(No Model.)

3 Sheets—Sheet 1.

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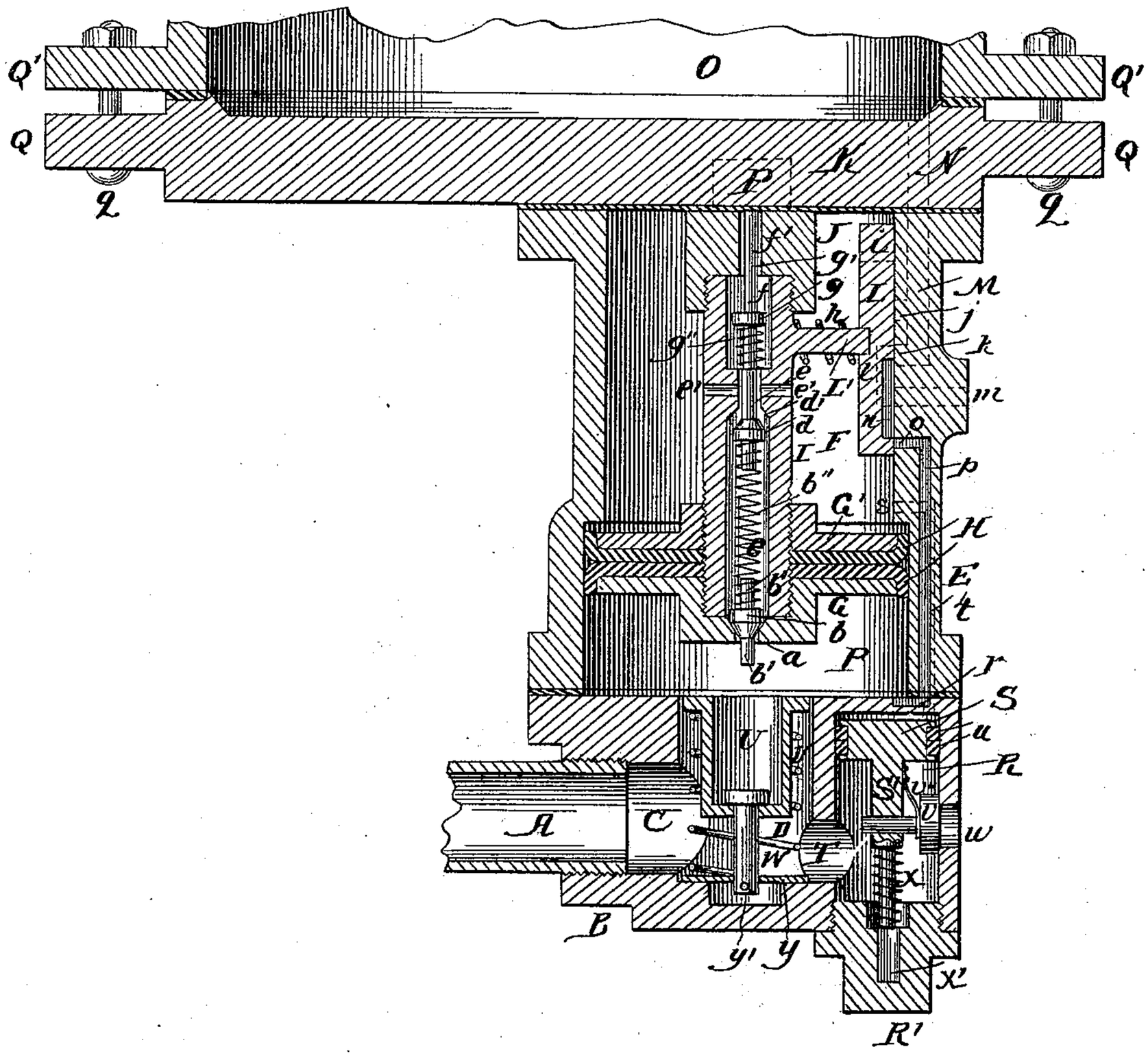
AIR BRAKE.

No. 605,905. Patented June 21, 1898.

Fig. 1.



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(No Model.)

3 Sheets—Sheet 2.

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Fig. 2.

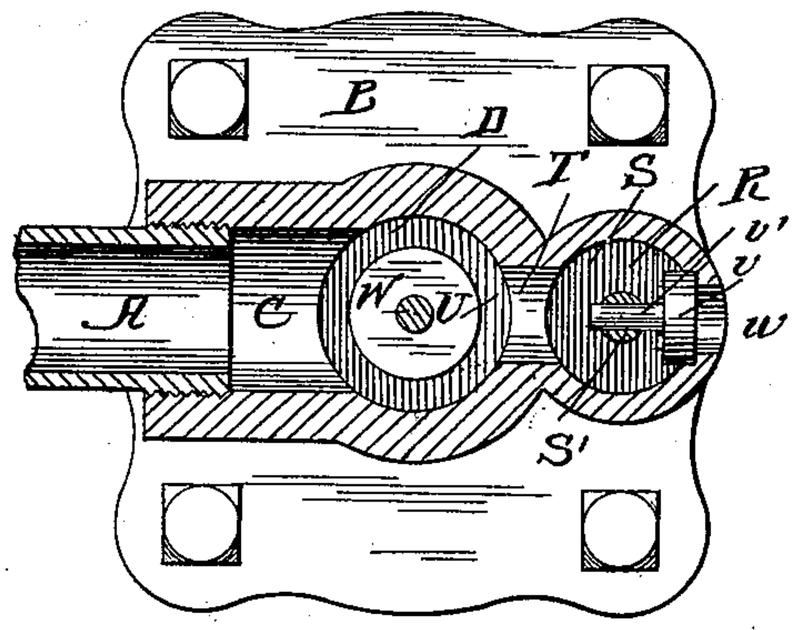
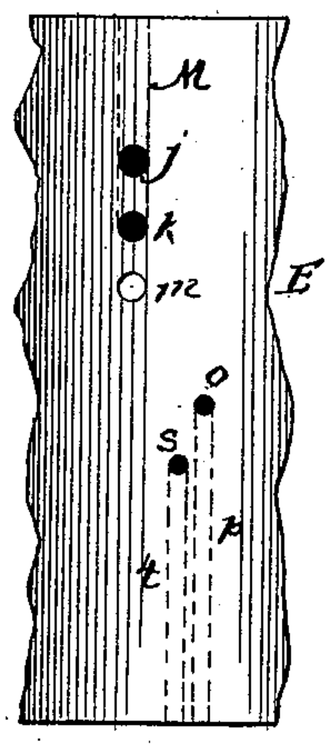


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 5.

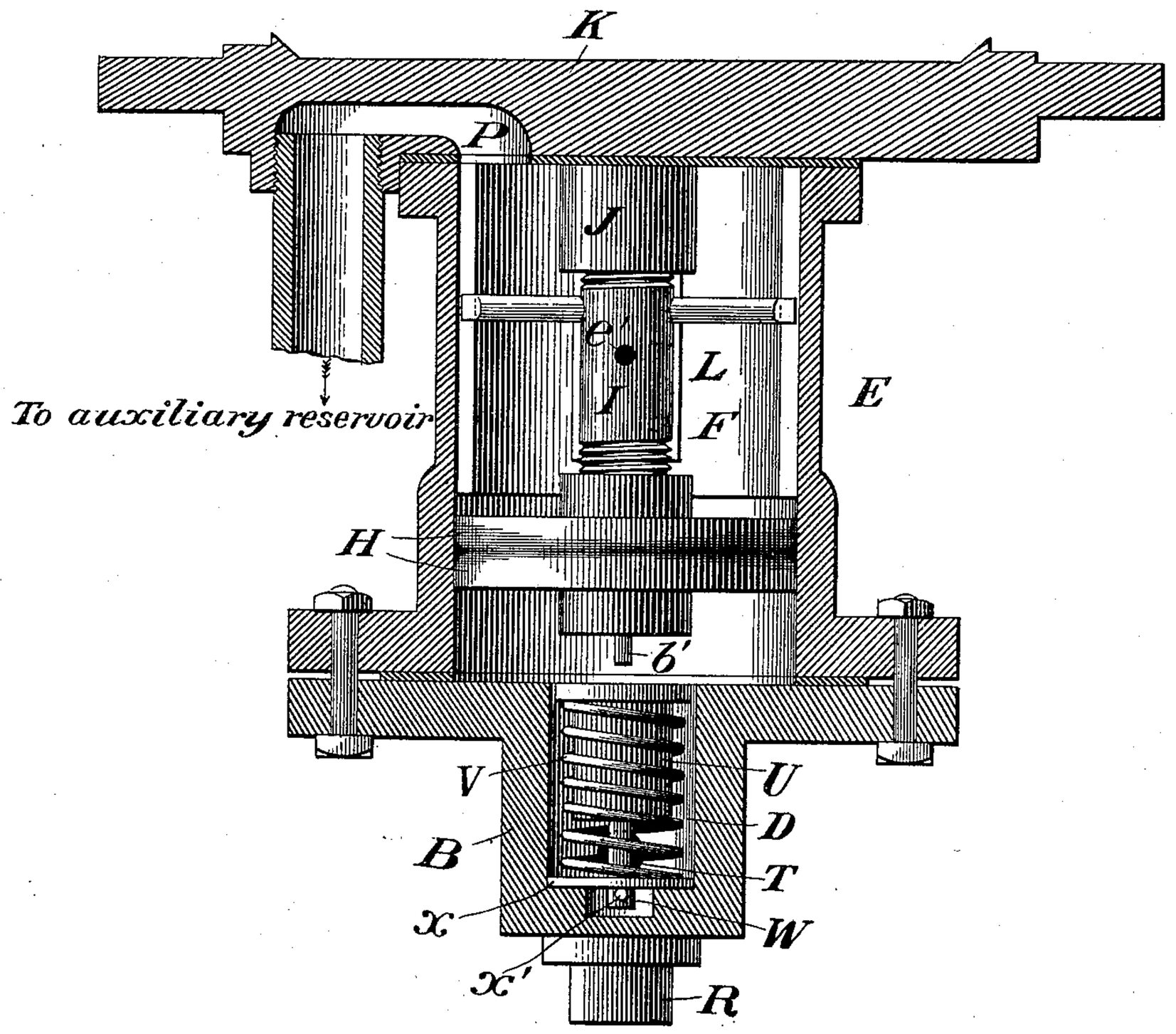
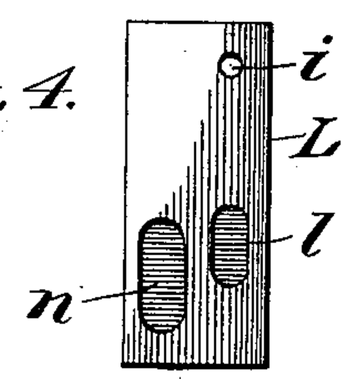


Fig. 4.



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AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 605,905, dated June 21, 1898.

Application filed March 7, 1890. Renewed May 3, 1898. Serial No. 679,653. (No model.)

To all whom it may concern:

Be it known that I, HARVEY S. PARK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Air-Brakes; 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 pertains to make and use the same, reference being had to the accompanying drawings, forming a part thereof, in which—

Figure 1 is a sectional elevation showing the main valve, a portion of the train-pipe, and a portion of the brake-cylinder. Fig. 2 is a cross-section through the train-pipe and the vent-chamber. Fig. 3 is a face view of the inside of the main-valve chamber, showing the ports and passages. Fig. 4 is a face view of the slide-valve. Fig. 5 is a central section through the triple-valve casing, showing the connection of the triple-valve chamber with the auxiliary reservoir.

The venting of the train-pipe in air-brake mechanisms wholly at the engineer's valve is open to the objection that the brakes of the forward cars are set in advance of the brakes of the rear cars, owing to the farther travel of the air from the rear cars to the engineer's valve, where the venting is done, and this setting of the forward brakes with the rear brakes unset allows the rear cars to come in contact, producing more or less jar or concussion and causing in some cases bad results.

The object of this invention is to vent the train-pipe for all the brakes simultaneously and thereby prevent any contact of the cars; and the nature of the invention consists in the several parts and combinations of parts hereinafter described, and pointed out in the claims as new.

In the drawings, A represents the train-pipe.

B is a cap or cover for the train-pipe end of the main-valve chamber, which cap or cover is attached to the cylinder of the chamber by suitable bolts, and the joint between the cap or cover and the cylinder is made air-tight by suitable packing.

C is an opening or passage in the cap B, receiving the end of the train-pipe A.

D is a chamber in the cap or cover B, into which the passage C opens.

E is the cylinder or casing for the main-valve chamber, to which the cap or cover B is attached.

F is the main-valve chamber.

G is a plate or disk having a screw-threaded opening at its center, and G′ is a companion plate or disk with a screw-threaded hole at its center.

H are cup-leather packings secured between the disks G and G′ for the edge of the packings to overlie the circumference of the disks, as shown in Fig. 1.

I is a stem, the lower portion of which is screw-threaded, for the disks G and G′. The center of the disk G has a port *a*, in which is seated a valve *b*, having a stem *b′* on both sides thereof, and the port *a* leads into a chamber *c* in the stem I, and a port *e* leads from the chamber *c*, which port has side passages *e′* leading through the stem I and is controlled by a valve *d*, having a stem *d′* projecting on both sides thereof. The chamber *c* has therein a coiled spring *b″*, one end of which is around the stem *b′* of the valve *b* and the other end around the stem *d′* of the valve *d*, and the port *e* leads into a chamber *f*, in which chamber is located a plate or disk *g*, having a stem *g′* on both sides thereof, one end of which stem *g′* enters a hole *f′* in a head on the end of the stem I and the other end of the stem *g′* has around it a coiled spring *g″*, which spring is located between the plate or disk *g* at the bottom of the chamber *f*, and this end of the stem *g′* abuts with the end of the stem *d′*, as shown in Fig. 1.

J is the head on the end of the stem I.

K is a cap or head to which is secured by bolts or otherwise the cylinder E, and the joint between the cap or head and the cylinder E is made air-tight by a suitable packing.

L is a slide-valve attached to the stem I by an arm L′ and held to its seat on the face of

the wall of the chamber F by a spring *h*. This valve L has a port *i* through it and a passage *l* in its acting face, and is likewise provided with another passage *n* in its acting face, as shown in Figs. 1 and 4.

M is a passage in the wall of the cylinder E, having a port *j*, leading to the chamber F, and a port *k*, which when the valve L is in its normal position communicates with the passage *l*, as shown by the dotted lines in Fig. 1.

N is a passage through the head K in line with the passage M and leading to the brake-cylinder O.

The passages M and N are shown in dotted lines in Fig. 1, and a port *m* (shown by dotted lines in Fig. 1) is formed through the wall of the cylinder E to be in communication with the passage *l* when the valve L is in its normal position. A passage *p* is formed in the wall of the cylinder E, which passage communicates with the chamber F by a port *o* and with a passage *r* in the head or cap B, which passage *r* communicates with the chamber F, and the wall of the cylinder E has another passage *t*, which communicates with the chamber F by a port *s*, and this passage *t* leads to a vent-chamber and is shown, with its port *s*, by dotted lines in Fig. 1.

O is a brake-cylinder having a piston and stem therein, as usual.

P is a passage in the cap or head K, communicating with the chamber F and having communication also with an auxiliary reservoir (not shown) for admitting air to the auxiliary reservoir from the chamber F, and vice versa.

Q are ears on the head K, and Q′ ears on the cylinder O, by means of which ears and bolts *q* the head K is attached to the cylinder O, and the joint between the head K and cylinder O is made air-tight by suitable packing.

R is the vent-chamber, formed in the cap or cover B.

S is a piston located in the chamber R and provided with suitable packing *u*, so as to be air-tight, and this piston S has a stem S′ with a continuation, around which is a coiled spring *x*, one end of which is against the end of the stem S′ and the other rests upon the bottom of a chamber formed in a plug R′, which closes the end of the chamber R, and from this chamber a hole *x*′ leads to allow the entrance of the stem *x* when the piston S is advanced. The plug R′ is for closing the end of the chamber R, which is open at one end to allow of the insertion of the piston S. The stem S′ of the piston S receives the stem *v*′ of a valve *v*, which valve seats against the wall of the chamber R and closes a vent-opening *w*, leading from the chamber R to the atmosphere, and the valve *v* is held to its seat by a spring *v*″, the free end of which engages the valve, and the opposite end of which is attached to the stem S′.

T is a passage between the chamber D and the chamber R and leading into the chamber R in front of the piston S.

U is a cup located in the chamber D, and acting as a stop to limit the movement of the triple-valve piston in service applications of the brakes.

V is a coiled spring encircling the cup U and resting against a flange on the cup U and upon a supporting-plate *y*.

W is a sliding pin in the bottom of the cup U, which pin carries the plate *y* by means of a pin *y*′.

The auxiliary reservoir (not shown) is charged with air from the train-pipe A, which enters the chamber D through the passage C and flows into the chamber F back of the piston in such chamber, and this air raises the valve *b*, opening the port *a* for the air to enter the chamber *c*, and as the valve *d* is opened by the contact of the abutting ends of the stems *d*′ and *g*′ air from the chamber *c* enters the port *e* and passes out through the side openings *e*′ into the chamber F and thence to the auxiliary reservoir through the passage P and the connecting-pipe for the auxiliary reservoir, and when the auxiliary-reservoir pressure is equal to the train-pipe pressure a corresponding pressure is in the chamber F forward and back of the piston in such chamber and likewise in the chamber *c*, and when this pressure is thus equalized the spring *b*″ acts and closes the valve *b* down, closing the port *a* against the admission of air into the chamber *c*. A reduction of a few pounds of pressure in the train-pipe produces a corresponding reduction in the chamber F, back of the piston, by the air in the chamber F passing out into the train-pipe through the chamber D and opening C, and as the pressure in the chamber F in front of the piston is greater than the reduced pressure in such chamber back of the piston the excess of pressure will act and move the piston in the chamber F back, carrying with it the slide-valve L, bringing the port *i* into communication with the port *j* for air to enter the passage M from the chamber F through the ports *i j*, and air from the auxiliary reservoir will also flow into the chamber F through the passage P and into the passage M through the ports *i j*, and this air admitted to the passage M will enter the brake-cylinder O through the passage N and set the brakes to a grading pressure. The backward movement of the slide-valve L carries with it the passage *n*, and such passage furnishes a communication between the ports *o* and *s*, and with this communication air from the chamber R, back of the piston S, will flow through the passage *t* and through the port *s* and passage *n* and will enter the passage *p* through the port *o* and pass to the chamber F, back of its piston, and the reduction of pressure thus effected back of the piston S will permit the pressure of the air in front to move the piston S in the chamber R and with it the valve *v* back to

close the vent-opening or port *w*, thereby preventing the further escape of fluid from the train-pipe through the port *w*. The air vented at the port or opening *w* will be train-pipe air from the chamber D, and this air is supplied to the chamber by the train-pipe between two valves, and in operation the train-pipe for the first car will be vented at the engineer's valve to set the brakes, and by such venting and setting of the brakes the vent opening or port *w* will be opened for the first valve by the reduction of the train-pipe pressure, which causes a corresponding reduction in the chamber R, in front of the piston S, and less than the pressure in the chamber F, in front of its piston, and as the air from the chamber F, in front of the piston, enters the vent-chamber R, back of the piston S, through the port *s* and passage *t* the pressure will advance the piston S and open the port *w*, and with this vent port or opening *w* open a part of the train-pipe, air between the first and the next succeeding valve will flow into the chamber D and enter the chamber R through the opening or passage T to flow out from the vent port or opening *w*, and with such venting of the train-pipe for the second valve the piston of such valve is receded, carrying back the valve L and opening the vent-valve *w* thereof to vent the third valve and then forming a communication between the chamber F of such valve, back of its piston, and the vent-chamber R through the passages *r* and *p*, port *o*, passage *n*, port *s*, and passage *t* to admit air from the chamber R to the chamber F and recede the piston S and close the port or passage *w* of the second valve, which valve will vent the air for the valve of the third car in the same manner as the first valve vents the second, by opening the vent-valve, and so on through the train, each preceding valve furnishing a vent for the train-pipe and the succeeding valve. The result of this venting of the train-pipe at each main valve is that such venting occurs simultaneously, or nearly so, throughout the entire train, producing the result of setting all of the brakes at the same time or so nearly so as to prevent any jam or contact of the cars that will produce any jar or concussion. The return of the valve L to its normal position on the restoration of the train-pipe pressure closes the port *o* and shuts off communication through the passage *p* from the chamber R into the chamber F, back of its piston, and such return opens the port *s*, allowing air to enter the passage *t* from the chamber F, in front of its piston, and pass into the chamber R, restoring the pressure on the back of the piston S, by which the air-pressure on both sides of the piston S will be equal, or nearly so, and the piston will be held by the spring *x* in its normal position. The reduction of the pressure in the chamber R, back of the piston S, will occur when the passage *n* communicates with the ports *o* and *s*, so that air can flow from chamber R through passage *t*, port *s*, passage *n*, port *e*, and passages *p* and *r* to chamber F, and by such reduction the pressure in the back of the piston S is reduced, so that the spring *x* will act and return the piston S to its normal position for the valve *v* to close the port or opening *w*, as in Fig. 1, and when the port or opening *w* is closed train-pipe pressure can enter the chamber R without passing out from such chamber, bringing the parts into position for the air to enter the chamber F, back of the piston in such chamber.

The movement of the slide-valve from its piston controls the movement of the vent-piston and its valve, and the movement of the piston of the slide-valve is had from the train-pipe, so that the vent-opening for the train-pipe is controlled through the train-pipe itself by means of the main-valve piston and its slide-valve.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination in an air-brake mechanism, of a train-pipe, a chamber communicating with the train-pipe and with the main-valve chamber, a main-valve chamber, a piston in such chamber, a slide-valve carried by the piston, a passage in the slide-valve, a port in the valve-casing communicating with the brake-cylinder and controlled by the slide-valve, two ports and passages leading from the main-valve chamber in front of its piston, one to a vent-chamber and the other to the main-valve chamber back of the piston, a vent-chamber, a piston in the vent-chamber which is normally exposed to fluid under pressure, a vent-opening, a valve carried by the piston and controlling the vent-opening, and a passage between the vent-chamber and the train-pipe chamber, substantially as and for the purposes specified.

2. In an automatic fluid-pressure brake system, the combination, with a triple valve, of a vent-valve controlling a passage through which fluid under pressure may be vented from the train-pipe, a piston for operating the vent-valve, which piston is normally exposed to pressure on both sides, and a valve operative by a reduction of train-pipe pressure for releasing pressure from one side of the piston to the train-pipe and thereby effecting closing movement of the vent-valve, substantially as set forth.

3. In an automatic fluid-pressure brake system, the combination, with a triple valve, of a vent-valve controlling a passage through which fluid under pressure may be vented from the train-pipe, a piston for operating the vent-valve, which piston is normally exposed on one side to auxiliary-reservoir pressure and on the other side to train-pipe pressure, and a valve for releasing the reservoir-pressure from one side of the piston to the train-pipe, substantially as set forth.

4. In an automatic fluid-pressure brake system, the combination, with a triple valve, of a vent-valve controlling a passage through

which fluid under pressure may be vented from the train-pipe under each car, a piston for operating the vent-valve, and a valve operative by a reduction of train-pipe pressure and controlling the admission of fluid under pressure to the piston and its release therefrom to the train-pipe, substantially as set forth.

5. In an automatic fluid-pressure brake system the combination, with a triple valve, of a vent-valve controlling a passage through which fluid under pressure may be released from the train-pipe, a piston for operating the vent-valve and which is exposed on one side to train-pipe pressure and on the other side to auxiliary-reservoir pressure, and a valve controlling communication between one side of the piston and the train-pipe, substantially as set forth.

6. In an automatic fluid-pressure brake system, the combination, with a triple valve, of a vent-valve controlling a passage through which fluid under pressure may be released from the train-pipe, a piston working in a chamber for operating the vent-valve, and passages from the valve-chamber of the triple valve to one side of the piston and to the train-pipe respectively, which passages are controlled by the main valve of the triple valve, substantially as set forth.

7. In an automatic fluid-pressure brake system, the combination, with a triple-valve device, of a vent-valve controlling a passage through which fluid may be released from the train-pipe, a piston for operating the vent-valve, which is normally exposed to fluid under pressure, and a valve operated by a reduction of train-pipe pressure for releasing pressure from one side of the piston and thereby effecting closing movement of the vent-valve, substantially as set forth.

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