(No Model.) 3 Sheets—Sheet 1.

H. C. ZENKE.

AIR BRAKE MECHANISM.

No. 571,736. Patented Nov. 17, 1896.

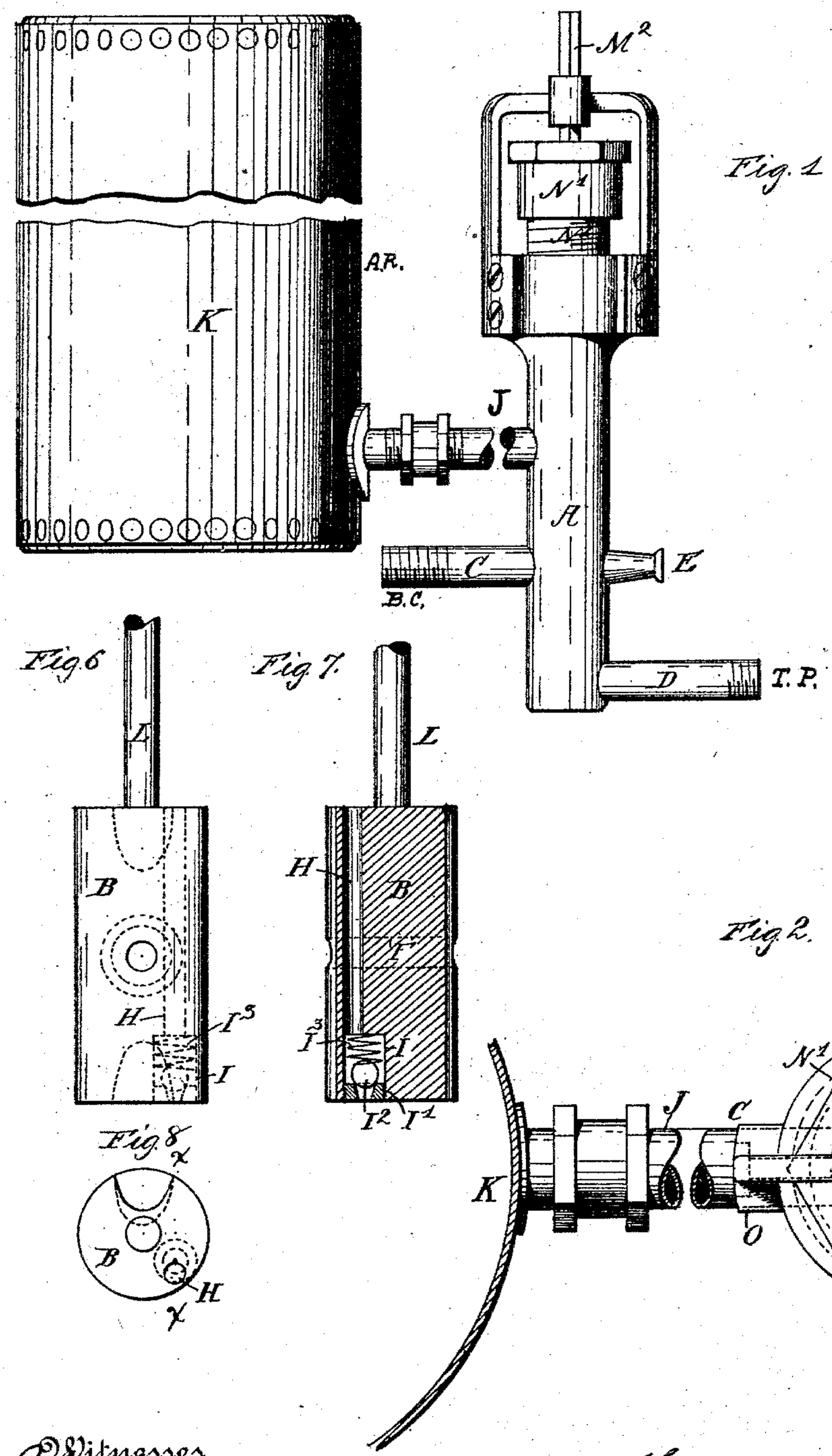

Fig. 1

Fig. 6

Fig. 7.

Fig. 8

Fig. 2.

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Fig. 3

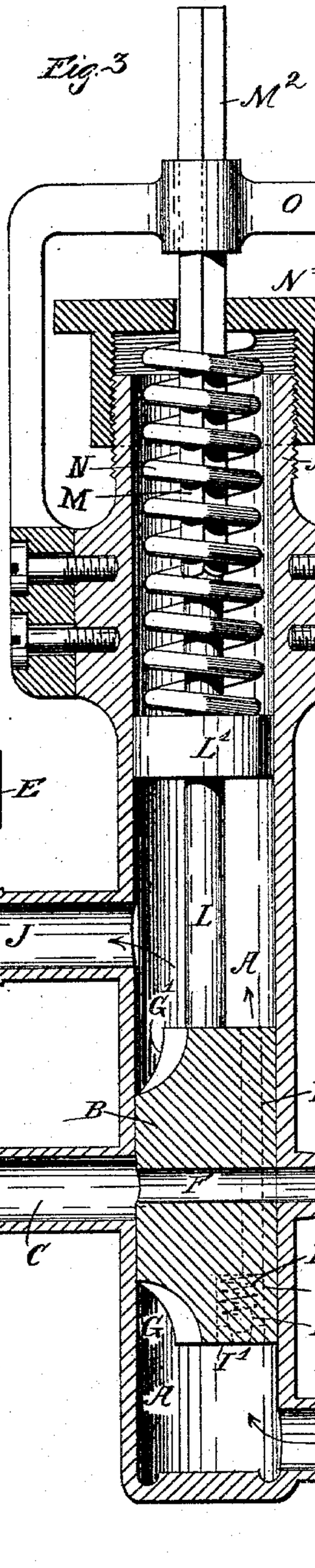

Fig. 4

Fig. 5

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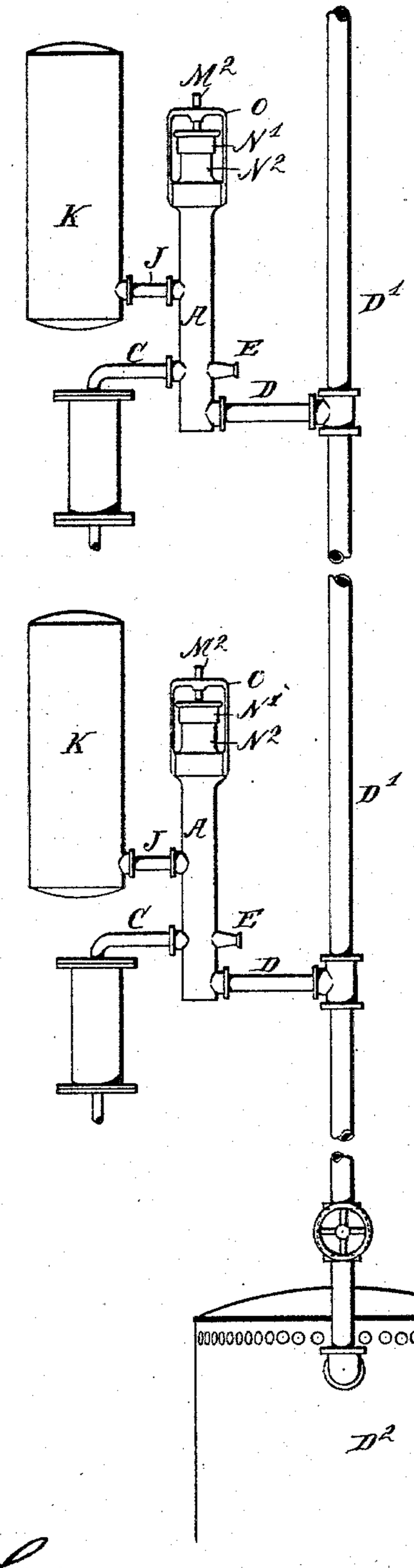
Fig. 9



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AIR-BRAKE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 571,736, dated November 17, 1896.

Application filed April 20, 1891. Renewed May 7, 1896. Serial No. 590,628. (No model.)

To all whom it may concern:

Be it known that I, HENRY C. ZENKE, a citizen of the United States of America, residing at Sandy Point, Island county, State of Washington, have invented and made new and useful Improvements in Air-Brake Mechanism for Railway-Cars; and I do hereby declare that the following is a full, clear, and exact description and specification of the same, reference being had to the accompanying drawings, forming part thereof.

The object of my invention is to obviate former difficulty and to provide devices which permit the use of air-pressure normally directly from the main air-reservoir on the brake-cylinder, so that the brakes can be applied with any degree of force by the engineer, and when needed or when a train air-pipe breaks the air-pressure from what I call the "auxiliary" reservoir is brought into use automatically to apply the brakes, the air in said auxiliary reservoir being automatically supplied from the main reservoir through suitable valve mechanism; in fact, the train cannot start after a stop until the auxiliary reservoir contains the normal pressure, which may be altered to suit the grades, &c. (The pressure generally in use with Westinghouse is seventy pounds to the square inch.)

By my invention the engineer can use either the direct or main air-pressure or that in the auxiliary reservoir at pleasure.

By my invention the air-pressure in the auxiliary reservoir is either automatically brought in use when the main air-pipe or train supply-pipe breaks or by design at the will of the engineer or conductor by the use of the well-known engineer's valve, by means of which the pressure of air in the train air-pipe is reduced or exhausted.

To this end my invention consists in certain mechanism and combinations of devices fully set forth in and claimed at the end of this specification.

In order that persons skilled in the art may understand, construct, and use my invention, I will proceed to describe it, referring to the drawings, in which—

Figure 1 is a side elevation. Fig. 2 is a top view or plan. Fig. 3 is a vertical central section. Figs. 4 and 5 are also vertical central sections showing the valve-pistons in their different extreme positions. Fig. 6 is a back or rear view of the valve-piston, looking from the right in the various figures. Fig. 7 is a vertical section of the same on line $x\ x$ of Fig. 8, also looking from the right of the sheet. Fig. 8 is a plan of the valve-piston. Fig. 9 represents a diagrammatic view of my invention as applied to more than one car in train.

A is the valve-chamber.

B is the valve-piston.

C is the pipe connection from the valve-chamber to supply air to the brake-cylinder.

D is the pipe connection to conduct air under pressure from the main reservoir on the engine of the train on which the brakes are to be operated.

D′ is the train-pipe leading from the reservoir on the engine (marked D^2) to the several cars' brake apparatus.

E is the pipe opening to the atmosphere from the valve-chamber.

F is the opening through the valve-piston, through which air is discharged from the brake-cylinder when the brakes are released, which occurs when the valve-piston is in the position shown in Fig. 3.

G and G′ are recesses in the lower and upper ends of the valve-piston through which air under pressure is admitted to pipe C from below or above, according as the valve-piston stands, as represented in Figs. 4 or 5.

H is an aperture passing lengthwise through the valve-piston for the purpose of conveying air under pressure from the main reservoir on the engine through the train-pipes and through pipe D to the valve-chamber above the valve-piston.

I is an enlargement of the lower end of this aperture H, into which a valve-seat is screwed, (marked I′,) a ball-valve rests upon the seat I′, (marked I^2,) and a coil-spring I^3 presses against the upper surface of this ball-valve and the top of the recess I and holds the valve on its seat.

J is a pipe connection leading from the upper part of the valve-chamber to the auxiliary air-pressure reservoir, (marked K.)

L is the valve piston-rod. It extends upward, as shown, and is surmounted by a piston L′, which fits and works upward and downward in the upper part of the valve-chamber and has a fixed relation to the valve-piston in its movements.

M is an extension of the rod L upward.

N is a coil-spring, which surrounds rod M and bears upon the upper surface of piston L′ and against an adjustable screw-cap N′ for the purpose of regulating the tension of the spring N upon the piston L′. Screw-cap N′ is screwed upon the upper end of the valve-chamber extension, (marked N^2.)

O is the yoke which guides the extension of rod M, (marked M^2,) in its reciprocations back and forth. This yoke is fastened by proper screws to the external upper part of the valve-chamber extension, as shown.

Operation: The operation of my invention is as follows: The connections being made between the valve-chamber A through the main supply-pipe D and the usual train-pipes and through the pipe C to the usual brake-cylinder which operates the brake mechanism, also through the pipe J to the auxiliary safety-reservoir, the pressure is admitted by the engineer to the lower part of the valve-chamber A beneath the valve-piston B, which pressure tends to force the piston-B upward or forward until the valve-piston reaches the position shown in Fig. 3 and balances the pressure of the spring N, (which is assumed to be sixty pounds to the square inch.) At the same time the air-pressure lifts the valve I′ in the piston-valve B and escapes into the space above the said valve-piston and into the auxiliary reservoir until the pressures below and above the said piston-valve are equalized. The air in the auxiliary reservoir cannot return through the piston-valve again, because the ball-valve I′ prevents it. When the piston-valve reaches the position indicated as above, (shown in Fig. 3,) the exhaust-opening F through the piston-valve B is opposite the pipe C and connects it and the brake-cylinder with the atmosphere through discharge-pipe E, and the brakes are released. When the engineer desires to apply the brakes again, he raises the pressure of the air in the supply-pipe D, (and consequently in the auxiliary reservoir,) beneath the piston-valve B, which, being greater than the resistance of the spring N, forces the piston upward or forward until the bottom of said piston-valve reaches the pipe C, when air-pressure is admitted to the brake-cylinder and the brakes are thus applied. The distance to which the valve-piston is moved forward is regulated by the increase of air-pressure in the pipe D by the engineer, and it will be seen that the pressure in the brake-cylinder can be regulated by the engineer and the brakes applied, as occasion requires, by direct air-pressure from the main reservoir on the engine. It will also be perceived that the pressure in the chamber below and above the valve-piston and in the auxiliary reservoir is always the same, while the brakes are operated by air direct from the main reservoir on the engine. Should, however, the pressure in the main supply-pipe D be reduced below the normal pressure, either by design or by accident, the pressure of the spring N, acting on piston L′, forces the piston-valve downward or backward until the valve reaches about the position shown in Fig. 5, and air-pressure is thus admitted from the auxiliary reservoir through pipe C to the brake-cylinder, which applies the brakes automatically, so that should any accident occur by which the train-pipes are severed from the engine the air from the auxiliary safety-reservoir is instantly and automatically brought into use and the brakes are forcibly applied.

The valve-piston is returned to the positions shown in Figs. 3 or 4 by the increase of pressure in the train-pipe D′ and pipe D and to the base of the valve-piston B, to which the pipe D leads unobstructedly, which pressure lifts the said valve-piston accordingly as the pressure is graduated to resist the force of the spring N above said valve-piston extension. There is sufficient space made beneath the base of the valve-piston B to allow air to pass beneath the same from pipe D.

By means of the screw-nut N′ the tension of the spring N against the regulator-piston L′ is varied at will and set to agree with the normal pressure of air to be used in operating valve-piston B by pressure direct from the main reservoir on the engine. The yoke O serves as a guide for the piston-rod M in its reciprocations. The rod M is made square or angular to prevent it from turning out of position of adjustment.

The valve-seat I′ is screwed into its place after the spring I and the ball-valve I^2 are inserted.

The shape of the valve-ports may be elliptical, round, or any other convenient shape. I prefer to make them rectangular, as is usual.

Having now fully described my invention and the specific manner in which I have embodied it, what I claim as new, and desire to secure by Letters Patent, is—

In an air-brake valve mechanism, the combination, consisting of the valve-chamber, provided with an inlet-port D, at one end, the other end being provided with a spring adjusting device, and open to the atmosphere; port J located at a distance from port D, leading to an auxiliary reservoir, the port C located between ports D and J; the port E, as shown; and the valve-piston B, located and reciprocating in said chamber B, between the ports D and J, and provided with port H, and its valve mechanism substantially as specified, and the port or channel F, arranged to connect ports C, and E, as specified; the spring M, located and acting as specified, all constructed, combined and arranged to operate substantially as and for the purposes specified.

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