

H. E. MARCHAND.
Atmospheric Car-Brakes.

No. 155,738.

Patented Oct. 6, 1874.

Fig. 1.

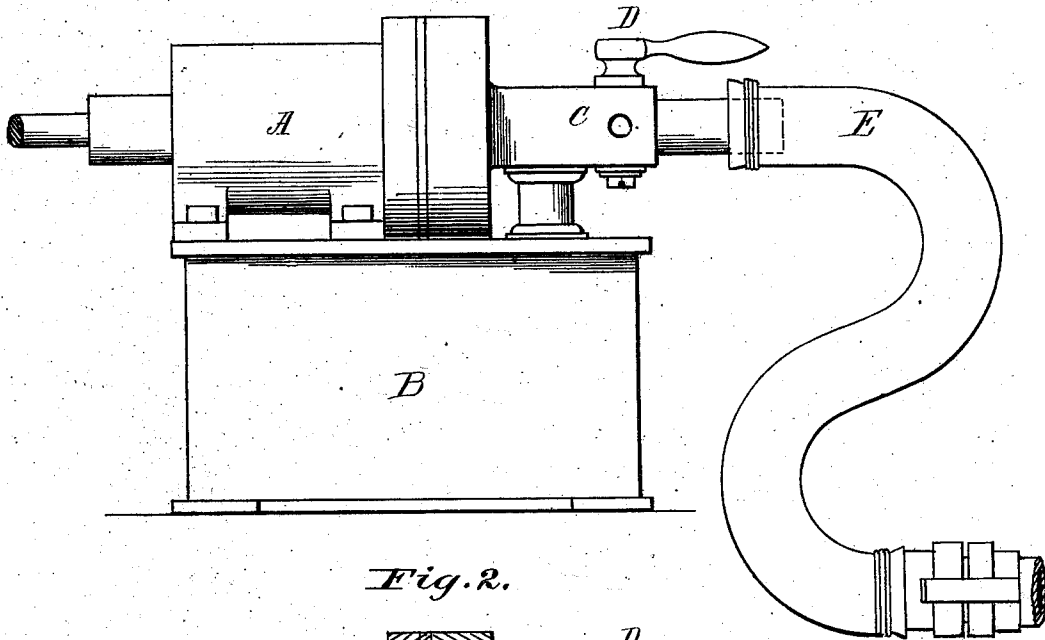


Fig. 2.

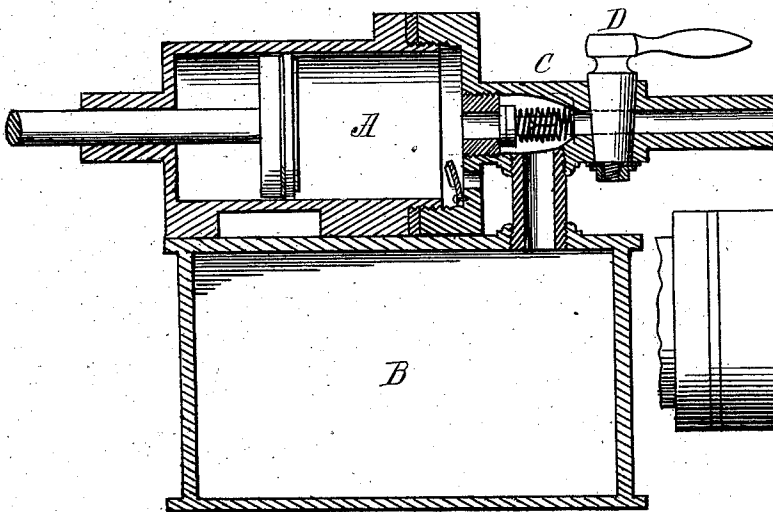
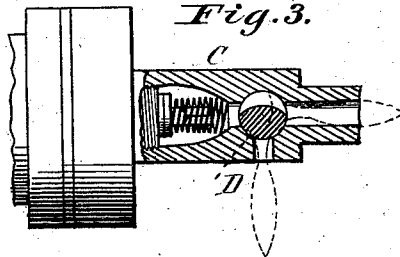


Fig. 3.



Witnesses.

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Fig.4.

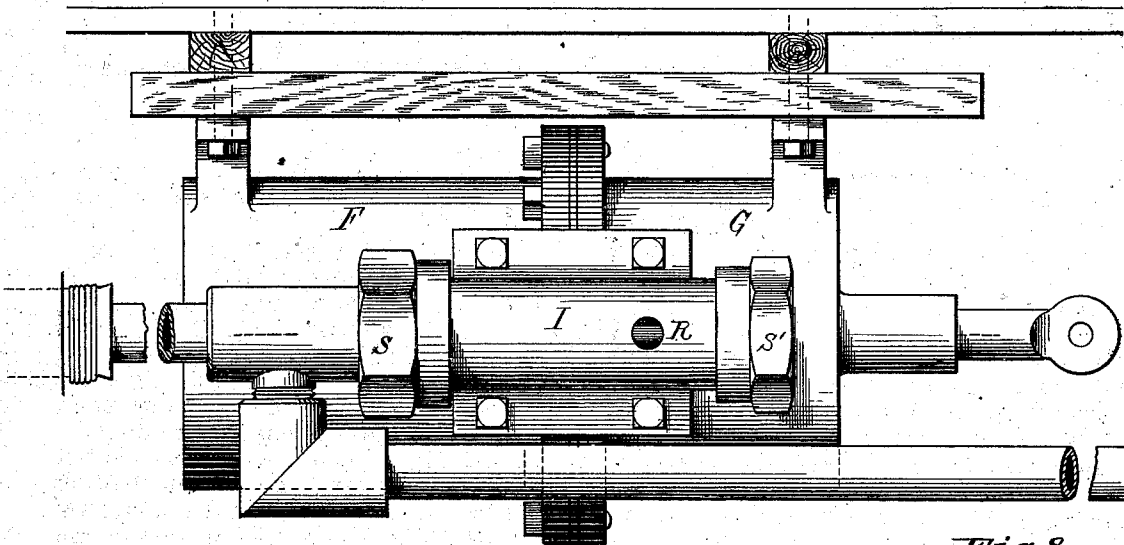


Fig.8.

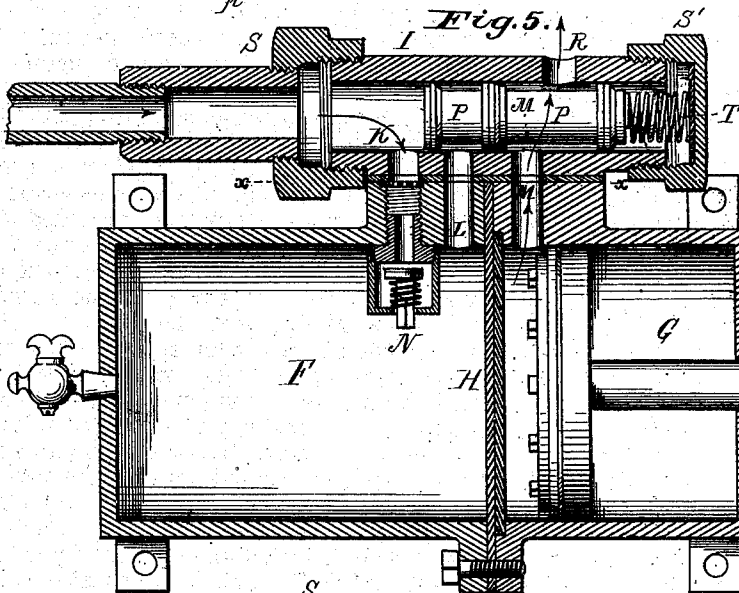
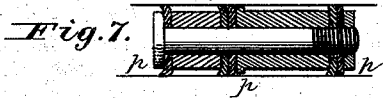
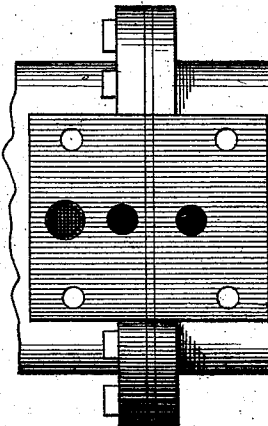
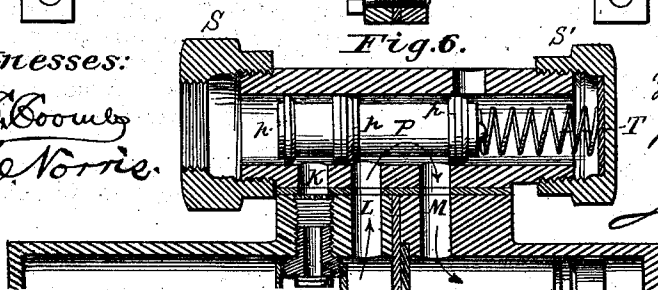


Fig.6.



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UNITED STATES PATENT OFFICE.

HENRY E. MARCHAND, OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN ATMOSPHERIC CAR-BRAKES.

Specification forming part of Letters Patent No. **155,738**, dated October 6, 1874; application filed August 27, 1874.

To all whom it may concern:

Be it known that I, HENRY E. MARCHAND, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Atmospheric Car-Brakes, of which the following is a specification:

My invention relates to certain new and useful improvements in the construction of atmospheric brakes for railway trains and cars, and to a new method of operating the same, by means of which the brakes may be rapidly and readily applied at the will of the engineer or brakeman, or automatically set, should the cars become uncoupled or the air-tube become broken, as will be hereinafter fully set forth; and is specially designed to improve upon that class of atmospheric brakes in which, when compressed air is admitted into the air-pipe, it forces back a valve to establish communication with the air-reservoir, for charging the same, at the same time placing a valve in position for closing the port of the piston-cylinder; the construction being such that, when the air is discharged from the air-pipe, the said valves are operated for connecting the ports of the air-reservoir and piston-cylinder, whereby the brakes of a car are applied and taken off by compressed air.

This invention consists in combining with the cylinder and piston, by means of which the brakes are operated, a reservoir for compressed air, said cylinder being provided with a single port, and the reservoir with two ports—an induction and eduction port—the single port of the cylinder serving the twofold purpose of admitting the compressed air behind the piston in putting on the brakes, and relieving the cylinder of compressed air in releasing them, the compressed air being supplied from the reservoir to the cylinder, and released from the same, by means of a valve operated automatically, in one direction by the compressed air, and in the opposite direction by a spiral spring, or otherwise, as will be fully hereinafter set forth.

The invention further consists in the combination of an air-reservoir and piston-cylinder with an interposed rigid partition and

suitable packing, the whole bolted together in the manner substantially as hereinafter described.

In the drawings, Figure 1 is a side elevation of the air-compressing pump and air-reservoir; Fig. 2, a horizontal section of the same. Fig. 3 is a sectional view of the end of the pump, showing the cock for admitting air to, or withdrawing it from, the pipes. Fig. 4 is a side elevation of the air and piston cylinder, with the valve-chest and pipes for holding the compressed air. Fig. 5 is a sectional view of the same, looking from underneath, showing the position of the valve when the brakes are thrown off. Fig. 6 is a similar view of the valve-chest, showing the position of the valve when the brakes are applied. Fig. 7 is a detached sectional view of the valve for opening and closing the ports of the air-chamber and piston-cylinder; and Fig. 8 is a top view of a strainer and packing placed between the valve-chest and air-chamber and piston-cylinder.

A represents an air-compressing pump of ordinary construction, communicating with a reservoir or air-chamber, B, in which the compressed air may be stored. From said pump and chamber extends a pipe, C, provided with a three-way cock, D. To the end of said pipe the hose E, which connects the pump to the brake, is secured. F represents the cylinder for compressed air, and G the piston-cylinder. The air-chamber and cylinder are formed with flanges at the edges where they join, and are united by means of bolts or otherwise, a diaphragm, H, suitably packed with rubber, caoutchouc, gutta-percha, or soft metal, such as lead, being interposed between the two, as shown. To one side of the reservoir and cylinder I secure a valve-chest, I, communicating with said reservoir and cylinder by means of the ports K L M. Said valve-chest is made separate from the cylinder and reservoir, and bolted to the same, or otherwise securely fastened thereon, the side of the cylinder being properly leveled or faced for the purpose, as shown in Fig. 8.

By this method of construction the ports are easily constructed in the valve-chest and in

the reservoir and cylinder. The upper end of the port K, in the reservoir, is countersunk and a disk of wire-gauze set therein, to prevent any ashes, cinders, or other injurious substances from finding their way into the reservoir and piston-cylinder. To the lower end of said port a valve, N, is applied, opening inwardly and provided with a spiral spring by means of which it is pressed to its seat. The said port K is the induction-port through which the compressed air is forced into reservoir. L is the eduction-port of the cylinder, leading into the valve-chest, immediately below the valve, and M is the port connecting the valve-chest with the piston-cylinder, which serves both as an induction and eduction port for the same. The valve is represented at P, and is made of two or more sections bolted upon a valve-stem. Between said sections are secured disks of rubber or other suitable material, larger in diameter than the valve, which serve as a packing for the same, and assume a dished or cup shape when the valve is in the valve-chest. The valve-chest is cylindrical in the interior, to correspond with the shape of the valve, and is provided with an eduction-port, R, as shown in Figs. 5 and 6. The valve is inserted from either end of the valve-chest before the heads S S' are applied, a spiral spring, T, being placed behind the valve at the end over the piston-cylinder, as shown, the object of which will be hereinafter set forth. The valve-stem projects behind the valve a sufficient distance to properly limit the backward movement of the valve and prevent the valve from being thrown too far, so as to uncover the ports K L. The valve is provided with three shoulders, *p p p*, forming two chambers by means of which the communication between the ports K, L, and M is made or broken. To the head S of the valve-chest is attached a tube which connects with the hose E, leading from the air-pump.

The operation of my apparatus is as follows: The parts being suitably connected, air is forced into the valve-chest by means of the air-pump, or let into the same from the reservoir connected to said pump, by properly turning the cock D. The air forces the valve P to the opposite end of the valve-chest, as

shown in Fig. 5, and then takes its way through the port K into the reservoir F, where it is compressed, as it cannot escape through the port L, as the same is covered by the short chamber of the valve P, which is connected with no other port. The valve at the lower end of the port K closes automatically when the pressure in the pipe E ceases, and prevents the escape of the air through said port. The reservoir being thus charged, and the valve in position shown in Fig. 5, the brakes are off and ready to be put on. This is done by relieving the pressure in the pipe E and valve-chest by turning the cock D so as to throw the said pipe E into communication with the open air, said cock being under the control of the engineer or brakeman. When the pressure in the pipe E and valve-chest is relieved, the spring behind the valve P will force it forward, throwing the long chamber of the valve over the ports L and M, as shown in Fig. 6, thereby forming a communication between the reservoir and piston-cylinder, allowing the compressed air to act upon the piston and force it forward to set the brakes.

It is evident that any accidental parting of the hose E, by uncoupling of the cars, or otherwise, will immediately set the brakes, as the pressure in the valve-chest will be at once relieved.

What I claim is—

1. In combination with the air-pipe, the valve-seat I, valve P, and spring T, of the air-reservoir F, piston-cylinder G, and ports K L M R, substantially as described, whereby the brakes are applied by compressed air from the air-reservoir and the valve operated to discharge air from the brake-cylinder by compressed air.

2. The combination of the air-reservoir F and piston-cylinder G, with the interposed rigid partition and suitable packing, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand.

HENRY E. MARCHAND.

Witnesses:

JAMES L. NORRIS,
JOS. L. COOMBS.