(No Model.) 2 Sheets—Sheet 1.

E. E. KERNS.

FLUID PRESSURE BRAKE.

No. 564,523. Patented July 21, 1896.

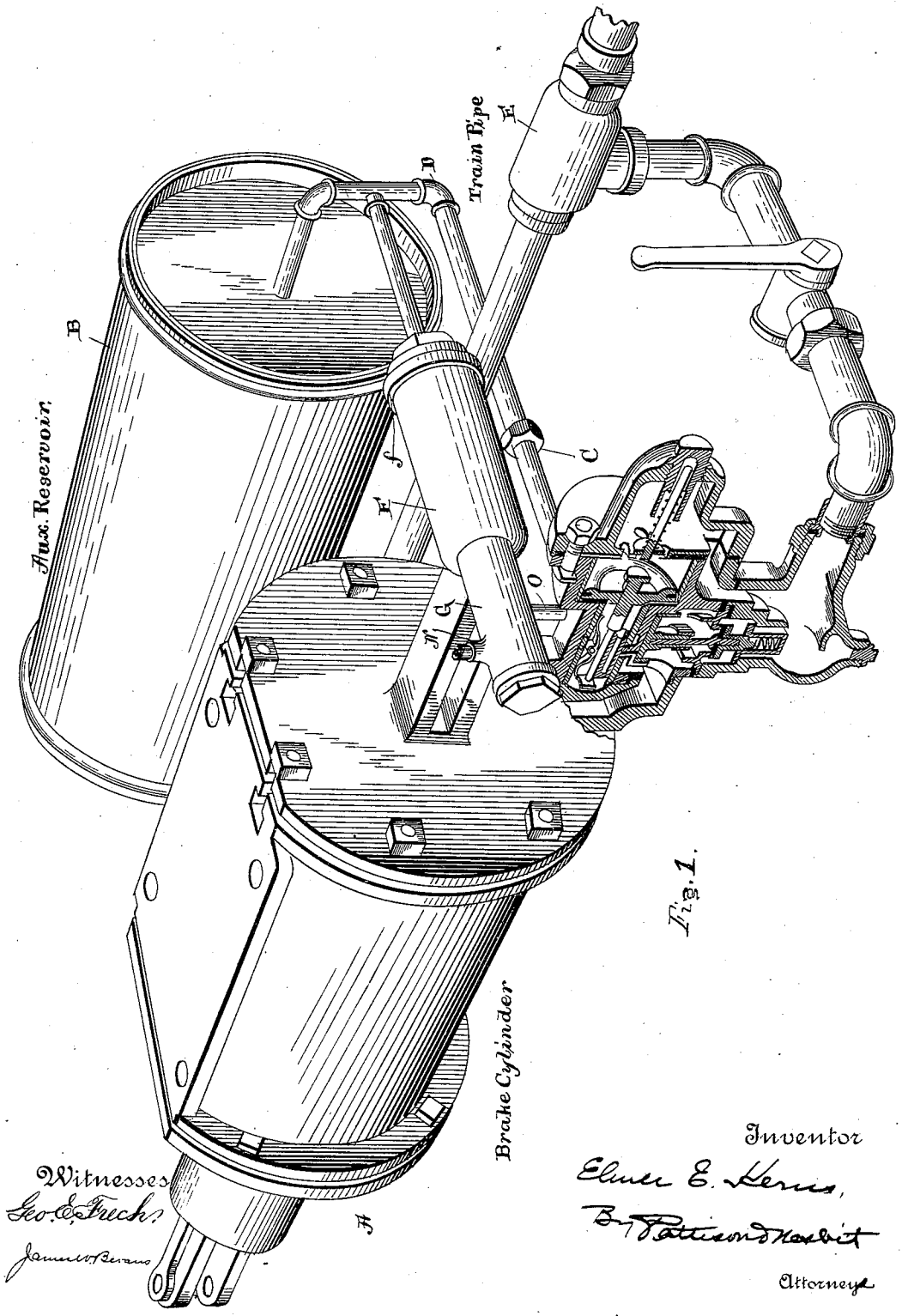

Fig. 1.

Witnesses
Geo. E. Frech
James W. Evans

Inventor
Elmer E. Kerns,
By Pattison & Nesbit
Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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Fig. 2.

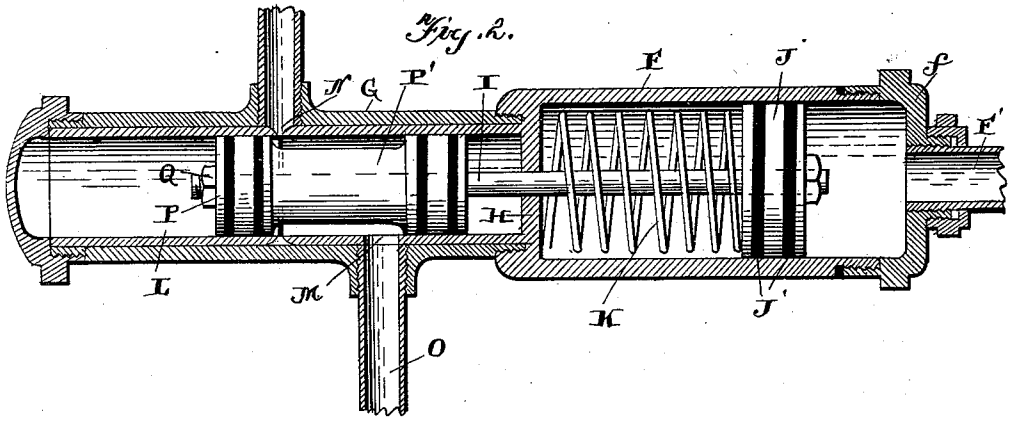


Fig. 3.

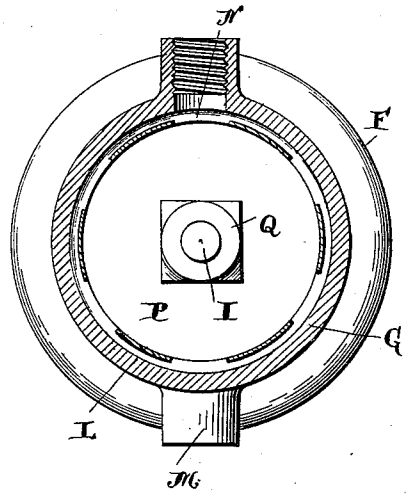
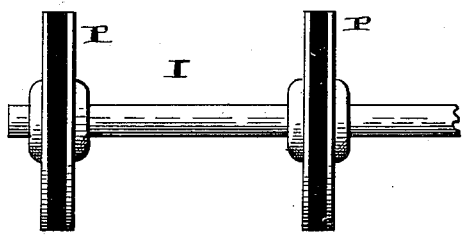


Fig. 4.



Witnesses
Geo. E. Frech,
James W. Berard

Inventor
Elmer E. Kerns,
By Pattison & Nesbit
Attorneys

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ELMER E. KERNS, OF BRADFORD, PENNSYLVANIA.

FLUID-PRESSURE BRAKE.

SPECIFICATION forming part of Letters Patent No. 564,523, dated July 21, 1896.

Application filed August 12, 1895. Serial No. 559,061. (No model.)

To all whom it may concern:

Be it known that I, ELMER E. KERNS, of Bradford, in the county of McKean and State of Pennsylvania, have invented certain new and useful Improvements in Fluid-Pressure 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 it, reference being had to the accompanying drawings, which form part of this specification.

This invention pertains to fluid-pressure brakes, and the object of the same is to provide a governor for the exhaust of the triple valve, the said governor being controlled by the pressure in the auxiliary reservoir, whereby the pressure in the brake-cylinder may be maintained while the pressure in the auxiliary reservoir is being restored.

With this object in view my invention consists in the novel features of construction hereinafter fully described and claimed, and illustrated by the accompanying drawings, in which—

Figure 1 is a perspective view showing my improvement in position. Fig. 2 is a longitudinal sectional view of the same. Fig. 3 is a cross-sectional view, taken at the exhaust, of my improvement. Fig. 4 is a detail view of a modification of the exhaust-valve.

A designates the brake-cylinder, B the auxiliary reservoir, C the triple valve, D the pipe connecting the auxiliary reservoir with the triple valve, and E the train-pipe, all of which are parts of the Westinghouse air-brake system.

In the brake apparatus of the type mentioned now in general use it is impossible, without the assistance of trainmen, to maintain pressure in the brake-cylinder and at the same time restore the pressure in the auxiliary reservoir. In other words, it is necessary to release the brakes, whether it is desired to do so or not, in order to raise the pressure to the proper degree in the auxiliary reservoir. In order to obviate this difficulty, and thus give to the engineer complete control of the brakes at all times instead of at such times only as he has the proper degree of pressure in the auxiliary reservoir, as has been the case prior to my invention, I propose to connect either the reservoir B or its pipe D to the exhaust of the triple valve in such a manner as will prevent the latter from exhausting with a depleted pressure in the reservoir. This I accomplish by providing the cylinders F and G, which are united, the former being of greater diameter than the latter, and connecting the outer end of cylinder F by means of pipe F′ to pipe D of the auxiliary reservoir. This connection, however, may be made directly to the reservoir, if so desired. The cylinders F and G are separated by a centrally-perforated partition H, through which extends the rod I.

To the end of the rod within cylinder F is secured piston-head J, suitably packed upon its periphery, as indicated at J′, and arranged between the piston J and partition H is the coiled spring K, which encircles the rod and serves to hold the piston-head normally in the outer end of cylinder F. The said outer end of cylinder F is closed by the flanged head or cap *f* screwing thereon.

Within cylinder G is the bushing or lining L, having inlet-port M and the circumferential interrupted exhaust-port N, which is V-shaped in cross-section. A passage is formed through cylinder G, which registers with port M, and to which pipe O leads from the exhaust of the triple valve C. Upon the end of the piston-rod projected through partition H is the spool-valve P, which is packed upon its periphery adjacent each end, so as to fit tightly in the bushing, while between the packing the same is reduced in diameter, as indicated at P′. This reduced diameter of the spool-valve is for the purpose of connecting ports M and N for permitting the triple valve and brake-cylinder to exhaust. I do not desire, however, to limit myself to this particular form of valve, as the same may be constructed as indicated in Fig. 4, in which two separated heads or disks are secured in proper position upon the piston-rod, and when thus arranged the valve will perform its function quite as effectually as in the construction first described.

In operation it is my purpose to so adjust the parts as to have the coiled spring exert the same amount of outward pressure upon piston J as it is desired to maintain in the auxiliary reservoir. This adjustment I ac-

complish by forming the wrench-hold Q integral with the outer end of the spool-valve and providing the latter with interior screw-threads to take the screw-threaded end of the piston-rod, thus moving the spool-valve inward upon the rod. The piston-head J will be drawn inward against the spring, and thus the latter may be gaged to the proper tension. It may be stated that the piston-head J is held on the rod N by a nut, as will be readily understood. For example, if it is desired to maintain a pressure within the auxiliary reservoir at seventy pounds, the parts are manipulated as described, in order to bring the spring to the proper degree of pressure, so that a back pressure of more than seventy pounds will be required to cause the piston-head J to recede in cylinder F. When the said head is under the control of the spring, the spool-valve is drawn to the inner end of the bushing, thus closing port N, so that when the brake has been set and the pressure in the auxiliary reservoir depleted thereby the latter may be restored by resuming the pressure in the train-pipe without releasing the exhaust from the train-cylinder and triple valve, as the same is held by the valve P, until the pressure in the auxiliary reservoir is of such degree as will overcome the spring behind the piston-head J, when the latter will be moved back in the cylinder, thus moving longitudinally the piston-rod and causing the spool-valve to open port N and thus release the brake-cylinder exhaust.

As will be apparent, the operation of my improved exhaust-governor is entirely automatic, its movement in one direction, or that of closing the exhaust, being controlled by the gaged spring, while the opposite movement, or that for releasing the exhaust, is effected by the restored pressure in the auxiliary reservoir. My object in providing the circumferential interrupted exhaust-port in the bushing, which port I prefer to have very narrow in cross-sectional extent, is that a quick release of the exhaust-air may be effected as soon as the outer end of the spool-valve has moved sufficiently far to permit the valve-cavity to communicate therewith. The V-shaped contour of the outer portion of the exhaust affords a ready passage for the air to outlet N.

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

1. A valve-casing including two chambers, one of said chambers communicating with the auxiliary reservoir, and the other chamber communicating with the triple exhaust and also provided with an exhaust, a rod movable longitudinally in the chambers, a piston-head on said rod within the chamber communicating with the auxiliary reservoir, a valve within the chamber communicating with the triple exhaust for controlling the exhaust of said chamber, said valve being mounted on the rod, and a spring adapted to normally hold the rod and valve in such position that the latter closes the chamber-exhaust, substantially as shown and described.

2. In a brake system, the centrally-partitioned casing, the rod extended therethrough, the piston secured to the end of the rod, and within the extremity of the casing connected to the auxiliary reservoir, a spring interposed between the partition and the said piston-head, and a valve in the opposite end of the casing for controlling the exhaust of the brake-cylinder, the said valve being adjustable longitudinally upon the rod for the purpose substantially as herein shown and described.

3. The combination of case G, bushing L within the case and forming a valve-chamber, said bushing formed with the exterior circumferential channel communicating with its interior and constituting exhaust N, triple-exhaust inlet O for said bushing, a valve controlling the communication between the said inlet and exhaust, and a device actuated by pressure from the auxiliary reservoir for adjusting said valve, substantially as shown and described.

4. The combination of a casing having a spring seat or stop, rod I, the piston thereon and within the casing and communicating with the auxiliary reservoir, a spring interposed between the spring stop or seat and the piston-head for holding the latter normally toward the said casing end, and a valve in the casing upon the opposite end of rod I for controlling the brake-cylinder exhaust, the valve being held normally closed by the spring but adapted to be opened by pressure on the piston-head from the auxiliary reservoir, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

ELMER E. KERNS.

Witnesses:
JNO. R. BAKER,
HERMAN H. NORTH.