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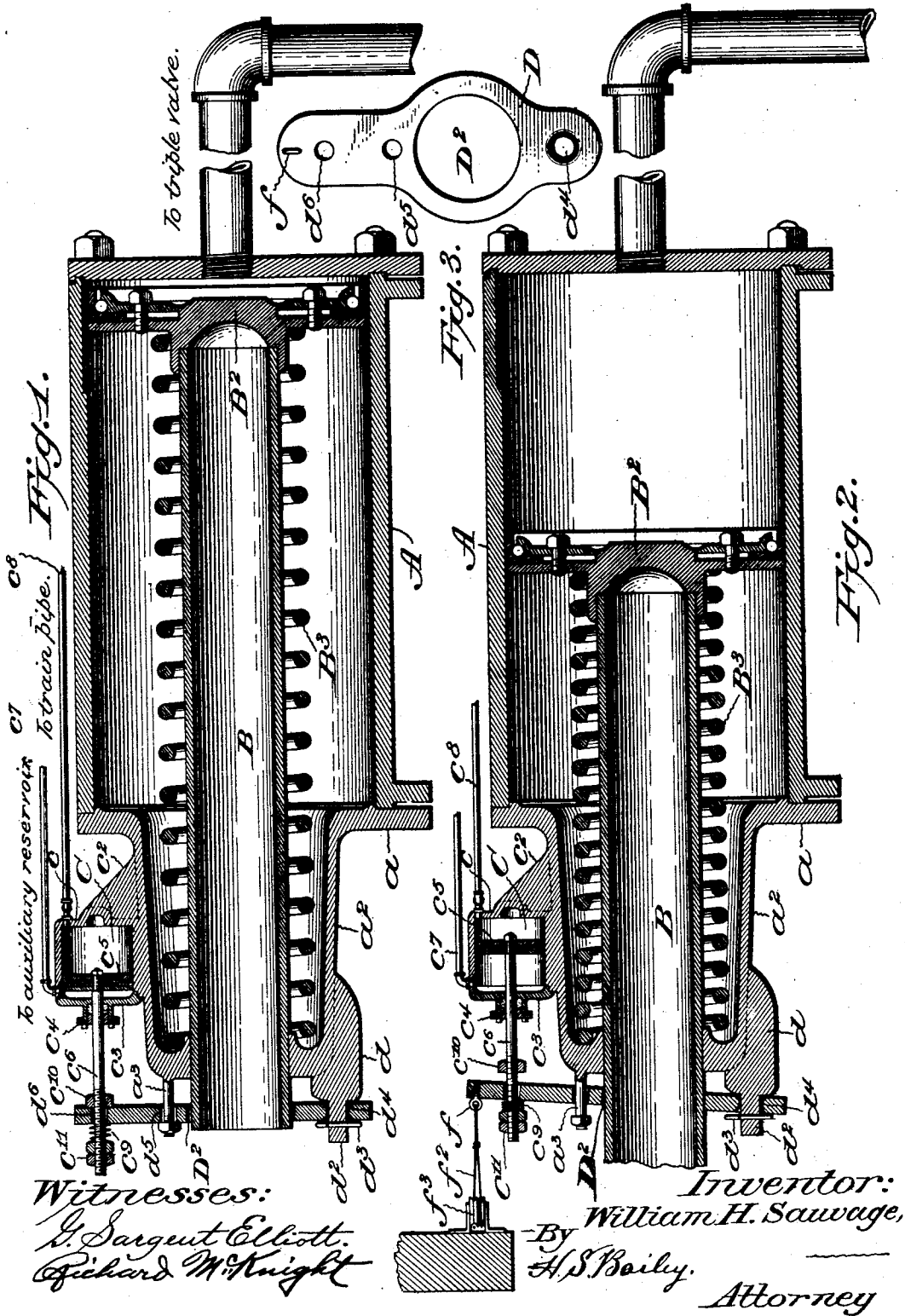
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W. H. SAUVAGE.

AUTOMATIC SAFETY LOCK FOR AIR BRAKE SYSTEMS.

(Application filed Feb. 14, 1902.)

(No Model.)



UNITED STATES PATENT OFFICE.

WILLIAM HENRY SAUVAGE, OF DENVER, COLORADO, ASSIGNOR OF ONE-FIFTH TO RICHARD MCKNIGHT, OF DENVER, COLORADO.

AUTOMATIC SAFETY-LOCK FOR AIR-BRAKE SYSTEMS.

SPECIFICATION forming part of Letters Patent No. 710,522, dated October 7, 1902.

Application filed February 14, 1902. Serial No. 94,147. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY SAUVAGE, a citizen of the United States of America, residing at Denver, in the county of Arapahoe and State of Colorado, have invented certain new and useful Improvements in Automatic Safety-Locks for Air-Brake Systems; and I do 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 appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in automatic safety-locks for brake-cylinders.

The object of the invention is to provide means connected with the said cylinders whereby when the brakes have been applied to hold the said brakes at the point to which they have been moved by the pressure in the brake-cylinder, and to this end I provide the forward end of the brake-cylinder with a specially-constructed head similar in form to that now in use, but having formed integral therewith a small cylinder, one end of which is connected by a pipe with the auxiliary reservoir, while the other end is similarly connected with the train-pipe, the said cylinder being provided with a piston, the rod of which is connected at its outer end with the upper end of a locking device, which has swinging connection at its lower end with a projection on the forward portion of the before-mentioned brake-cylinder head, the said locking device being provided with a hole through which the hollow piston-rod or plunger of the brake-cylinder passes and being designed to be swung to one side of a vertical line through its connection with the aforesaid small cylinder, so as to clamp the said piston-rod or plunger and hold the same in the position to which it has been moved by pressure upon its piston, as will be hereinafter set forth.

A further object of the invention is to provide a lock which will hold the brakes set even after the car has been detached from the train or from its connection with the air-pressure, means being employed for manu-

ally restoring the lock to its normal position at such time and for preventing the said lock from moving beyond a vertical position, all of which will fully appear in the accompanying specification and claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal sectional view taken through a brake-cylinder, showing the piston retracted, the safety-lock standing vertical or out of operative position. Fig. 2 is a similar view showing the piston moved forward, as when the brakes are applied, and the safety-lock in position to clamp the hollow piston-rod or plunger, so as to hold the same against back motion; and Fig. 3 is a view of the safety-lock detached.

Referring to the drawings, the letter A indicates the brake-cylinder, which is of the form in general use. To the front end of this cylinder is secured a head a , having the usual extended cylindrical portion a^2 , which is provided with an axial bore, through which slides the hollow plunger B, which is attached to and moves with the piston B^2 as the same is actuated either by compressed air from behind or by the expansive spring B^3 on the opposite side thereof, as will be understood.

The parts thus far mentioned are all in general use, and a more extended description thereof is deemed unnecessary.

Upon the upper side of the extension a^2 of head a is a small cylinder C, which may be made independent of the extension a^2 and securely bolted thereto, though it is preferable to form the same integral with the extension, as illustrated in the drawings. The rear head c is thus solid with the cylinder, and an integral strengthening-web c^2 extends therefrom to the extension a^2 , as shown. A front head c^3 is bolted to the cylinder in the usual manner, the said head having a packing-box c^4 . A piston c^5 moves within the cylinder C, having a rod c^6 secured to the same which operates a safety-lock, as will hereinafter fully appear. A pipe c^7 enters the front end of the cylinder and connects the same with the auxiliary reservoir, (not shown,) while a second pipe c^8 enters the rear end of the cylinder and connects with the train-pipe. (Also not shown.) The piston c^5

is thus moved rearward by air from the auxiliary reservoir or forward by air from the train-pipe.

To the under side of the extension a^2 of head a and at the forward end thereof is formed a projection or lug d , from the front end of which projects a pintle d^2 , upon which the safety locking device D is supported, so as to have a swinging or rocking motion thereon, the said locking-lever being held against displacement by a pin d^3 , which passes through the pintle in front of the lock. While I have illustrated this manner of attaching the locking-lever, it is obvious that the same could be hinged to the extension a^2 .

The improved safety-lock D consists of a steel plate or lever of suitable dimensions made in the form shown by Fig. 3. About centrally of its length the plate is provided with a circular opening D^2 , which when the lock is in position upon the head extension a^2 is in axial alinement with the hollow plunger B, which has an endwise movement through the same. The opening D^2 is slightly greater than the external diameter of plunger B in order that the lock D may have a slight rearward rocking movement at right angles to the movement of the plunger. The lower end of the lock is provided with a hole d^4 , through which the pintle d^3 passes, and just above the central opening D^2 is a hole d^5 , while at the top of the lock is a third hole d^6 . Through the hole d^5 passes a bolt a^3 , which projects from the forward end of the extension-head a^2 and upon which a nut is screwed, against which the lock D will contact, so as to be limited in its forward movement to a true vertical position. When the nut is properly positioned, the same may be secured upon the bolt a^3 by upsetting the end of said bolt, thus retaining the nut in position to prevent the lock D from moving forwardly beyond a vertical position. Through the hole d^6 at the top of the lock D passes the outer end of the piston-rod c^6 , attached to piston c^5 of small cylinder C. The rod c^6 fits loosely in the hole d^6 and carries a nut c^{10} , which lies on the rear side of lock D in position to contact with the said lock on the forward movement of the rod and move the lock to a vertical position as the rod reaches the limit of its forward movement. On the outer end of the rod and forward of the lock D is screwed a pair of jam-nuts c^{11} , between which and the lock is interposed a cushion-spring c^9 . The nuts may be adjusted relatively to the rearward movement of the rod so that when they contact with the lock the said lock may be swung rearward a sufficient distance to cause the edges of the central opening D^2 to tightly clamp the plunger B and hold the same at the position to which it has been moved by pressure upon its piston B^2 .

By the employment of my improved safety-lock a train may be kept under perfect control even on a very steep grade, and the trouble and time consequent upon resetting

the brakes, which with the system in general use must often be done on long grades, owing to leakage of air from the brake-cylinder and consequent reduction of pressure upon said brakes, is practically overcome, as when the lock is once set the back pressure upon the plunger will cause the said lock to more tightly clamp the said plunger, thus holding it to its position without the necessity of recharging the brake-cylinder.

The operation of this improved lock is as follows: When it is desired to apply the brakes, either for the purpose of stopping the train or while descending a steep grade, air from the auxiliary reservoir is caused to enter the brake-cylinder and moves the piston B^2 and plunger B forward, (the said plunger carrying the push-rod which operates the brake-lever, as is well understood.) At the same time air from the auxiliary reservoir under operative pressure is conveyed through pipe c^7 to the forward end of cylinder C, causing the piston and rod to move rearward. As the rod moves, the lock D will also be moved rearward by the nuts c^8 upon the outer end of the said rod, the force of the movement of the rod upon the lock being first cushioned by the spring c^9 . The lock is thus caused to tightly clamp the plunger B and hold it to its position even though a reduction of pressure should occur in the brake-cylinder and cylinder C. When it is desired to release the brakes, air from the train-pipe is conveyed to the rear end of cylinder C through pipe c^8 under greater pressure than that which is in the forward end of the said cylinder. The pressure on the rear side of the piston c^5 being greater than on the forward side, the said piston will be moved forward, and the nut c^{10} on rod c^6 , contacting with the rear side of lock D, will move the same to a vertical position, thus releasing its clamping hold upon plunger and allowing the same to move back to its released position.

The upper end of lock D is provided with an eyebolt f , to which is attached a pair of cords or cables f^2 , which extend one to each side of the car, the said cords or cables first passing in opposite directions around a double sheave f^3 , which is secured to a floor-beam f^4 , as shown. Thus when a car has been detached from the train and the brakes are set the same may be released by pulling on either of the cords or cables f^2 , which will unclamp the lock and restore the same to a vertical position. It will be understood that the hand brake mechanism of the car operates entirely independent of the locking device herein described.

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

1. In an automatic air-brake-locking device for air-brake systems of railway-trains, the combination with the auxiliary reservoir, the brake-cylinder and its piston, of air-brake systems of a supplementary cylinder arranged in juxtaposition to said brake-cylinder, a pis-

ton and piston-rod operatively arranged in said supplementary cylinder, a compressed-air pipe connected between one end of said supplementary cylinder and said auxiliary reservoir and a compressed-air-pipe connection between the opposite end of said supplementary cylinder and the air train-pipe of said air-brake system, and means connected with the piston of said supplementary cylinder and the piston of said brake-cylinder, including a gripping device for automatically gripping and locking said brake-cylinder's piston in operative set-brake position, substantially as described.

2. In an automatic air-brake-locking device for air-brake systems of railway-trains, the combination with the train air-pipe system, the auxiliary reservoir, the brake-cylinder and its plunger or piston-rod of a supplementary cylinder adjacent to said brake-cylinder, a piston and piston-rod operatively arranged in said supplementary cylinder, an air-supply connecting one end of said supplementary cylinder with said auxiliary reservoir, and connecting its opposite end with said train-pipe air-supply system, a lever-plate adjustably secured at one end to the free end of the piston-rod of said supplementary cylinder and pivotally connected at its opposite end below the plunger or piston of said brake, and means including said pivotal connection at the opposite end of said lever for gripping and locking and releasing said plunger of said brake-cylinder in and from set-brake positions, substantially as described.

3. In an automatic brake-locking device, for air-brake systems, the combination with a brake-cylinder of a supplementary cylinder provided with an operative piston and piston-rod and arranged in operative relation to said brake-cylinder, a plunger or piston in said brake-cylinder, a lever pivotally supported at one end and arranged normally free of said plunger but to clamp and hold said plunger when in operative set-brake action, and having its opposite end adjustably secured to the piston-rod of said supplementary cylinder, and means for connecting the opposite ends of said supplementary cylinder to the said auxiliary reservoir and to said train's air-supply pipe system, substantially as described.

4. In an automatic air-brake-locking device for air-brake systems, the combination with the auxiliary reservoir, the train-pipe system and the general brake-cylinder and its brake-actuating plunger, of a plunger-locking lever pivotally secured to a suitable support at one end, and arranged to surround said plunger-piston loosely, and adapted to have a limited reciprocal movement thereon, and arranged and adapted to rest loosely on said plunger when positioned centrally between the limits of its reciprocal movement, means for adjustably limiting the reciprocal movement of said lever and said plunger, a locking-lever-actuating cylinder arranged adjacent to the free end of said plunger-locking lever, a piston

and piston-rod reciprocally mounted in said cylinder and adjustably connected to the free end of said plunger-locking lever and means including an air connection between said auxiliary reservoir and one end of said cylinder, and also between said train air-supply pipe system and the opposite end of said cylinder for actuating said piston and piston-rod of said lever-actuating cylinder to move said lever in a reverse direction to the operating brake-setting movement and to the brake-release movement of the plunger of said brake-cylinder, substantially as described.

5. In an automatic air-brake-locking device for air-brake systems, the combination with a railway-car and its auxiliary air-reservoirs, its air train-pipe system and its brake-cylinder and its brake-actuating plunger of an auxiliary cylinder arranged to coöperate therewith, and provided with an operative piston and piston-rod, a lever pivotally secured at one end to a suitable support and adjustably secured to the free end of the piston-rod of said auxiliary cylinder, and adapted to impart to said lever a reciprocal movement, and having said lever arranged and adapted to surround loosely but closely, opposite sides of said plunger, when positioned centrally between the limits of its reciprocal movement, but adapted to clamp or grip the said plunger when moved into engagement with it, when said plunger starts to move, to move in the same direction said lever moves in when moving into operative locking position; adjustable means for defining the locking position of normal disuse of said lever, an air-pipe connection between one end of said cylinder and the auxiliary air-reservoir, and an air-pipe connection between the opposite end of said cylinder, and the train-pipe system, whereby said brake-cylinder's plunger may be locked in a set-brake position, and released from a set-brake position by reverse pressures of air on the piston of said auxiliary cylinder, and manual means, including cables or rods secured at one end to the free end of said plunger-locking lever and extending in opposite directions to the sides of said car, and arranged to be manually operated to release said locked air-brakes actuating plunger when said car is cut out from a train with its air-brakes set, substantially as described.

6. In an automatic air-brake-locking device for air-brake systems, the combination with a brake-cylinder and plunger, and means for operating the same, of a lock which is pivotally secured at its lower end to the forward cylinder-head, and having a central opening which surrounds the said plunger and means for moving the said lock, so as to clamp the plunger in its forward position, and hold the same against rearward movement, substantially as shown.

7. In an automatic air-brake-locking device for air-brake systems, the combination with a brake-cylinder and plunger, and means for operating the same, of a lock hinged at its

- lower end to the forward head of the cylinder and having a central opening which surrounds the said plunger; and means for automatically moving the lock so that the edges
5 of its central opening will engage the said plunger to hold it in its forward position; and for automatically releasing the plunger by restoring the lock to its normal position, substantially as shown.
- 10 8. In an automatic air-brake-locking device for air-brake systems, the combination with a brake-cylinder and plunger and means for operating the same, of a lock hinged at its lower end to the forward head of the cylinder,
15 and having a central opening which surrounds the said plunger; a cylinder positioned upon the upper side of the before-mentioned cylinder-head, having a piston and piston-rod, the said rod extending through a hole in the upper end of the lock, means carried by the rod for engaging each side of the
20 lock and pipes connecting with a source of compressed air, which enter the cylinder at the front and rear of its piston, the movement of said piston in one direction effecting
25 the clamping of the lock upon the plunger so as to hold the same in its forward position; while the reverse movement of said piston restores the lock to its normal position, and releases the plunger, substantially as shown.
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- In testimony whereof I affix my signature in presence of two witnesses.
- WILLIAM HENRY SAUVAGE.
- Witnesses:
G. SARGENT ELLIOTT,
RICHARD MCKNIGHT.