L. H. SCHENCK.

MEANS FOR AUTOMATICALLY VARYING, PROPORTIONATELY TO THE LOAD, THE PNEUMATIC APPLICATION OF FRICTION BRAKES.

APPLICATION FILED DEC. 4, 1908.

976,000.

Patented Nov. 15, 1910.

4 SHEETS—SHEET 1.

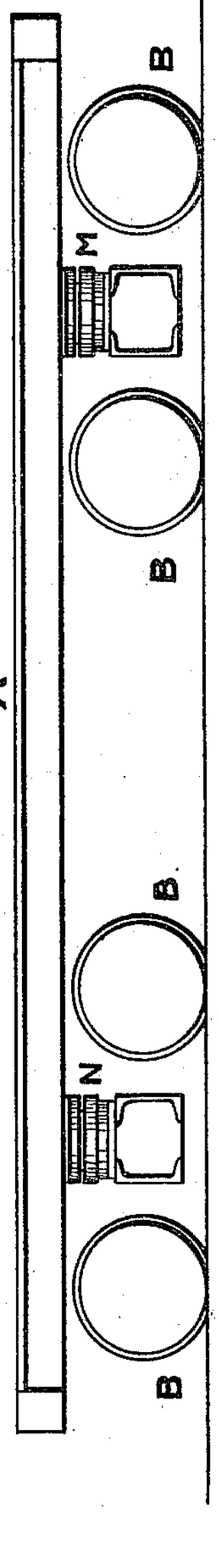



FIG. 1

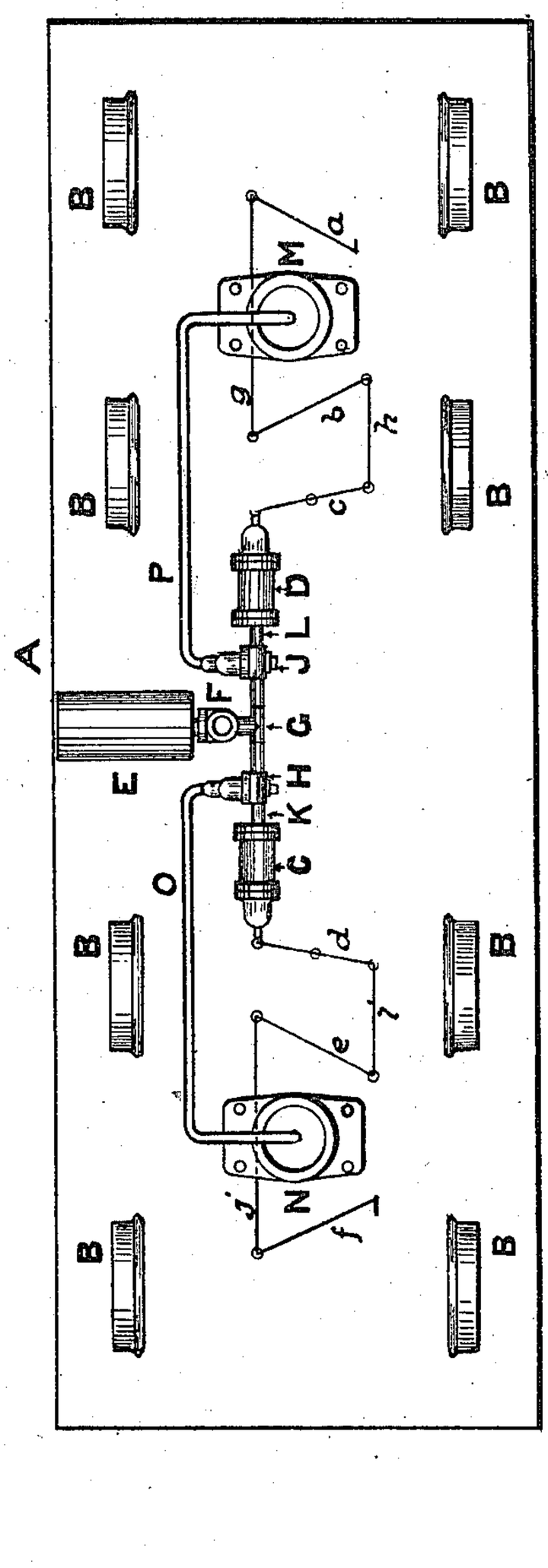



FIG. 2

Witnesses

Gertrude Manning

Mary H. Darg

Inventor

Leon H. Schenck

By Delbert H. Decker

Attorney

L. H. SCHENCK.

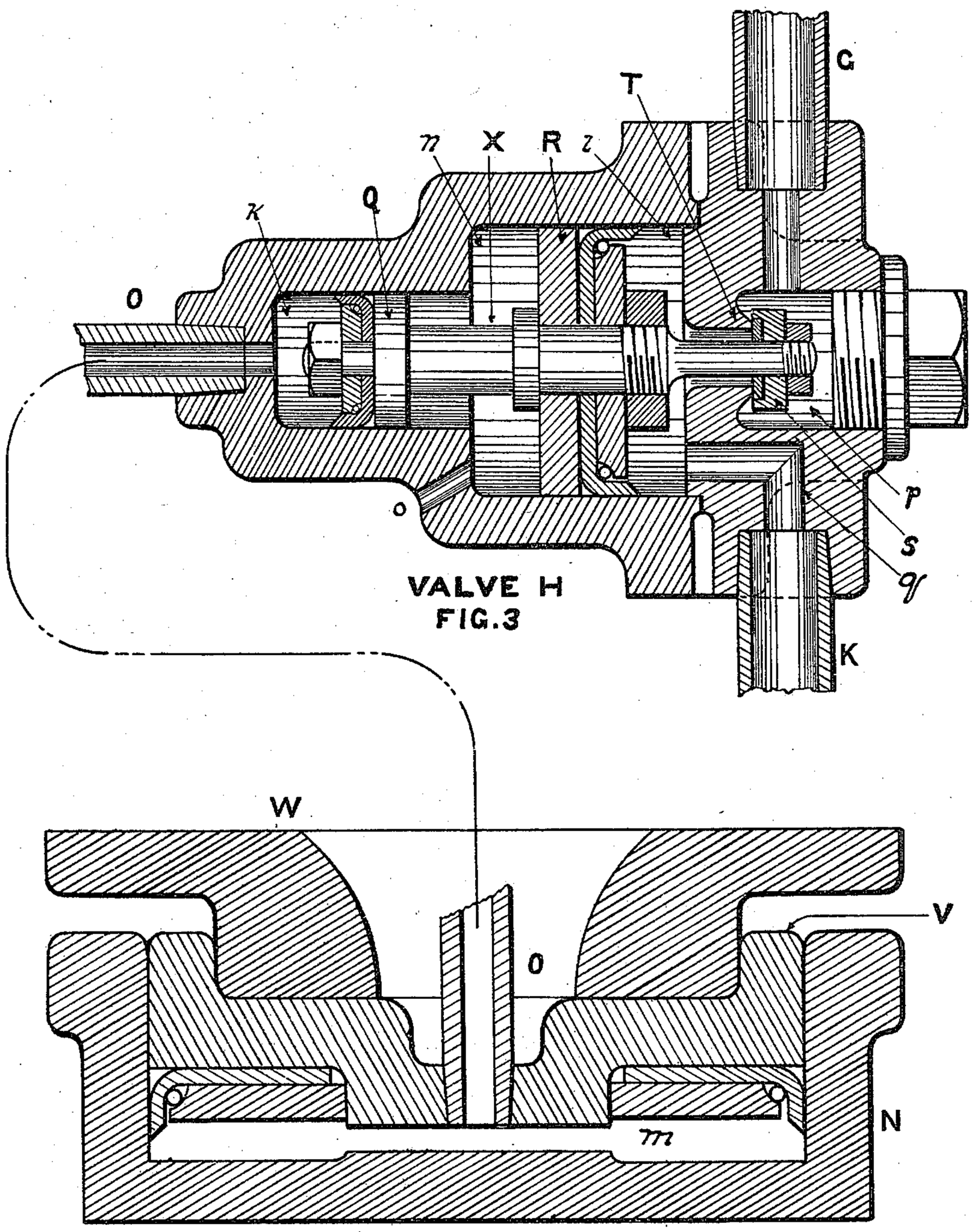
MEANS FOR AUTOMATICALLY VARYING, PROPORTIONATELY TO THE LOAD, THE PNEUMATIC APPLICATION OF FRICTION BRAKES.

APPLICATION FILED DEC. 4, 1908.

**976,000.**

Patented Nov. 15, 1910.

4 SHEETS—SHEET 2.




VALVE H
FIG. 3

CENTRE PLATE
FIG. 4

Witnesses
Gertrude Manning
Mary H. Dang

Inventor
Leon H. Schenck
By Delbert H. Ducker
Attorney

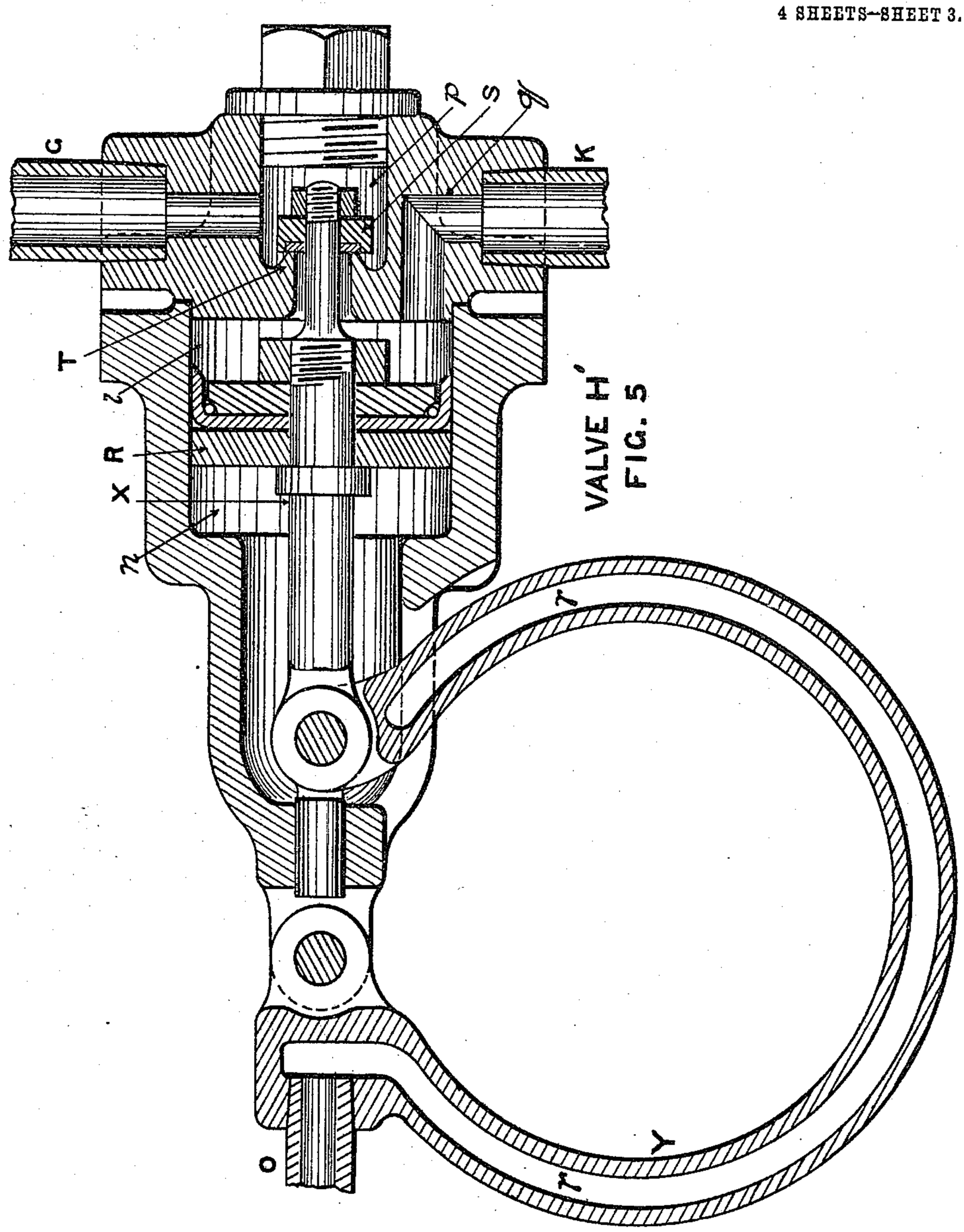
L. H. SCHENCK.

MEANS FOR AUTOMATICALLY VARYING, PROPORTIONATELY TO THE LOAD, THE PNEUMATIC APPLICATION OF FRICTION BRAKES.

APPLICATION FILED DEC. 4, 1908.

976,000. Patented Nov. 15, 1910.

4 SHEETS—SHEET 3.




Witnesses

Gertrude Manning

Mary H. Darg

Inventor

Leon H. Schenck

By Delbert H. Decker

Attorney

L. H. SCHENCK.

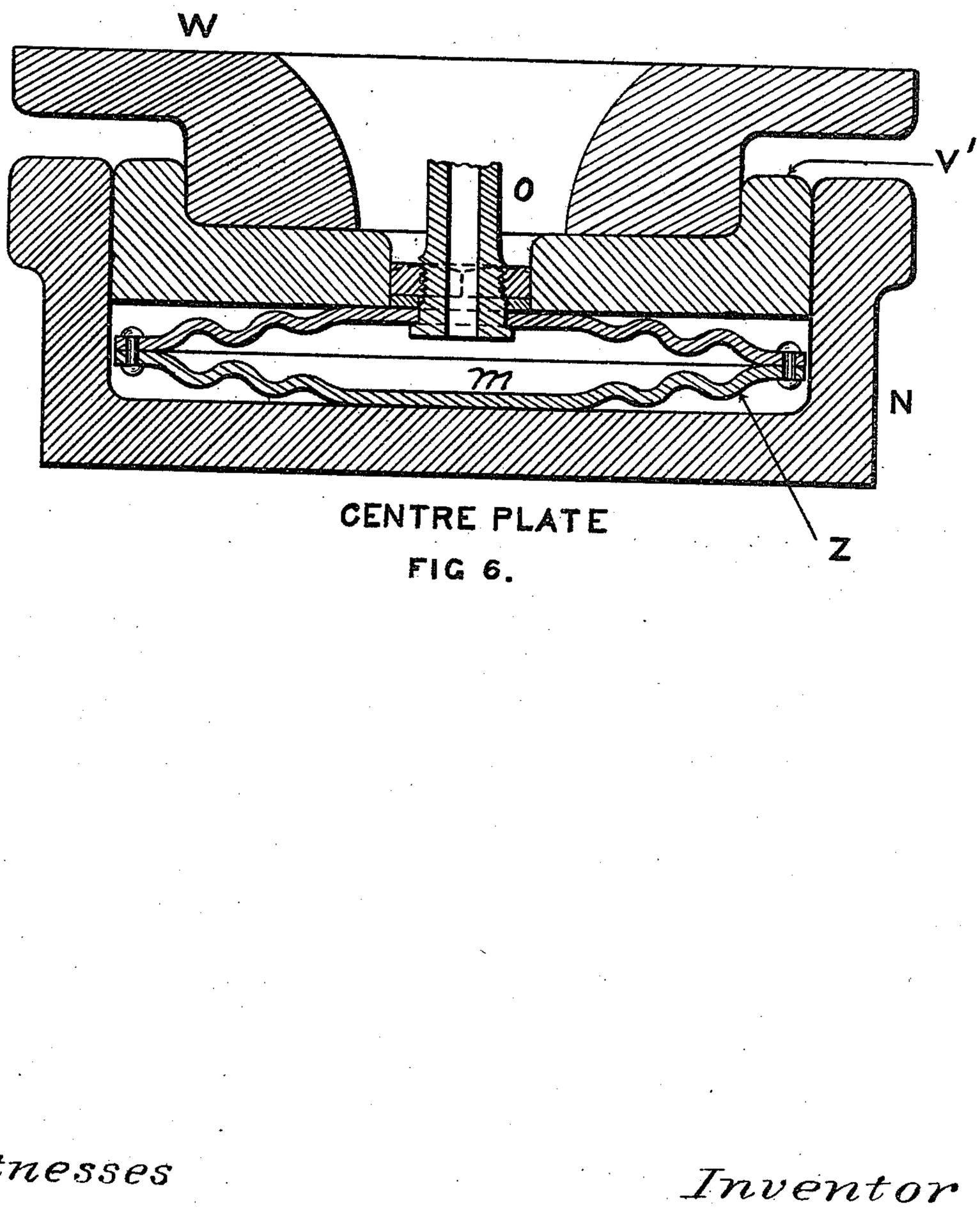
MEANS FOR AUTOMATICALLY VARYING, PROPORTIONATELY TO THE LOAD, THE PNEUMATIC APPLICATION OF FRICTION BRAKES.

APPLICATION FILED DEC. 4, 1908.

976,000.

Patented Nov. 15, 1910.

4 SHEETS—SHEET 4.




CENTRE PLATE

FIG 6.

Witnesses

Gertrude Manning.

Mary H. Darg

Inventor

Leon H. Schenck

By Delbert H. Decker

Attorney

# UNITED STATES PATENT OFFICE.

LEON H. SCHENCK, OF SCHENECTADY, NEW YORK.

## MEANS FOR AUTOMATICALLY VARYING, PROPORTIONATELY TO THE LOAD, THE PNEUMATIC APPLICATION OF FRICTION-BRAKES.

976,000. Specification of Letters Patent. Patented Nov. 15, 1910.

Application filed December 4, 1908. Serial No. 465,933.

*To all whom it may concern:*

Be it known that I, LEON H. SCHENCK, a citizen of the United States, residing at Schenectady, in the county of Schenectady, State of New York, have invented a new and useful Improvement in Means for Automatically Varying, Proportionately to the Load, the Pneumatic Application of Friction-Brakes, of which the following is a specification.

This invention relates to an improvement in air brakes generally and particularly to means for automatically varying the force of application of friction brakes in proportion to the load carried by the vehicle.

To this end the invention consists in the construction and combination of parts as herein set forth and claimed.

In the drawings, which accompany this specification as a part thereof, Figure 1 represents in side elevation so much of a car as is necessary to show the application of the invention; Fig. 2 is a diagrammatic plan of so much of a car and of an ordinary air brake system as is necessary to properly illustrate the combination therewith of the present invention; Fig. 3 is a horizontal medial section of a preferred form of an automatic pressure controlling valve for use in this system; Fig. 4 is a vertical sectional view showing a preferred form of load actuated mechanism consisting in a fluid-pressure cylinder and piston through the agency of which the automatic valve is operated; Fig. 5 is a horizontal medial section of the pressure controlling valve with a modified operating device; and Fig. 6 is a vertical sectional view of a modification of the load actuated mechanism for operation of the automatic valve.

In Figs. 1 and 2 there is represented a car body A and supporting wheels B. The letters *a*—*b*—*c*—*d*—*e* and *f* indicate the levers and *g*—*h*—*i* and *j* the rods in the ordinary, shoe-operating mechanism. C and D indicate the brake cylinders at opposite ends of the car, E the auxiliary reservoir and F the triple valve all substantially as now in common use. G indicates the pipe, which ordinarily leads directly to the brake cylinders from the triple valve. It is in the line of this pipe that the automatic load-controlled valves are located, one for each brake cylinder, as represented at H and J. These valves are identical in structure and operation. The valve H is shown in detail in Fig. 3. The load actuated mechanisms for furnishing pressure to the controlling valves are represented at M and N as located in the bolsters of the trucks at either end of the car and are also identical. The one at N is illustrated in detail in Fig. 4. K and L are pipes leading respectively from valve H to cylinder C and from valve J to cylinder D. O and P are pipes which transmit this fluid pressure from cylinder N to valve H and from cylinder M to valve J respectively.

In the automatic valve H, Fig. 3, a piston Q is arranged to withstand pressure from cavity *k;* R is a piston arranged to withstand pressure from cavity *l;* S is a valve arranged to close against its seat T; cavity *n* is open to the atmosphere by port *o*.

In Fig. 4, *m* is a cavity in the center plate of the bolster and constitutes the pressure cylinder at N; V is a piston arranged to withstand pressure from cavity *m;* and W is the usual car frame centerpin, and is journaled in a step-bearing in the piston V.

The mechanism operates as follows, reference being made to that end thereof whose parts are shown in detail: Reservoir E is charged with compressed air. Valve F allows this air to pass through pipe G to cavity *p* in valve H. When valve S is open, this air will pass to chamber *l* and through port *q* and pipe K to the brake cylinder C, there operating the usual piston which applies the brakes. The pressure in the brake cylinder and cavity *l* of valve H are numerically equal and, in cavity *l*, will press upon piston R, which by piston rod X will tend to draw valve S against its seat. Cavity *m*, pipe O and cavity *k* are filled with a fluid such as oil which is subjected to pressure due to the weight of the car body through the centerpin W. This pressure operates upon piston Q, which, by piston rod X, will tend to push valve S away from its seat, thus making pistons Q and R operate in opposition to each other in moving valve S. The thrust of piston Q will vary with the load on the car. When thrust of piston R is slightly in excess of thrust of piston Q, valve S will close against its seat, obstructing a further increase of pressure upon piston R, thereby making pressure in cavity *l* and in the brake cylinder vary with the load on the car. The pressure of the brake shoes on the wheels therefore varies with the load on

the car, since this pressure is proportional to the brake cylinder pressure.

Obviously the movement of rod X for unseating valve S may be effected through means other than the piston Q, as for instance, through the agency of a Bourdon tube, as illustrated in connection with the valve in Fig. 5, wherein a Bourdon tube is represented at Y, the interior *r* thereof being in direct communication with the pipe O. The free end of the tube Y is connected to the valve stem X and the variation in pressure within the tube causes reciprocation of the stem X and consequent operation of the valve S to the same end, as in valve H, Fig. 3. It is also obvious that the fluid pressure may be supplied or generated by devices other than that illustrated in Fig. 4. Another form of mechanism for this purpose is illustrated in Fig. 6, wherein a diaphragm chamber Z with its piston V′ is substituted for the piston V and its cylinder. In Fig. 6, the piston V′ acts upon the diaphragm chamber and forces the contents of said chamber through the pipe O either to chamber *k* in valve H or to the interior *r* of the Bourdon tube in valve H′, the resultant action upon the controlling valve S being the same in both instances.

The invention claimed is:—

1. In an air brake system, the combination with the brake cylinder and pipe for leading air thereto, of a valve in said pipe, and fluid-pressure producing means operable by the load of the vehicle for varying and controlling the passage of air through said valve.

2. In an air brake system, the combination with the brake cylinder and pipe for leading air thereto, of a valve in said pipe, and a device producing an additional fluid-pressure operable by the load of the vehicle for varying and controlling the passage of air through said valve.

3. In an air brake system, the combination with the brake cylinder and pipe for leading air thereto, of a valve in said pipe, and a fluid-pressure device for controlling said valve, said device consisting of a mechanism operable by an additional fluid under pressure to unseat the valve, a fluid-pressure generator on the truck of the vehicle for providing pressure for said additional fluid and actuated by the load of the vehicle, and a pipe connecting said mechanism and said generator.

4. In an air brake system, the combination with the brake cylinder and pipe for leading air thereto, of a valve in said pipe, and a fluid-pressure device for controlling said valve, said device consisting of a piston in the valve casing connected to the valve for seating it, a fluid-pressure actuated device for unseating said valve, and a fluid-pressure generator on a truck of the vehicle and actuated by the load of the vehicle, and a pipe connecting said mechanism and said generator.

5. In an air brake system, the combination with the brake cylinder and pipe for leading air thereto, of a valve in said pipe, and a fluid-pressure device for controlling said valve, said device consisting of a piston in the valve casing connected to the valve for seating it, a second piston connected to the valve for unseating it, a pressure cylinder and piston on a truck of the vehicle, and a pipe connecting said cylinder with said valve casing, and containing an additional fluid to which pressure is applied by the piston and cylinder on the truck.

6. In an air brake system, a fluid-pressure mechanism for controlling the admission of air to the brake cylinder, consisting of a fluid-pressure generator located in a bolster of a car truck and actuated by the load of the car body, a device controlling the passage of air to the brake cylinder, and a pipe connecting this device to said pressure generator.

7. In an air brake system, a fluid-pressure mechanism for controlling the admission of air to the brake cylinder, consisting of a fluid-pressure cylinder located in the bolster of the car truck, a piston in said cylinder and adapted to be forced into said cylinder by the load of the car body, thereby to generate pressure, a device controlling the passage of air to the brake cylinder and a pipe connecting this device to said pressure cylinder.

8. The combination with an air brake system for vehicles, of a valve for controlling the passage of air to the brake cylinder, and means for controlling the operation of said valve consisting of a fluid-pressure cylinder, a pipe connecting said cylinder with the casing of said valve, and a piston in said cylinder and operable by the load on the vehicle for generating and varying the fluid-pressure.

9. In an air brake system, the combination with the brake cylinder and pipe for leading air thereto, of a valve in said pipe, a piston in the valve casing connected to the valve and actuated by the air passing to the brake cylinder, another piston in said casing and also connected to said valve, and an additional fluid under pressure for moving this second piston by and in accordance with the load of the vehicle.

10. In an air brake system, the combination with the brake cylinder and pipe for leading air thereto, of a valve in said pipe, a piston in the valve casing connected to the valve and actuated by the air passing to the brake cylinder, another piston in said casing and also connected to said valve, a fluid-pressure cylinder on a truck of the vehicle containing an additional fluid and connected to the chamber of said second piston, and

a piston in said cylinder connected to the vehicle body and operable thereby in accordance with the load of the vehicle to vary the pressure on said additional fluid.

11. In a fluid-pressure device for automatically controlling the admission of air to a brake cylinder in a pneumatic brake system for cars, a fluid-pressure generator in the center plate of one of the trucks and operable by the load of the car.

12. In a fluid-pressure device for automatically controlling the admission of air to a brake cylinder in a pneumatic brake system for cars, an additional fluid-pressure generator consisting of a cylinder formed in the center plate of one of the trucks, and a piston therefor connected to the car frame centerpin, whereby the load of the car may actuate the piston.

13. In a fluid-pressure device for automatically controlling the admission of air to a brake cylinder in a pneumatic brake system for cars, a fluid-pressure generator in the center plate of one or both of the trucks, and actuating means therefor carried by the car.

14. In a fluid-pressure device for automatically controlling the admission of air to a brake cylinder in a pneumatic brake system for cars, a fluid-pressure generator in the center plate of one or both of the trucks, and a piston forming part of said generator and provided with a step-bearing for the car frame centerpin, whereby the load of the car body may actuate said generator.

LEON H. SCHENCK.

Witnesses:
A. RUSSELL STEVENSON,
GEO. C. MOON.