J. R. RENIFF.

AIR BRAKE.

No. 183,206. Patented Oct. 10, 1876.

Fig. 1

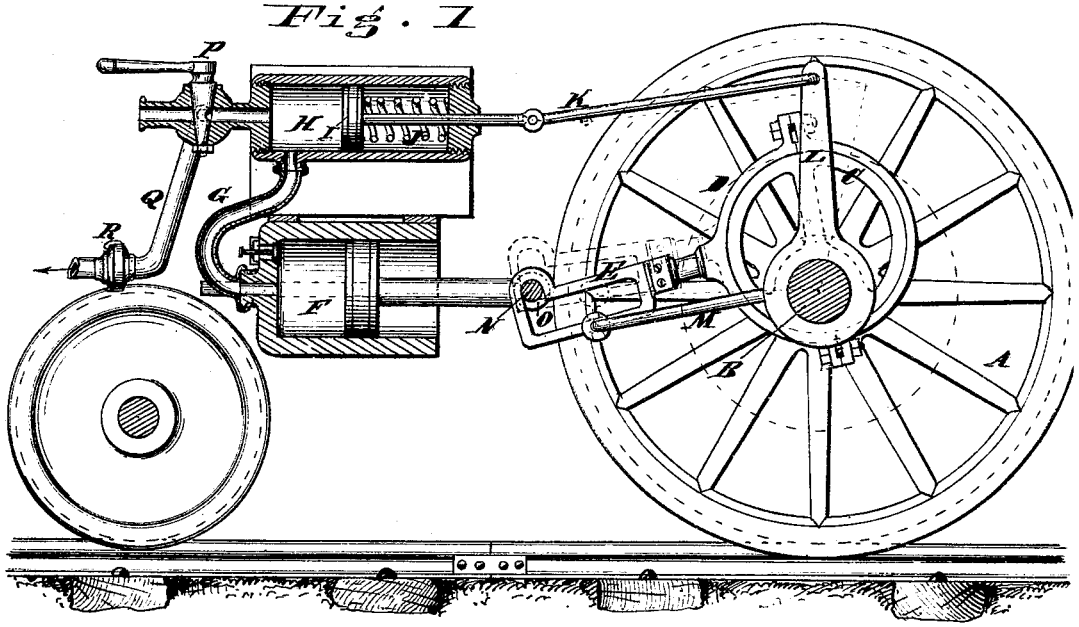
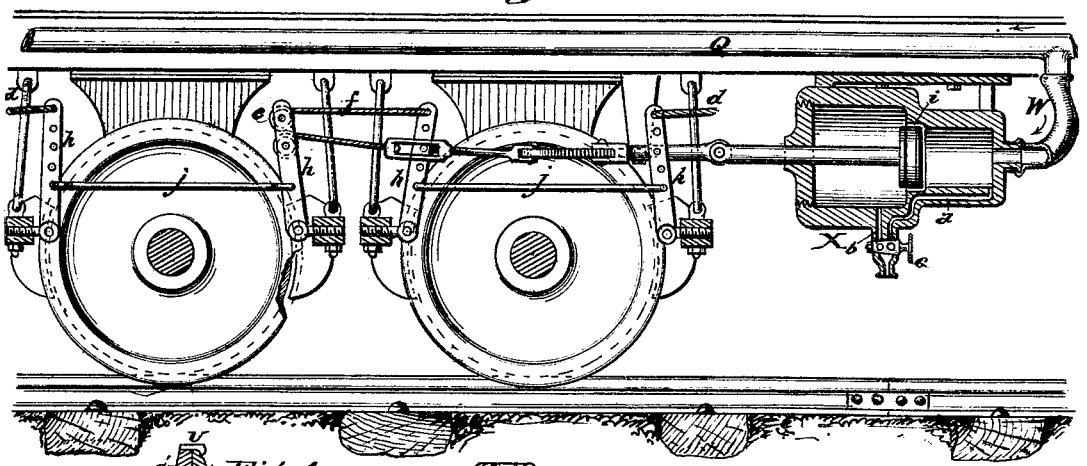


Fig. 2



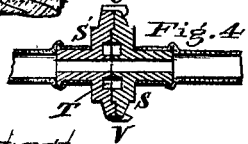


Fig. 4

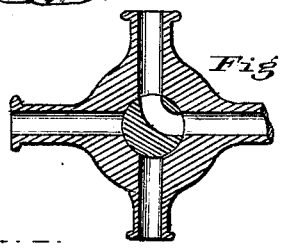


Fig. 3

Witnesses

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IMPROVEMENT IN AIR-BRAKES.

Specification forming part of Letters Patent No. **183,206**, dated October 10, 1876; application filed April 20, 1876.

To all whom it may concern:

Be it known that I, JAMES R. RENIFF, of Bloomington, in the county of McLean and State of Illinois, have invented a new and useful Improvement in an Air-Brake, which is fully described in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of the drive-wheel of the locomotive and the air-pump, with a supplementary cylinder and piston for regulating the action of the pump. Fig. 2 is a side elevation of the attachments made to a car to operate the brakes. Fig. 3 is a transverse section of the cock by which the engineer governs the passage of air to control the brakes, and Fig. 4 is a section of the coupler for coupling the air-pipe between the cars.

My invention relates to that class of brakes which use compressed air as a motor to apply the brakes.

The invention consists in an auxiliary air-cylinder communicating directly with the air-pump, and provided with a spring-piston connected to suitable mechanism for controlling the action of the pump, so that the air passes directly into it on its way to the brake-cylinders, and when a given degree of pressure is reached the pump ceases to act, and as soon as the pressure falls below that given degree the pump commences to operate again. The atmospheric pressure for applying the brake is regulated in this manner and kept nearly the same.

My invention further consists in providing the cylinder which I use beneath the cars with drip-passages, and a cock to enable me to draw off the water that may accumulate from the condensation of moisture in the atmosphere. It also consists in the combination of the air-brake levers and pulleys by which the brakes are applied, as hereinafter specified.

In the accompanying drawings, A represents the drive-wheel for a locomotive, and B the axle, to which the ring C is rigidly attached eccentrically thereto. D is an outer ring, clasped to the ring C in such a manner that the ring C revolves therein. E is a slotted arm attached to the ring D, and connected to the piston-rod of the pump, as clearly shown in Fig. 1, in such a manner that the revolutions of the axle B operate the pump. F is the air-pump, constructed in the usual manner. G is an air-pipe conducting the air from the pump into a cylinder, H. I is a piston in the cylinder H, behind which is the coiled spring J. The piston I is connected to the arm L by the connecting-rods K, so that as the piston moves the arm L is vibrated. The arm L passes loosely around the axle B, and has a rod, M, rigidly attached to it, which has a forked end, that straddles one part of the slotted arm E, in such a manner that the arm E is vibrated with the rod M, and the rod in turn is vibrated by the arm L. It will be seen that when the pressure of air in the cylinder H is sufficient to overcome the force of the spring J, the piston I is moved back in the cylinder, thereby vibrating the arm L and raising the rod M, which throws the slotted arm E up, so that the pin N on the pump-rod no longer rests in its notch O in the slotted arm E, so as to be moved back and forth by the arm, but the latter reciprocates as the axle turns, without moving the pin which rests in the slot, and consequently without operating the pump.

When the atmospheric pressure from the front of the piston I is reduced, the spring J restores the piston, and thereby vibrates the arm L in the opposite direction, so that upon the arm E making a stroke, the pin N passes into its notch O in the arm E again, and the pump is put in operation. P is an ordinary four-way cock, by which the engineer controls the passage of air from the cylinder H, and to and from the pipe Q, that leads to the cylinders under the cars. R is a coupling for coupling the pipe Q between the cars, so that a section of it remains under each car, connected to the valve cylinder that operates to apply the brakes. This coupling consists of two metal heads, S S′, with holes through them for the passage of air, and with recesses T to receive a packing.

U is a wide strong hook, rigidly attached to the edge of the head S, and V is a spring-hook attached to the head S opposite to the rigid hook U. The head S′ is coupled to the head S by placing its edge in the rigid hook U, and springing the hook or catch V, so as

to clasp its opposite edge. The hooks or clasps hold these parts firmly together, so that in connection with the packing they will not leak under a heavy pressure. W is a branch pipe, which leads from the main pipe to each of the brake-cylinders under the cars. X is a brake cylinder placed beneath each car, and in which is fitted a valve-piston, Y. I admit the compressed air into one end of the cylinder, and when the valve-piston Y is forced through part of the length of the cylinder the air passes by it through ports *i*, made for that purpose, into the other end of the cylinder, thereby making an equal pressure on both sides of the piston, and holding it in position between the ends of the ports as long as the pressure is maintained in the pipes and cylinder. While the piston is in this position, the brakes are not applied, but held off, as clearly shown in Fig. 2.

It will be observed that the brakes are held in the position shown in Fig. 2—that is, not applied so long as the pipes and cylinders under the cars are kept supplied with compressed air. When the engineer finds it necessary to apply the brakes, he simply turns the cock P, so as to allow the air to escape from the pipe Q, which relieves the pressure from one end of the cylinder X, when the valve-pistons move toward that end, and immediately close the ports or openings *i*, and the expansion of the air in this second closed end of the cylinders forces the valve-piston forward and applies the brakes. The engineer removes the brakes by simply turning the cock P, so as to check the outflow of compressed air from the pipe Q, and admit it to said pipe from the cylinder H. This air throws the pistons Y back till the air port or passage *i* is opened again, so as to admit of the passage of air past the valve-piston, and restore an equal pressure in both ends of the cylinder X. *a* and *b* are two passages to the cock C for the escape of water that may be formed from the condensation of moisture in the cylinder X. These passages do not connect when the cock is closed, and form no communication between the two ends of the cylinder.

I show, in Fig. 2, the brakes upon opposite sides of the same wheel, so that one wheel represents a truck, and the system of levers and brakes shown represents the levers and brakes upon the entire car. The chains *d* are attached to the ordinary hand-wheel on the platform, for applying the brake by hand whenever desired. I simplify the ordinary system of rods and levers by use of the sheave *e* and chain or cord *f*. In addition to this sheave and cord, to which the piston-rod is directly connected, I only have four levers, *h*, which are attached directly to the brakes, and the two connecting-rods *j*.

My system provides a means for applying a brake, whereby the power generated is automatically controlled and kept substantially uniformly the same, because, if it is found necessary to keep a supply of compressed air, the cylinder H can be connected with a reservoir, where sufficient compressed air could be stored to apply the brakes, if the pump should not operate fast enough to generate the required power as rapidly as needed.

The engineer has the application as well as the removal of the brakes entirely under his control, and can apply or remove them instantaneously.

If the pipes burst or the cars are separated, by accident or otherwise, the brakes are applied automatically and the cars stopped.

In the apparatus described above the course of the current of compressed air is from the pump directly into the supplementary cylinder H, from which it passes directly into the supply-pipe Q, and thence into the brake-cylinders, the passage being controlled by the stop-cock P. This construction simplifies and cheapens the apparatus by avoiding separate connecting devices, which are necessary when the supplementary cylinder is not arranged so as to be a part of the circulating devices for the compressed air. In this arrangement it will also be seen that the pressure of the spring-piston in the cylinder H is acting continually upon the air in said cylinder to force it into and through the supply-pipe Q, when the stop-cock P is turned so as to open the passage thereinto.

Having thus fully described the construction and operation of my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the air-pump, an auxiliary air-cylinder communicating directly with the pump, so that the air is forced by the latter into and through the former, and a spring-piston within the cylinder, and connected to mechanism which it operates to throw the pump into and out of action automatically, substantially as described.

2. The combination of the cylinder H, piston I, spring J, rods K, arms L and M, and reciprocating arm E, for making and breaking connection with the pump piston-rod, substantially as specified and shown.

3. The combination of the arm E, slotted as described, and provided with a notch, O, and the pump piston-rod, substantially as described.

4. The combination, with the air-pump of an auxiliary cylinder, provided with the spring-piston I, supply-pipe Q, the stop-cock P, and the brake-cylinder X.

5. The brake-cylinder X, provided with the drip-passages *a* and *b* and the stop-cock *c*, substantially as described.

6. The combination of the chain *f*, connected to the piston-rod, levers *h*, arranged on both sides of the wheels, sheaves *e*, connecting-rods *j*, and the brake-shoes, as shown and described.

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Witnesses:

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