





# UNITED STATES PATENT OFFICE.

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## AUTOMATIC AIR-BRAKE.

No. 839,881.

Specification of Letters Patent.

Patented Jan. 1, 1907.

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*To all whom it may concern:*

Be it known that I, AUGUSTUS PARKER-SMITH, a citizen of the United States of America, and a resident of the borough of Manhattan, city, county, and State of New York, have invented certain new and useful Improvements in Automatic Air-Brakes, of which the following is a specification.

My invention relates generally to fluid-pressure brakes for cars, and more specifically comprises a simple mechanism for automatically varying the brake power or pressure upon the brake-shoes approximately in proportion to the weight of the car.

It is well known that many cars, such as the heavy coal-cars now in use, weigh when loaded approximately three times what the car alone weighs empty. As standard practice forbids the application to the brake-shoes of a pressure more than ninety per cent. of the weight carried by the wheel, it is evident that the brake equipment can only be such as will produce this maximum for the empty car and that when said car is loaded the brake-shoe pressure will then be only thirty per cent. instead of ninety per cent. of the weight carried upon each wheel, and accordingly the brakes will have but slight retarding effect upon such loaded cars. Various mechanisms have been devised for causing the varying weight of the car to produce a shifting leverage in the brake system or to control the flow of air to the cylinder; but these, so far as I am aware, have not gone into general use by reason of their complication and more or less uncertain action. I have invented a simple positive means of accomplishing this result which operates, broadly speaking, on the principle of the installation of a second cylinder and piston and the employment of positive locking or restraining means for holding the piston of the second cylinder out of action when the car is empty and allowing it to have its natural amount of travel when the car is loaded, and so throw into operation the power of said second cylinder.

The best form of apparatus embodying this invention at present known to me is illustrated in the accompanying sheet of drawings, in which—

Figure 1 is a plan view of a brake-rigging

embodying my invention. Fig. 2 is a vertical detail section showing the operating parts in the position assumed when the car is empty or lightly loaded. Fig. 3 is a similar view showing the position of similar parts when the car is loaded, and Figs. 4 and 5 are modifications.

Throughout the drawings like reference-figures indicate like parts.

1 represents the main cylinder, and 2 the auxiliary cylinder, which is preferably thrown into action after the movement of the piston in the first cylinder has begun, the air passing over from the first to the second cylinder through the pipe 19, all in the manner set forth in the Reissued Letters Patent to William H. Sauvage, No. 12,229, dated June 7, 1904, and 3 represents the adjacent portions of the brake-rigging; 4, an auxiliary lever; 5, a link by which the same is connected to the brake-rigging.

6 is a push-rod connected to the auxiliary lever 4 and telescoping into the hollow piston 7 in the cylinder 2 when the said piston is shoved home. This telescoping action is brought about by the push-rod latch 8 riding up over the trip 9 when the piston is pushed in, as shown in Fig. 2, but dropping out so as to engage the piston when the push-rod is pulled out by the movement of the piston in the first cylinder, the latch 8 then taking the position shown in Fig. 3.

10 is a latch, which I will call the "cut-out" latch, which is pivoted to the auxiliary cylinder 2 and adapted to have its hooked end fall over and engage the end of the hollow piston 7. This latch is lifted out of engagement by means of any convenient mechanism operated by the loading and unloading of the car—such, for instance, as the cord or wire 15, passing through the guide 16 16<sup>a</sup> on the car-body 11, the loop in the end of the bracket 18, carried by the truck-bolster 13 and connected to the bolster 12 or other convenient portion of the car-body. 14 represents the ordinary car-supporting springs, which carry the weight of the car.

In the modification shown in Fig. 4, 20 is any convenient form of spring panel or trap in the bottom or side 21 of the car-body, which is normally held up by spring 22 engaging the bell-crank 23, extending from said



spring-trap, which is hinged at 24. In this case the cord 15 is connected to the bell-crank 23.

The operation of my invention is as follows:

5 When the car is empty and the springs 14 are expanded, as shown in Fig. 2, the cord 15 is allowed to run out to the left, and the restraining or cut-out latch 10 drops into the position shown in said Fig. 2. This locks  
10 the piston 7 in its innermost position, and when air is admitted to the main cylinder 1 it operates to apply the brakes with the power of its piston; but the push-rod 6 moves idly in and out of the hollow piston 7, and no  
15 power is applied by the second cylinder. When, however, the car is heavily loaded and the springs are compressed, as shown in Fig. 3, the cord 15 is pulled to the right, lifting up the restraining-latch 10 out of the path of the  
20 piston 7, and when the brakes are applied the second piston moves out and applies its power to the brake-rigging in the manner set forth in the Sauvage patent, above referred to.

25 In the modification shown in Fig. 4 the same result is produced by the elevation or depression of the spring panel or trap 20, which is forced down by the load of coal or other material in the car-body or forced up  
30 by the spring 22 when the car-body is empty.

As shown in Figs. 1, 2, and 3 of the drawings, the wire or cord 15 extends in both directions from the brake-cylinders and should be operatively connected to both trucks.  
35 As indicated in Figs. 2 and 3, said cord may be arranged in one continuous loop, which runs through the guide 16 in opposite directions and has its bight connected with the cut-out latch 10. This special arrangement  
40 would have the effect of producing upon the cut-out latch a lifting action amounting to the mean or average effect of the depression of the springs at the two ends of the car. Thus if the car was so loaded that one truck  
45 was fully depressed and the other not at all the latch would be lifted one-half of the full distance. If one end of the car were fully depressed and the other half-way depressed, the latch would be lifted three-quarters of  
50 the full distance. These and other variations in the extent of depression of the springs might be caused to modify the action of the brake so as to produce varying pressures between that of the main cylinder alone and  
55 the full power of the two cylinders by employing a modified form of cut-out latch, (shown in Fig. 5,) where the outer hook or projection 10<sup>a</sup> extends farther than the inner hook or projection 10<sup>b</sup>, so that a partial lift  
60 of the latch will free the piston of the second cylinder from engagement with the inner hook 10<sup>b</sup>, but will limit its outward travel by reason of its contact with the outer hook 10<sup>a</sup>. Thus limiting the travel of the second cylinder will of course limit the pressure which

can be applied by it to the slightly elastic brake-rigging and brake-beams, and so produce an intermediate brake-pressure between the two extremes, which will be applied when the car has an intermediate load somewhere  
70 between its weight empty and fully loaded.

The advantages of my invention comprise its cheapness, simplicity, positiveness in action, and ease of repair by unskilled labor in case anything breaks.

75 It is evident, of course, that various changes could be made in the details of construction illustrated and described without departing from the spirit and scope of my invention.

Other forms of mechanism for positively  
80 withholding the second piston from movement might be substituted, the second piston might be operated by other means than air admitted from the first cylinder, other forms of connecting the second piston with the  
85 brake-rigging might be employed, and other mechanism for drawing the restraining-latch into and out of engagement might be devised. All these and other similar modifications I should still regard as being within the  
90 boundaries of my invention.

In case the bearing-springs 14 were in the truck-frame, as in some constructions now in use, then 12 would represent the truck-bolster, and 13 a bar carried by the wheel-axes  
95 of the truck. It is also obvious that the spring 22 might be replaced by other equivalent mechanism tending normally to overbalance the weight of the panel 20 alone. In short, the weight of the cut-out latch 10  
100 might be made great enough to accomplish this, and so do away with spring 22.

Having therefore described my invention, I claim—

1. In a fluid-pressure brake system for  
105 railroad-cars, the combination with the brake-rigging, the main cylinder and piston, of a second cylinder and piston and mechanism by which the thrust of said second piston may be transmitted to the brake-rigging,  
110 means for positively withholding the second piston from movement, and mechanism by which said means may be thrown into or out of action.

2. In a fluid-pressure brake system for  
115 railroad-cars, the combination with the brake-rigging, the main cylinder and piston, of a second cylinder and piston and mechanism by which the thrust of said second piston may be transmitted to the brake-rigging,  
120 means for positively withholding the second piston from movement, and mechanism by which said means may be thrown into or out of action, together with connections through which said mechanism is operated by the  
125 load on the car.

3. In a fluid-pressure brake system for railroad-cars, the combination with the brake-rigging, the main cylinder and piston, of a second cylinder and piston and mechan-  
130



ism by which the thrust of said second piston may be transmitted to the brake-rigging, a locking device for positively withholding the second piston from movement, and mechanism by which said locking device may be thrown into or out of action.

4. In a fluid-pressure brake system for railroad-cars, the combination with the brake-rigging, the main cylinder and piston, of a second cylinder and piston and mechanism by which the thrust of said second piston may be transmitted to the brake-rigging, a locking device for positively withholding the second piston from movement, and mechanism by which said locking device may be thrown into or out of action, together with connections from said locking device to the car-springs by which the locking device is thrown out of action when the springs are depressed, and into action when the springs are expanded.

5. In a fluid-pressure brake system for railway-cars, the combination with the brake-rigging, the main cylinder and piston, of a second cylinder, and piston and telescoping piston-rod by which the thrust of said second piston may be transmitted to the brake-rigging in aid of the first piston, but the first piston may move independently of the second piston, a locking-hook pivoted on the second cylinder and adapted to normally engage the second piston, and means operated by the load on the car to lift said hook out of such engagement and free the piston.

6. In a fluid-pressure brake system for railway-cars, the combination with the brake-rigging, the main cylinder and piston, of a second cylinder, and piston and telescoping piston-rod by which the thrust of said second piston may be transmitted to the

brake-rigging in aid of the first piston, but the first piston may move independently of the second piston, a locking-hook pivoted on the second cylinder and adapted to normally engage the second piston, and means operated by the load on the car to lift said hook out of such engagement and free the piston, said means comprising connecting mechanism attached to the car-body and extending to the car-truck.

7. In a fluid-pressure brake system for railway-cars, the combination with the brake-rigging, the main cylinder and piston, of a second cylinder, and piston and telescoping piston-rod by which the thrust of said second piston may be transmitted to the brake-rigging in aid of the first piston, but the first piston may move independently of the second piston, a locking-hook provided with a series of projections of different lengths adapted to engage and limit the travel of the second piston, and means operated by the load on the car to lift said hook to varying gears of disengagement with said second piston.

8. In a fluid-pressure brake system for railroad-cars, the combination with the brake-rigging, the main cylinder and piston, of a second cylinder and piston and mechanism by which the thrust of said second piston may be transmitted to the brake-rigging, and means for positively graduating the movement of the second piston.

Signed at New York, N. Y., this 20th day of April, 1906.

AUGUSTUS PARKER-SMITH.

Witnesses:

FRANK O'CONNOR,  
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