No. 609,312.

Patented Aug. 16, 1898.

J. V. WELLS.

TRIPLE VALVE.

(Application filed Oct. 2, 1897.)

(No Model.)

2 Sheets—Sheet 1.

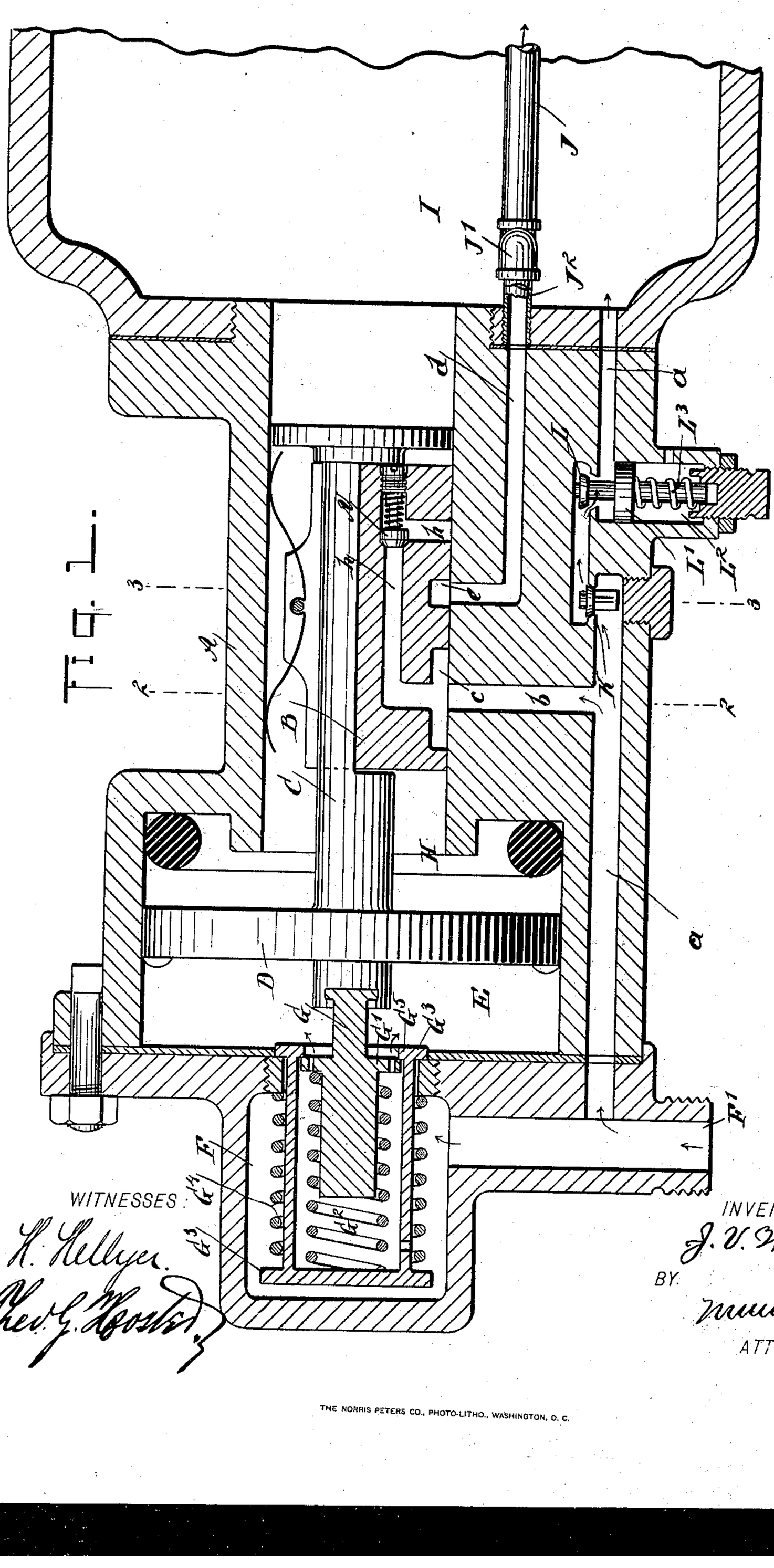

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Fig. 2.

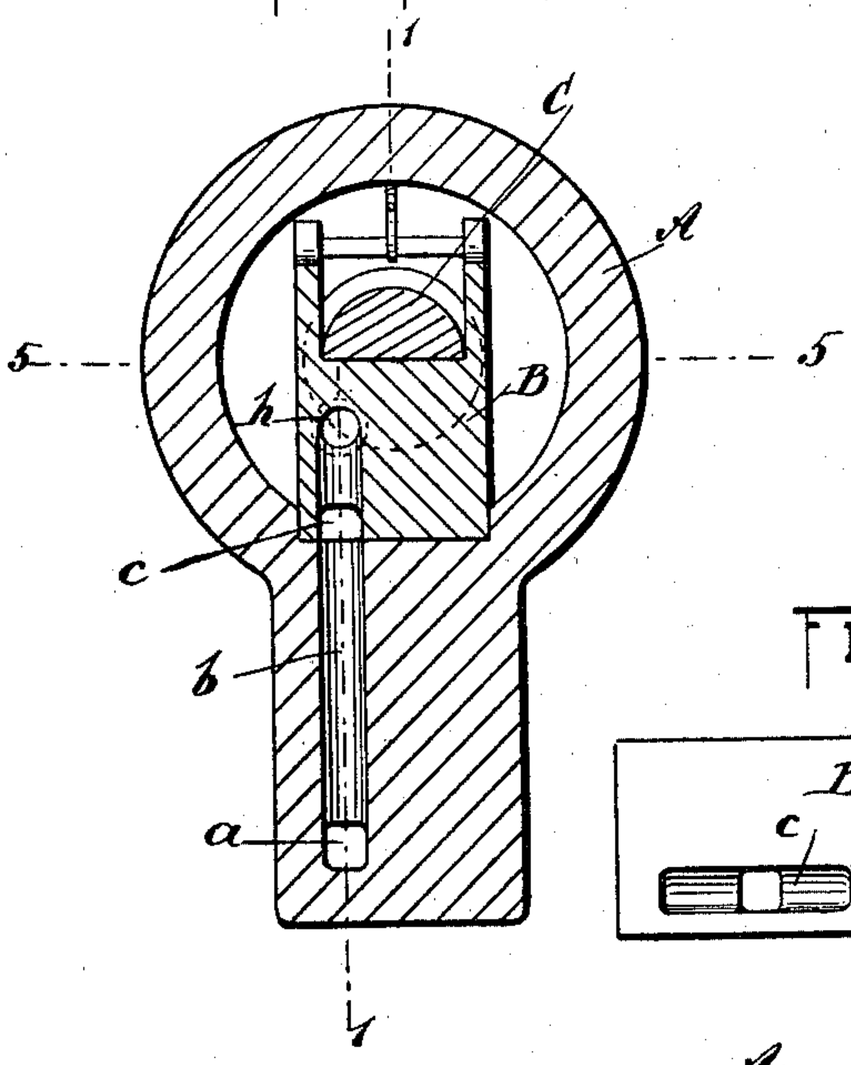


Fig. 3.

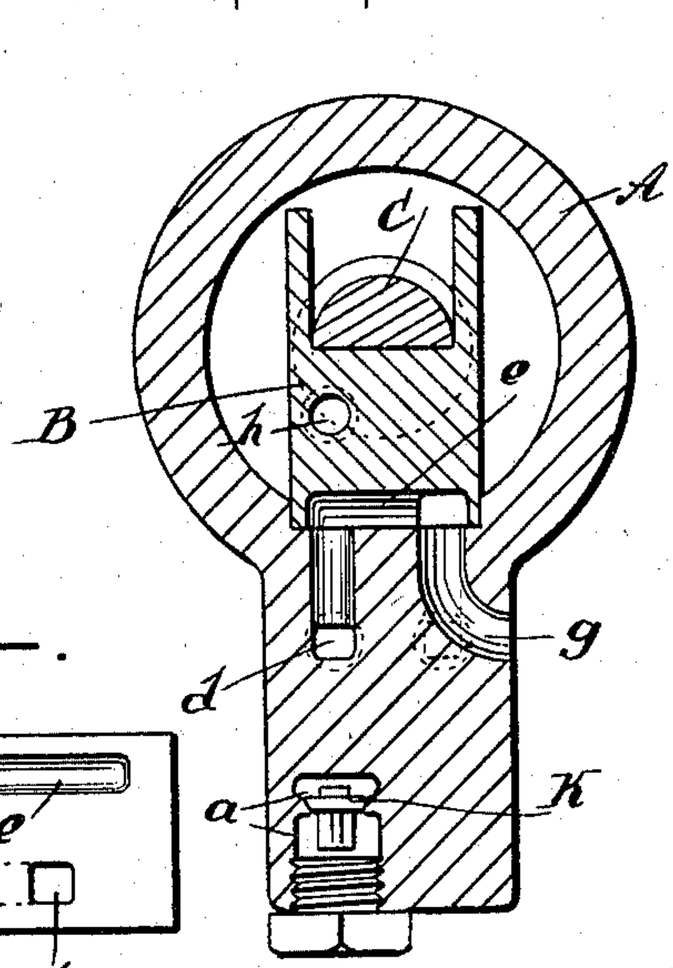


Fig. 4.

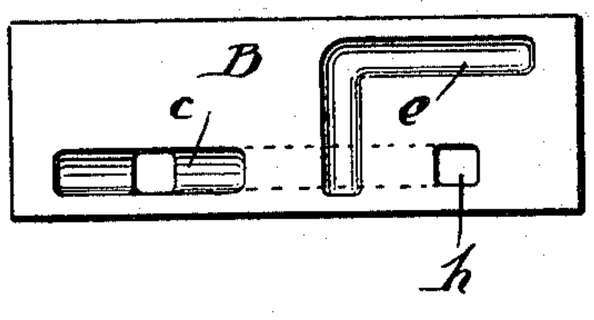


Fig. 5.

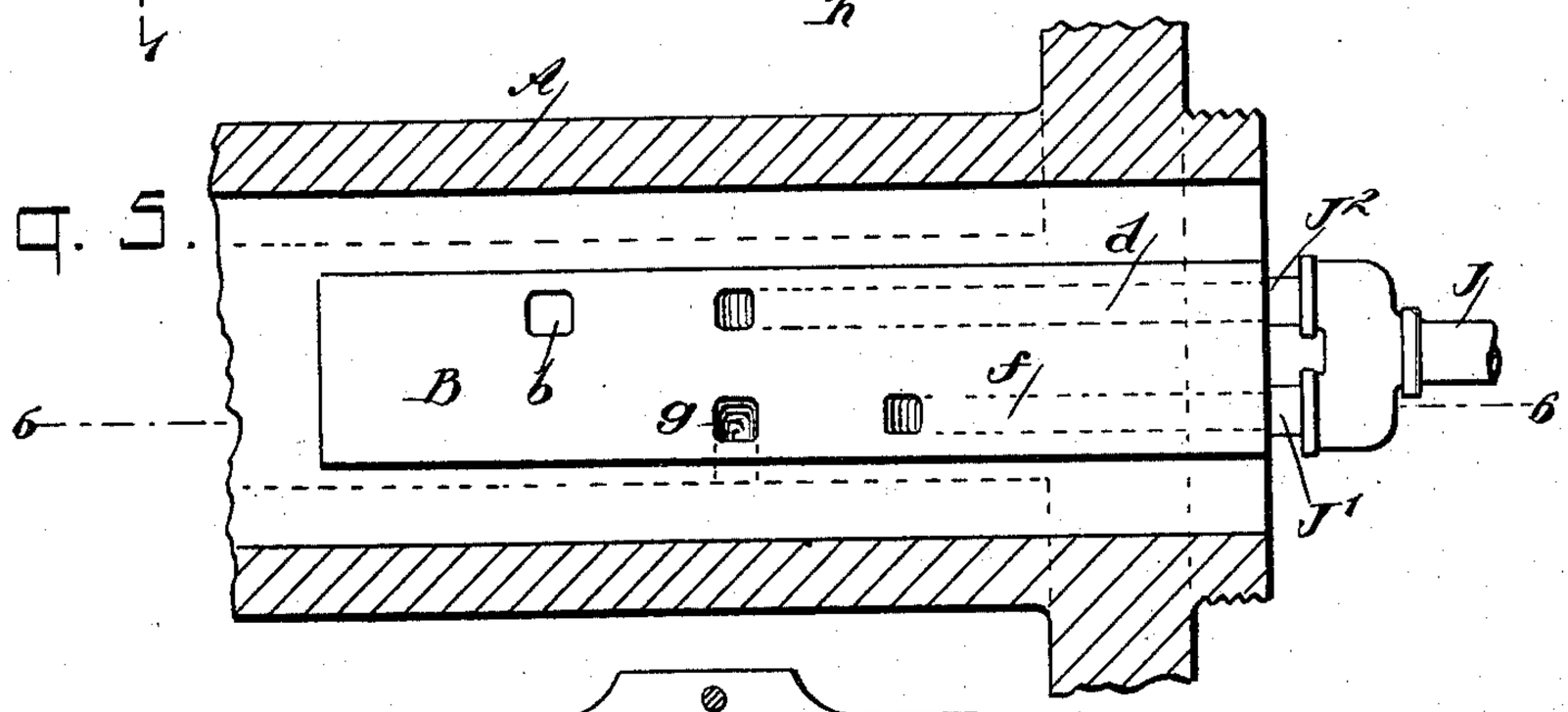
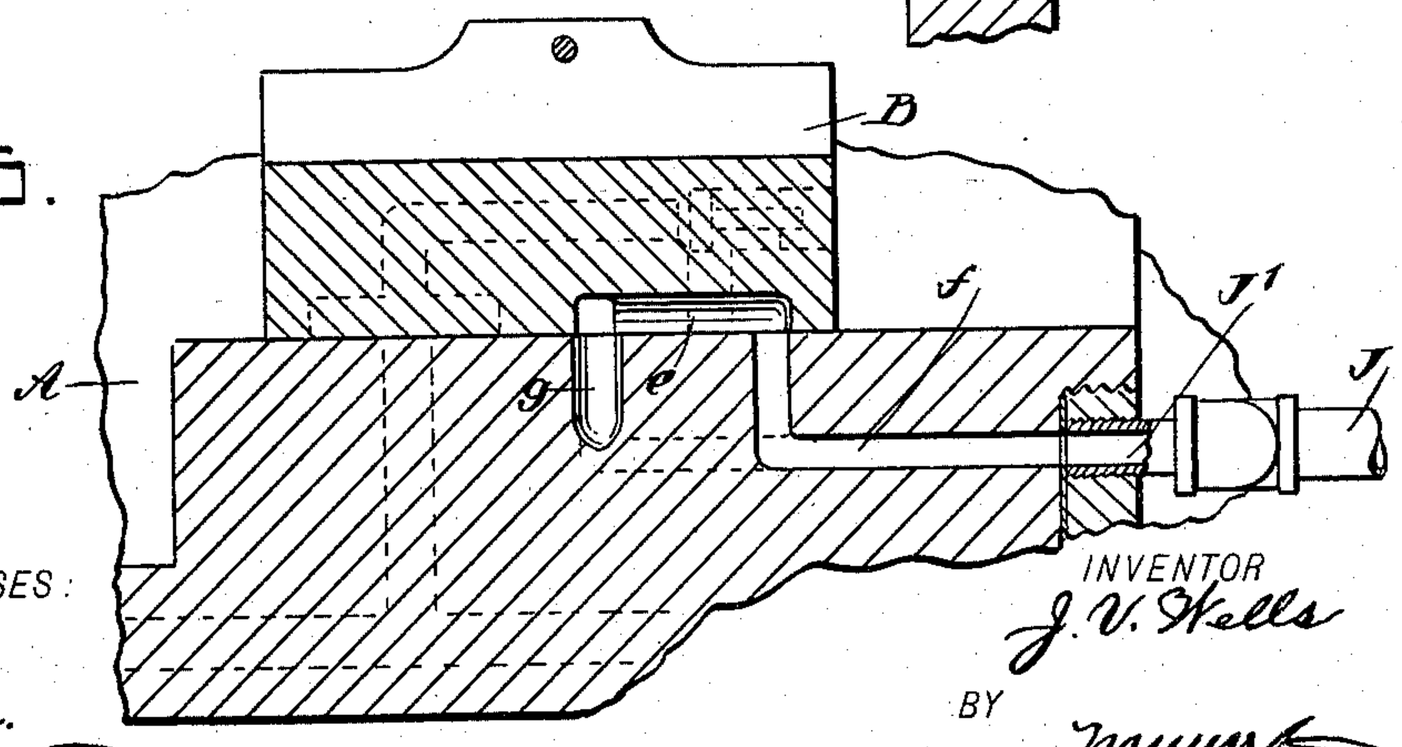


Fig. 6.



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JOHN V. WELLS, OF WILMERDING, PENNSYLVANIA.

TRIPLE VALVE.

SPECIFICATION forming part of Letters Patent No. 609,312, dated August 16, 1898.

Application filed October 2, 1897. Serial No. 653,814. (No model.)

To all whom it may concern:

Be it known that I, JOHN V. WELLS, of Wilmerding, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Triple Valves, of which the following is a full, clear, and exact description.

The object of the invention is to provide certain new and useful improvements in triple valves whereby the necessity of releasing the brakes to recharge the auxiliary reservoir is removed, the reservoir being at all times fully charged in case of an emergency.

The invention consists of certain parts and details and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a sectional side elevation of the improvement in a release position, the section being taken on the line 1 1 of Fig. 2. Fig. 2 is a transverse section of the same on the line 2 2 of Fig. 1. Fig. 3 is a similar view of the same on the line 3 3 of Fig. 1. Fig. 4 is an inverted plan view of the slide-valve. Fig. 5 is a sectional plan view of the triple-valve body with the slide-valve removed, the section being taken on the line 5 5 of Fig. 2. Fig. 6 is a sectional side elevation of the body with the slide-valve in position, the section being taken on the line 6 6 of Fig. 5.

The improved triple valve illustrated in the drawings is provided with a triple-valve body A, containing a slide-valve B, connected by a stem C with a piston D, mounted to travel in a cylinder E in communication with a drain-cup F, having an inlet-port F′ connected with the train-pipe. The left-hand end of the piston D is connected to a short stem G, having a collar G′ pressed on by a spring G^2, contained in a cup G^3, the latter being pressed on by a spring G^4, contained in the drain-cup F, and as plainly shown in Fig. 1, the springs G^4 and G^2 being of nearly equal strength and sufficient to overcome the friction on the face of the slide-valve B when the pressure is equal on both sides of the piston D, the latter then standing in the release position, as shown in Fig. 1. The collar G′ abuts against an annular internal flange G^5 on the cup G^3, so that when the piston D moves to the left the spring G^2 is compressed and when the piston moves to the right the other spring G^4 is compressed, as the collar G′ then pulls on the flange G^5 for compressing the said spring G^4. The air from the train-pipe can thus enter the drain-cup F and by means of a port in the cup G^3 and ports in the collar G′ can pass into the left-hand end of the cylinder E to press on the piston D and shift the same from the left to the right upon applying the brakes, as hereinafter more fully described, the piston D then moving with its right-hand face in contact with a gasket H, held in the cylinder E and adapted to be compressed by the piston, provided sufficient force is employed for the purpose.

An auxiliary reservoir I is employed with the valve-body A, and the brake-cylinder (not shown) may be attached to the said reservoir. From the latter leads a pipe J, extending through the auxiliary reservoir and terminating in two branch pipes J′ J^2, connected with ports, as hereinafter more fully described.

The auxiliary reservoir I is connected with an inlet-port *a*, extending through the valve-body A and containing a check-valve K and a piston-valve L, carried on a piston L′, fitted to slide in a cylinder L^2 and pressed on by a spring L^3, set equal to the normal pressure in the train-pipe, so that the valve L is normally open. The cylinder L^2 below the piston L′ is provided with a port opening to the atmosphere to allow the piston L′ to readily yield to any increase of pressure and seat the valve L. From the port *a* leads a branch port *b* to the face or seat of the valve B to register with a recess *c*, formed on the sliding face of the said valve B. The recess *c* is adapted to connect the port *b* with a port *d*, likewise formed in the body A and opening into the branch pipe J^2, forming part of the pipe J, for supplying the brake-cylinder with fluid-pressure. The port *d* is also adapted to be connected by an L-shaped port *e* with a port *f*, connected with the other branch pipe J′ and with an exhaust-port *g*, formed in the body A and leading to the outside. (See Fig. 3.)

In the valve B is formed a port *h*, which opens at one end into the recess *c* and contains,

near its other end, a spring-pressed valve N for normally closing this end of the port *h*, as shown in Fig. 1, the said port being adapted to connect with the port *d* when the valve B is moved into an emergency position—that is, to the extreme left.

The operation is as follows: When the several parts are in the position shown in Fig. 1, then the air-pressure from the train-pipe can pass through the cup F into the cylinder E at the left-hand end of the piston D, and air can also pass through the port *a*, past the valve K and the open valve L, into the auxiliary reservoir I, and through the valve-chamber to the cylinder E at the right-hand end of the piston D, so that the pressure on both sides of the said piston is equal. Now when the engineer's valve is adjusted to maintain, say, seventy pounds, pressure in the train-pipe and it is desired to apply the brakes then an excess pressure from the reservoir above the train-pipe pressure is allowed to enter the train-pipe and pass from the latter to the port *a*. The valve L, being set to close when the pressure on the piston L exceeds that normally maintained in the train-pipe and auxiliary reservoir, is closed by the excess of pressure which passes through the drain-cup F into the left-hand end of the cylinder E to press against the piston D, so as to force the same to the right against the auxiliary-reservoir pressure, which is only seventy pounds. The piston D thus comes in contact with the rubber ring or gasket H, but at this time the cavity or recess *c* is not yet in register with the port *d;* but upon further pressure and compression of the gasket H the recess *c* is brought in register with the port *d* to allow the train-pipe pressure to pass directly from the port *a*, port *b*, recess *c*, and port *d* into the branch pipe J^2, and by the pipe J to the brake-cylinder to apply the brakes.

Now if it takes five pounds of excess pressure to the square inch to move the piston D against the gasket H and one additional pound of pressure to compress the said gasket H then it is clear that when one pound of pressure has passed into the brake-cylinder, as above described, then the resiliency of the rubber gasket H causes it to expand to its normal position to move the piston D slightly to the left to bring the recess *c* out of register with the port *d*. Thus the full pressure remains in the brake-cylinder to keep the brakes supplied until the piston D is moved either farther to the right or to the left by a reduction or increase of pressure in the train-pipe. The rubber gasket H makes a perfect joint between it and the piston D, so that air is not liable to leak from the cylinder through the valve-chamber into the auxiliary reservoir, or vice versa, thereby preventing equalization.

In order to release the brakes, the train-pipe pressure is reduced down to seventy pounds, (to normal pressure,) so that the spring G^4 moves the piston D back to its normal position (shown in Fig. 1) to bring the slide-valve B, with its recess *e*, over the port *d* to allow the air to escape from the brake-cylinder by way of the pipe J, branch pipes J' J^2, port *d*, recess *e*, and exhaust-port *g*.

In order to make an emergency application, the train-pipe pressure is reduced, so that pressure in the auxiliary reservoir I forces the piston D to the left against the tension of the spring G^2, the piston moving the slide-valve B sufficiently to the left to uncover the port *f* and allow the auxiliary-reservoir pressure to pass through the port *f* and branch pipe J' into the pipe J and to the brake-cylinder to instantly apply the brakes. The valved end of the port *h* will also be moved in register with the port *d*, and as the valve K remains closed by the excess of pressure from the auxiliary reservoir I it is evident that some of the train-pipe pressure before it gets away passes through the port *b* and recess *c* into the port *h* to open the valve N and to pass into the port *d*, thus allowing the train-pipe pressure to rush into the brake-cylinder until said pressure meets the stronger pressure from the auxiliary reservoir, after which the valve N will again close.

By the arrangement described the action of the brakes in a whole train is almost instantaneous, as the brake-cylinders are filled very rapidly with pressure for applying the brakes.

It is further evident that by the arrangement described no release of the brakes for recharging the auxiliary reservoir is necessary, and the reservoir-air is always ready in case of the breaking of the hose or train-pipe and is also up to the required amount. Furthermore, a gradual braking can be accomplished from one pound or a fraction to the full main-reservoir pressure, as required. It is further evident that the engineer is not required to release the brakes to get a fresh hold in case of repeated application.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A triple valve provided with a slide-valve adapted when moved in one direction to connect the train-pipe pressure with the brake-cylinder, a piston connected with the said valve and adapted to be acted on by excess train-pipe pressure, two springs for holding the piston normally in a release position, and a compressible gasket for the piston to rest on and compress the said gasket serving to make a close joint with the piston to prevent the leak of air and also serving by its resiliency to move the piston to disconnect the train-pipe pressure from the brake-cylinder, substantially as described.

2. A triple valve provided with a valve-body having two ports independently connected with the brake-cylinder, and a slide-valve arranged to uncover one of said ports to make connection with an auxiliary reservoir on an emergency application, the said slide-valve being provided with a recess in its face at all

times in communication with the train-pipe pressure and a port leading from said recess, and adapted to connect the other port in the valve-body with the train-pipe pressure, substantially as shown and described.

3. A triple valve provided with a valve-body having two ports independently connected with the brake-cylinder, and a slide-valve arranged to uncover one of said ports to make connection with an auxiliary reservoir on an emergency application, the said slide-valve being provided with a port having a spring-pressed valve near one end and opening at the other end into a recess at all times in communication with the train-pipe pressure, the said port in the slide-valve being adapted to connect the other port in the valve-body with the train-pipe pressure, as shown and described.

4. A triple valve provided with a triple-valve body having a port for connecting the auxiliary reservoir with the train-pipe pressure and a port for connection with the brake-cylinder, a slide-valve having a recess for connecting the said ports with each other, a spring-pressed piston for operating the said valve, the said piston and valve being normally held in a release position with the said ports disconnected, and an elastic ring for the piston to rest on, the said ring being adapted to be compressed by the said piston when the latter is moved to cause the ports to be connected by the recess in the valve to allow excess of pressure to pass to the brake-cylinder, the resiliency of the said elastic ring causing it to expand to move the piston and valve to disconnect the ports and maintain the pressure in the brake-cylinder, substantially as described.

5. A triple valve provided with a triple-valve body having a port for connecting the auxiliary reservoir with the train-pipe pressure, the port containing a check-valve and a graduated piston-valve, the said body being also provided with a branch port leading from the first-mentioned port, the valve-body being further provided with two separate ports connected with the brake-cylinder, and a slide-valve having a recess for connecting the branch port with one of the said brake-cylinder ports, the slide-valve also having a second recess for connecting the said brake-cylinder port with an exhaust-port, substantially as shown and described.

6. A triple valve provided with a triple-valve body having a port for connecting the auxiliary reservoir with the train-pipe pressure, the port containing a check-valve and a graduated piston-valve, the said body being also provided with two separate ports connected with the brake-cylinder, and a slide-valve having a recess for connecting the train-pipe pressure with one of the said brake-cylinder ports, the slide-valve also having a second recess for connecting the said brake-cylinder port with an exhaust-port, the other brake-cylinder port being adapted to be uncovered by the slide-valve, to connect the auxiliary reservoir with the brake-cylinder, substantially as shown and described.

7. A triple valve provided with a triple-valve body having a port for connecting the auxiliary reservoir with the train-pipe pressure, the said port containing a check-valve and a piston-valve and a branch port leading from said port, the said body being also provided with two separate ports connected with the brake-cylinder, and a slide-valve having a recess at all times in communication with the train-pipe pressure and adapted to connect with one of the said brake-cylinder ports, the slide-valve also having an L-shaped recess for connecting both of the said brake-cylinder ports with an exhaust-port, substantially as shown and described.

8. A triple valve provided with a triple-valve body having a port for connecting the auxiliary reservoir with the train-pipe pressure, the port containing a check-valve and a piston-valve, the said body being also provided with a branch port leading from the first-mentioned port, the body being further provided with two separate ports connected with the brake-cylinder, and a slide-valve adapted to uncover one of said ports connected with the brake-cylinder to connect the auxiliary reservoir with the brake-cylinder, the said slide-valve being provided with a port having a valve near one end and opening at the other end into a recess formed on the face of the valve, the said recess being at all times in communication through the branch port in the body with the train-pipe pressure, the valved end of said port in the slide-valve being adapted to be moved in register with the other port in the body connected with the brake-cylinder, substantially as described.

9. A triple valve provided with a triple-valve body, a slide-valve contained in said valve-body, a cylinder, a piston mounted to travel in said cylinder and connected at one side by a stem with the said slide-valve, the other side of the said piston being connected with a stem provided with a collar a drain-cup having an inlet-port connected with the train-pipe, a cup arranged within said drain-cup and provided with an annular internal flange against which the collar on the valve-stem abuts, a spring arranged within the said cup and pressing on the collar on the valve-stem, a spring pressing on said cup and contained within the drain-cup, the said springs holding the piston normally in a release position, and a compressible gasket arranged within the cylinder for the piston to rest on and compress, substantially as shown and described.

10. A triple valve provided with a triple-valve body having a port for connecting the auxiliary reservoir with the train-pipe pressure, and a port for connection with the brake-cylinder, a slide-valve for connecting the said ports with each other, a piston connected with

the said valve for operating the same, a cylinder in which the piston is mounted to travel, a drain-cup communicating with the said cylinder and having an inlet-port connected with the train-pipe, springs for holding the piston normally in a release position, and a compressible gasket held in the cylinder and adapted to be compressed by the piston, as and for the purpose set forth.

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Witnesses:
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