

Fig. 1.

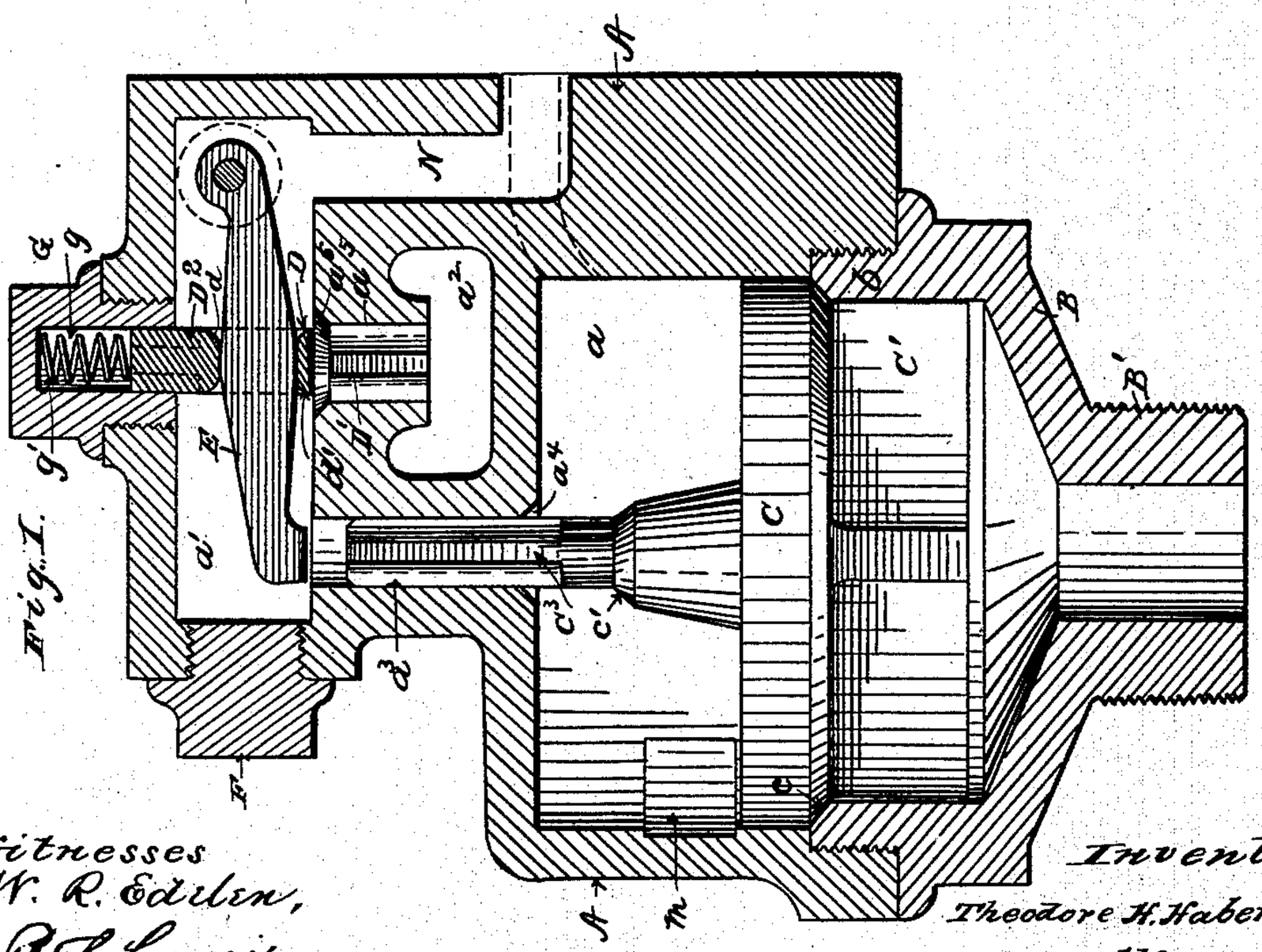

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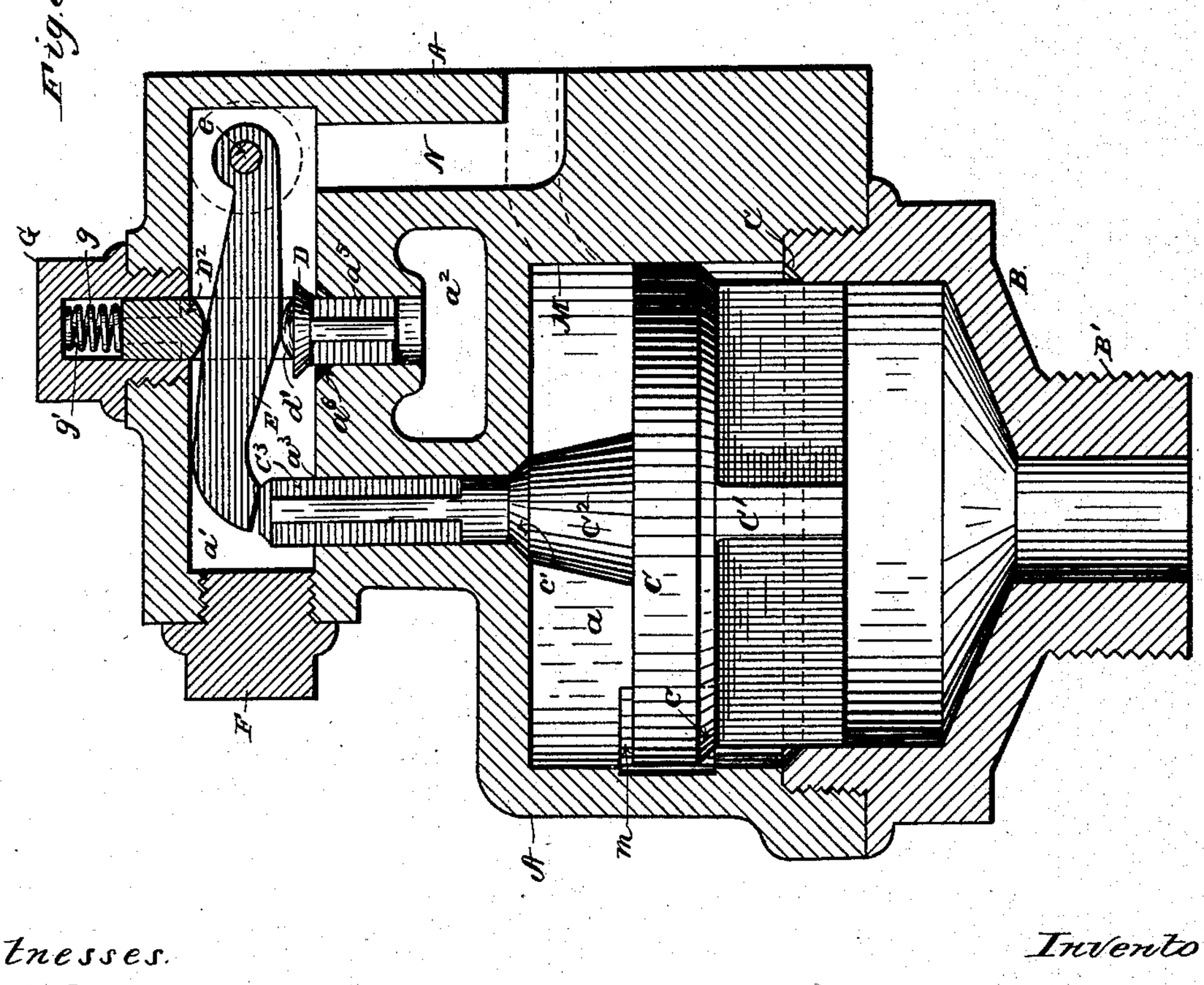
Fig. 3.



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UNITED STATES PATENT OFFICE.

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VALVE MECHANISM FOR AIR-BRAKES.

SPECIFICATION forming part of Letters Patent No. 413,252, dated October 22, 1889.

Application filed April 26, 1889. Serial No. 308,703. (No model.)

To all whom it may concern:

Be it known that I, THEODORE H. HABERKORN, of Fort Wayne, in the county of Allen and State of Indiana, have invented certain new and useful Improvements in Valve Mechanism for 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 pertains to make and use the same.

My invention relates to improvements in valve mechanism for air-brakes; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figures 1 and 3 are corresponding elevations in section, showing, respectively, different positions of the valves. Fig. 2 is an elevation taken at right angles to the view shown in Figs. 1 and 3.

A represents the valve-casing, having on the one side thereof a broad flange A′, for attaching the valve, for instance, to the governor, (not shown,) this flange having the necessary holes A^2 for receiving the securing-bolts. Casing A has three compartments or chambers, respectively, a, a', and a^2. The walls of the larger or primary chamber a are bored to fit nicely the periphery of valve C, this chamber being closed below by cap B. The upper section of this cap is bored to receive wing C′ of this valve, the cap having a seat b and the valve having a seat c for mutual engagement. Cap B terminates below in a screw-threaded nozzle B′, for attaching to the main air-supply pipe, (not shown,) that leads along under the cars and supplies the different auxiliary air-reservoirs, in which latter compressed air is stored for operating the respective brake-cylinders of the different cars, all of which is well known. Chambers a and a' are connected by bore a^3, in which latter operate the wings C^3 of the valve-stem C^2, the casing having a seat a^4 for engaging seats c' of the valve-stem, this valve-stem and valve C being, of course, integral. Port M (shown in dotted lines, Figs. 1 and 3, and in solid lines in Fig. 2) opens into chamber a, and leads from thence to the auxiliary air-reservoir. (Not shown.) A port or recess m admits air past valve C when the latter is in its elevated position. (Shown in Fig. 3.) The secondary chamber a' is connected by bore a^5 with the exhaust-chamber a^2, the latter communicating with the atmosphere. Port N opens into chamber a' and leads from thence to the brake-cylinder. (Not shown.)

Valve D engages seat a^6 of the casing, the wings D′ of this valve operating in bore a^5 aforesaid. This valve has an upwardly-projecting stem D^2, that passes loosely through a hole in lateral lever E, with shoulders at d d', respectively, above and below the lever and engaging the latter.

Lever E is pivoted at e to the casing, the free end of the lever being in position to be engaged by the stem of valve C when the latter is being elevated. The casing has a lateral opening for assembling the parts, such opening being closed by a screw-threaded plug F. A similar opening on top is closed by plug G, the latter having a central bore g, opening inward, for receiving the stem of valve D, with spring g', located as shown, to co-operate with the gravity of the valve and connected lever in closing the valve.

The operation of the valve mechanism is as follows: The air under pressure, forced along through the main air-supply pipe from the engine, enters the cavity of nozzle B under valve C, raising the latter to the position shown in Fig. 3, thus bringing seats a^4 and c' in contact, thereby closing bore a^3—in other words, closing communication between the auxiliary air-reservoir and the brake-cylinder. Meantime valve-stem C^2 has engaged and tilted upward lever E, thereby elevating valve D, whereby communication is opened from the brake-cylinder to exhaust-chamber, and from thence to the atmosphere. In such position of parts the air-supply from the main pipe passes through a recess or port m past valve C, and from thence passes through port M to the auxiliary reservoir, and when the air-pressure in the reservoir becomes equal to the pressure in the main pipe valve C is still held elevated by reason of the larger lower surface of the valve that is exposed, the difference between the upper and lower surfaces of the valve exposed being the area of seat c', the latter being just large enough to cause the valves to maintain their elevated positions so long as the air-pressure is the same above and below valve C. The elevated po-

sition of the valves may be considered their normal positions, and except while the brakes are being applied the supply-pipe and auxiliary reservoir are consequently always in open relation, thus giving plenty of time for accumulating the maximum air-pressure in the reservoir. When it is desired to apply the brakes, the pressure is reduced in the main pipe, and such reduction of pressure below the valve C causes the latter to descend, thus closing the communication between main pipe and auxiliary reservoir, then closing the exhaust-port, the gravity of valve D and lever E and coil-spring *g* acting in concert to close the exhaust-valve, then opening bore a^3, whereby the air from auxiliary reservoir may pass to the brake-cylinder *via* ports M and N. Seats *b* and *c* come then in contact. When the maximum air-pressure is again established in the main pipe, the valves are again lifted to their normal or elevated positions; but, suppose the engineer wishes to apply the brakes with little force, for instance, in slighly retarding the movement of the train. In such case the air-pressure in the main pipe is only slightly reduced. This causes the valve to descend, as aforesaid; but as soon as the air-pressure in the auxiliary reservoir is by the passage of air to the brake-cylinder reduced below the pressure in the main pipe the valve C will rise, close communication between auxiliary reservoir and brake-cylinder, and is thus held in said position by lever E, or more direct by valve D, with the existing air-pressure and coil-spring on top of valve D, until more pressure is admitted under valve C, which will cause valves to move to their elevated or normal positions. Consequently the engineer has full control of the brakes and may apply them with little or more force, according to circumstances.

Suitable governing mechanism for co-operating with the valve mechanism herein described is made the subject of application for United States Letters Patent filed April 26, 1889, Serial No. 308,704.

What I claim is—

1. In valves for air-brakes, the combination, with casing having primary, secondary, and exhaust chambers, and having ports and connecting-openings, substantially as indicated, of primary valve C, so constructed as, when depressed, to close the induction-opening of the casing, and when elevated to close communication between primary and secondary chambers, and a valve for closing the exhaust-opening, the latter valve having a lever attachment for engaging the primary valve, whereby the exhaust-valve is opened by the upward movement of the primary valve, substantially as set forth.

2. The combination, with valve-casing having primary, secondary, and exhaust chambers, of ducts respectively connecting the primary and secondary chambers and connecting the secondary and exhaust chambers, the primary chamber being connected with the air-supply and having a port connecting with the auxiliary air-reservoir, the secondary chamber having a port connecting with the brake-cylinder, a double-seated differential gravity-valve operating in the primary chamber for closing, when depressed, the induction-opening, and closing, when elevated, communication between auxiliary reservoir and brake-cylinder, such valve having a stem adapted to extend into the secondary chamber, and an exhaust-valve having a lever attachment adapted to engage the stem of the primary valve, whereby the exhaust-valve is opened by means of elevating the primary valve, substantially as set forth.

In testimony whereof I sign this specification, in the presence of two witnesses, this 15th day of March, 1889.

THEODORE H. HABERKORN.

Witnesses:
JULIA M. BRIANT,
PAUL F. KUHNE.