

No. 808,716.

PATENTED JAN. 2, 1906.

C. E. BARRY.
BRAKE SYSTEM.

APPLICATION FILED AUG. 13, 1903.

Fig. 1.

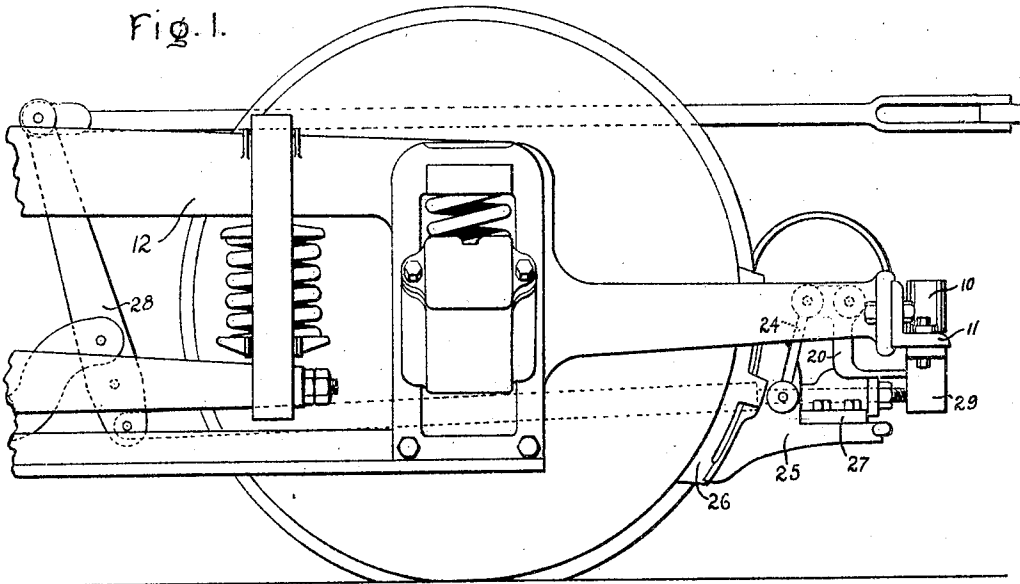


Fig. 2.

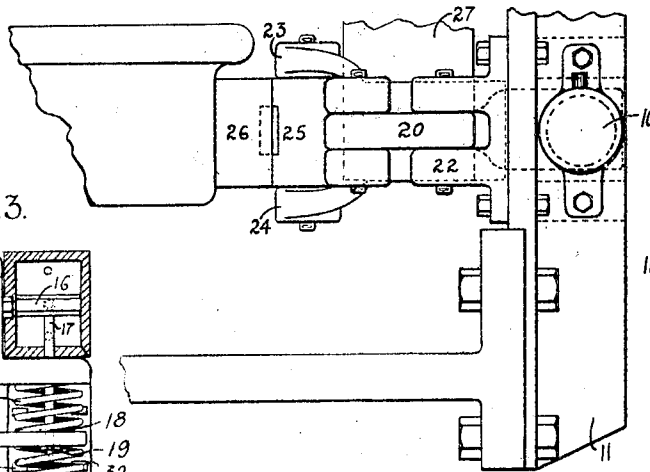


Fig. 3.

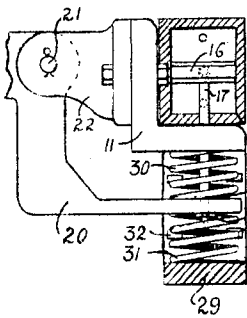


Fig. 4.

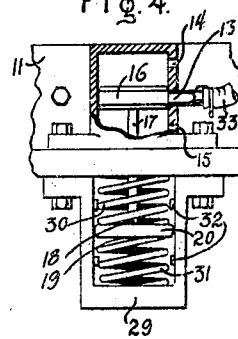
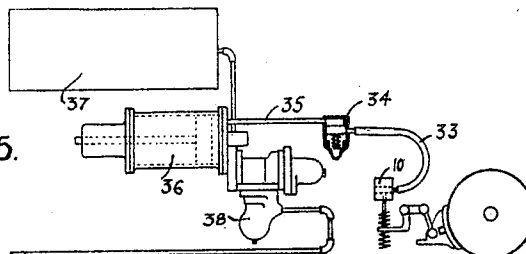


Fig. 5.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES E. BARRY, OF SCHENECTADY, NEW YORK, ASSIGNOR TO
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BRAKE SYSTEM.

No. 808,716.

Specification of Letters Patent.

Patented Jan. 2, 1906.

Application filed August 13, 1903. Serial No. 169,349.

To all whom it may concern:

Be it known that I, CHARLES E. BARRY, a citizen of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Brake Systems, of which the following is a specification.

My invention relates to improvements in air-brake systems, and particularly in high-speed air-brake systems.

It is a well-established fact that the coefficient of friction is a function of the speed and that when a train is moving at a high rate of speed more pressure may be brought to bear upon the brake-shoes without causing the wheels to slide than when the train is moving at a low speed. Therefore if a high pressure be applied to the brake-shoes while the train is running at full speed and this pressure is gradually reduced as the speed decreases, so that the wheels of the train are maintained during the entire time of making a stop just on the point of sliding, a maximum braking effect will be obtained. Heretofore it has been proposed to bring about this gradual reduction of brake-shoe pressure by providing a reducing-valve arranged to control an exhaust-passage leading from the brake-cylinder and operated to permit the air to escape from the brake-cylinder at a rate proportional to the retardation of the train. The operation of such pressure-reducing valves, however, is dependent upon the brake-cylinder pressure and the size of the escape-opening, and these must be determined by experiment based upon certain general assumptions of operation, which depart considerably in many cases from the actual conditions, and thereby detract from the general efficiency of the mechanism. In another type of mechanism heretofore proposed the reduction of brake-shoe pressure is made directly dependent upon the friction between the brake-shoes and the wheels and is therefore free from the above objection and in operation may be adjusted so that the reduction of brake-shoe pressure is brought about only when the friction between the brake-shoes and the wheels reaches a point beyond which it cannot go without causing the wheels to slide.

My invention relates to the latter type of mechanism; and it consists in a novel arrangement of the pressure-controlling mechanism whereby the reduction of pressure on

the brake-shoe is stopped when the pressure has reached a limit at which skidding the wheels is impossible for any speed.

My invention comprises certain other novel features which will be specifically pointed out in the following specification and appended claims.

I have shown one embodiment of my invention in connection with an automatic air-brake system in the accompanying drawings, in which—

Figure 1 is a side elevation of a portion of a car-truck equipped with mechanism embodying the features of my invention. Fig. 2 is a plan of a portion of said truck and said mechanism. Fig. 3 is an enlarged view of a portion of said mechanism, illustrating the exhaust-controlling valve-casing and the spring-holding stirrup in section. Fig. 4 is a rear elevation of that portion of the mechanism shown in Fig. 3 with a portion of the controlling-valve casing broken away so as to show the inlet and outlet ports, and Fig. 5 is a diagram illustrating the connections of said mechanism with the other parts of the brake system.

In the drawings, 10 designates the casing of the exhaust-controlling valve, which is mounted on the horizontal portion of an angle-bar 11, which forms one of the cross members of a car-truck 12. This valve-casing 10 is provided with an inlet or supply port 13 and exhaust-ports 14 15 and a slide-valve 16, which normally closes the inlet-port 13. The stem 17 of the slide-valve extends down through an opening in the angle-bar 11 and is movably secured at its lower end by means of pins 18 and 19 to the lower horizontal portion of a Z-shaped lever 20. This lever 20 is pivotally secured near its upper end at the point 21 to a casting 22, which is bolted to the vertical portion of the cross-bar 11 in proximity to the valve-casing 10. This Z-shaped lever, together with the downwardly-extending links 23 and 24, pivotally secured to its upper and inner end, constitute the connecting-lever mechanism between the valve-piston and the brake-shoe, the lower end of the links 23 24 being secured to the brake-shoe head 25. The head 25 is provided with the usual brake-shoe 26 and through the agency of the usual cross-bar 27 and brake-rigging 28 operates to apply pressure to the brake-shoe when the brake-cylin-

der is charged. A stirrup 29 is secured to the cross-bar 11 directly beneath the valve-casing 10 and serves both as a guide for the lower horizontal portion of the lever 20 and
 5 as a casing for coiled springs 30 31, which bear upon opposite sides of this portion of the lever 20 and normally maintain it and the valve 16 in a central position. Suitable stops 32 on the inner walls of the stirrup
 10 limit the movements of the lever 20.

The supply-port 13 of the valve-casing 10 is in direct communication through a flexible connection 33 with a pressure-retaining valve 34, and the latter is connected in turn
 15 by a pipe 35 with the upper end of the brake-cylinder 36. This brake-cylinder is associated with the usual auxiliary reservoir 37 and triple valve 38 of an automatic air-brake system. As clearly illustrated in Fig. 5, the
 20 ports of the pressure-retaining valve are so disposed that unless the pressure above the piston is sufficient to overcome the upward pressure of the spring communication cannot be established between the brake-cylinder
 25 and the controlling-valve 10. In the practice of my invention the spring of the retaining-valve should be adjusted so as to cut off communication with the controlling-valve, and thereby render it inoperative when-
 30 ever the brake-cylinder pressure falls to a point which can be used throughout the remainder of the stop without causing the wheels to slide.

In the operation of the mechanism herein
 35 disclosed, assuming that the train is traveling at full speed and it is desired to make a stop, as soon as the triple-valve 38 is actuated by a reduction in train-pipe pressure to admit a high pressure from the auxiliary reservoir 37 to the brake-cylinder air at this
 40 high pressure will flow through the connection 35 and force down the piston of the retaining-valve 34, and thus establish communication with the controlling-valve 10. At
 45 the instant this high pressure is applied to the brake-shoes the movable parts of the mechanism will be in the position illustrated in Figs. 3 and 4—that is, the valve 16 will close the inlet-port 13—and no air will be allowed to escape from the brake-cylinder.
 50 However, as soon as the speed of the train decreases by reason of the brake action the friction between the shoe 26 and its wheel will increase and when it has increased sufficiently to drag the shoe in the direction of
 55 rotation of the wheel in opposition to the restraining action of the springs 30 and 31 the valve 16 will uncover the inlet-port and establish communication between it and one of the exhaust-ports 14 15, according to the direction of rotation of the wheel, and air will then escape from the brake-cylinder, and thereby through the agency of the brake-rigging correspondingly reduce the brake-shoe
 60 pressure. As soon as this brake-shoe pres-

sure falls off so that the friction between the brake-shoe and its wheel is insufficient to pull the brake-shoe around in opposition to the springs 30 and 31 the parts will be returned
 70 to normal position through the action of said springs and the inlet-port 13 of the controlling-valve closed. Upon further reductions in the speed of the train the same operation of the parts will be repeated intermittently
 75 until the pressure in the brake-cylinder has fallen off sufficiently to allow the retaining-valve 34 to cut off communication between the brake-cylinder and the controlling-valve, and thereby render the controlling-valve in-
 80 operative, and, as previously indicated, the retaining-valve should be adjusted so as to bring this about when the pressure in the brake-cylinder has fallen sufficiently to render further reductions unnecessary.

It is of course apparent that many altera-
 85 tions and modifications may be made in the mechanism herein disclosed without departing from the spirit and scope of my invention, and I therefore do not wish to be limited to the specific mechanism shown, but aim to
 90 cover by the terms of the appended claims all such alterations and modifications.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an air-brake system, a brake-shoe, a
 95 brake-cylinder controlling said shoe, a passage from said cylinder to atmosphere, a valve controlling said passage, operative connections between said valve and said brake-shoe, and means for rendering said valve in-
 100 operative when the pressure in said cylinder is below a definite value.

2. In an air-brake system, a brake-shoe associated with a wheel of the vehicle, a
 105 brake-cylinder controlling said shoe, an exhaust-passage from said cylinder to atmosphere, a valve in said passage, operative connections between said brake-shoe and said
 110 valve whereby said valve is moved to open said passage when the friction between said shoe and the wheel exceeds a definite amount, and means independent of said valve for closing said passage when the pressure in said cylinder is below a definite value.

3. In an air-brake system, the combina-
 115 tion with the wheels of a vehicle to which the system is applied, of a plurality of brake-shoes associated therewith, a brake-cylinder and brake-rigging by which pressure may be applied to said shoes, a valve controlling an
 120 exhaust-passage from said brake-cylinder, means connected to one of said brake-shoes and operable thereby when the friction between it and its wheel exceeds a definite amount to exhaust said brake-cylinder, and
 125 means for cutting off said exhaust when the brake-cylinder pressure falls to a definite point.

4. In an air-brake system, the combina-
 130 tion with a car-truck, brake-shoes and rig-

ging, of a valve-casing secured to said truck and provided with a central inlet-port and upper and lower exhaust-ports and having a valve yieldingly mounted so as to remain
5 normally in a position to close said inlet-port, and connecting means between said valve and one of said brake-shoes operative upon the movement of said brake-shoe peripherally of its wheel in either direction to move
10 said valve either up or down to establish communication between said valve inlet-port and one of said exhaust-ports.

5. In an air-brake system, the combina-

tion of a brake-cylinder, a valve arranged to control an exhaust-passage leading from said
15 cylinder, a pressure-retaining valve located in said passage, a brake-shoe associated with one of the wheels of the vehicle, and means operated by said shoe to actuate said controlling-valve.

In witness whereof I have hereunto set my
hand this 12th day of August, 1903.

CHARLES E. BARRY.

Witnesses:

BENJAMIN B. HULL,
HELEN ORFORD.