

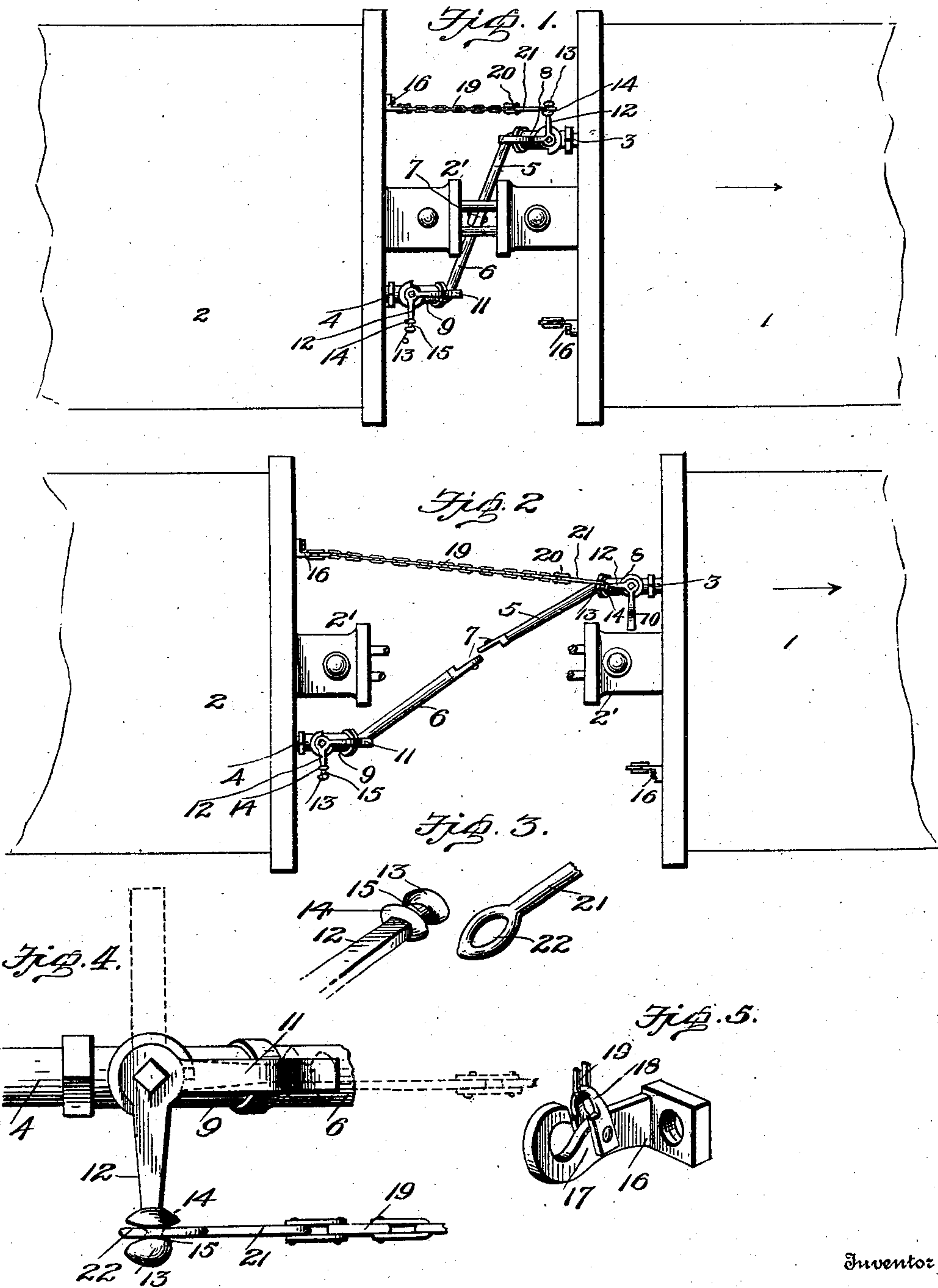
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J. R. RICHARDSON.  
AIR BRAKE SYSTEM.

(Application filed Aug. 16, 1900.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## AIR-BRAKE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 661,075, dated November 6, 1900.

Application filed August 16, 1900. Serial No. 27,046. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN R. RICHARDSON, a citizen of the United States, residing at Scranton, in the county of Lackawanna and State of Pennsylvania, have invented certain new and useful Improvements in 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.

My invention relates to air-brakes.

The object of the invention is to provide means whereby should a train part the brakes of the rear section of the train will be automatically applied by the escape of the air through the disconnected or broken air-tube, while the brakes on the front section of the train will not be materially affected, thereby leaving them under the control of the engineer, so as to avoid a rear-end collision, which would inevitably occur should the brakes be applied to the front section and said section come to a stop before the rear section, and also to provide a novel construction and arrangement of parts whereby the engineer will receive a signal that his train is broken in two before or simultaneously with the closing of the air-valve on the rear car of the forward section.

In carrying out the invention I provide a connection between the air-cock of the air-pipe of one car and the adjacent car, so that if the train parts the air-cock at the rear end of the last car of the forward section of the train will be turned off a short interval after the breaking of the air-tubes, thus preventing the entire application of the brakes on the cars of the forward section, while the air in the train-line of the rear section of the parted train will escape at the forward cock and effect the application of the brakes to that section, thus bringing the rear section to a stop, while leaving the brakes of the forward section under the complete control of the engineer. To effect the signaling to the engineer that the train has parted, I make the connection between the front end of one car and the cock at the rear end of the adjoining car of greater length than the distance between said parts, so as to normally hang slack, whereby when the cars part the air-

brake coupling will be disconnected and allow of a small escape of air from and a partial reduction of pressure in the train-pipe of the forward section of the train before said connection tightens and closes the valve at the rear end of the last car of the front section and cut off the escape of air, the engineer being thus notified that his train has parted in order that he may look to the safety of the forward section thereof.

In the accompanying drawings, Figure 1 is a plan view illustrating the application of my invention and showing the parts in normal position. Fig. 2 is a similar view showing the positions of the parts upon the parting of the cars. Fig. 3 is a detail view showing the connecting ends of the valve and chain-arms. Fig. 4 is a top plan view, on an enlarged scale, of the chain and the air-cock, showing in full lines the air-cock open and in dotted lines the air-cock closed. Fig. 5 is a detail view of the bracket.

In the drawings, 1 and 2 are conventional representations of two coaches of a railroad-train, which, it will be assumed, are traveling in the direction of the arrow indicated in Figs. 1 and 2.

2 denotes the couplings connecting the cars.

3 and 4 denote the air-pipes.

5 and 6 denote the hose tubes or couplings, which are coupled at their ends 7 in the usual manner. 8 and 9 denote the air-cocks, to which said hose-couplings are connected, and 10 and 11 denote the handles of the cocks, all of the ordinary or any preferred construction.

In carrying my invention into practice I provide each cock with an arm 12, extending at right angles to and preferably formed integrally with the handle 10 or 11, so as to project laterally and at right angles to the car when the handle is turned to open the cock, as shown in Fig. 1, and in a direction longitudinally of the car when the handle is turned inward to close the cock, as illustrated by the position of the parts shown in the cock 9 in Fig. 2 and in broken lines in Fig. 4. This arm is formed at its outer end with a head or knob 13 and with a stop-shoulder 14 of greater diameter than the knob, this construction causing the formation of a groove 15 between said knob and shoulder. The knob is oval or



elliptical in form, with its major axis lying in a direction transversely of the arm and one of its ends beveled, so as to provide for the effective holding and release of the operating connection, which will now be described. To the end of each car is bolted or otherwise secured a bracket 16, provided with a hook 17 and a pivoted clip 18, to which clip is connected one end of a chain 19, provided at its opposite or free end with a swiveled link 20, to which is pivoted a lever-arm 21, formed at its free end with an oval or elliptical shaped ring or eye 22, having its greatest length extending longitudinally thereof. This ring is adapted to be slipped over the knob 13 on the arm 12 and lie in the groove 15, formed by said knob and the shoulder 14, and be prevented from sliding longitudinally along said arm by said stop 14. In practice when two cars of a train are coupled together the chain 19 on the rear car—say the car 2—is connected to the arm 12 of the cock of the forward car—say the cock 9 of the car 1—and this manner of coupling up is carried out from one car to another throughout the entire train. The free ends of the chains on the ends of the forward cars, which are not in use, are suspended, so as not to trail along the track, by engaging the ring or eye 22 with the hook 17 on the bracket 16, the chain 19, for instance, on the car 1, which is not in use, being suspended in this manner.

The object of employing the arm 12 is to obviate the necessity of connecting the chain to the handle 10 or 11, which would require a reversal of the accustomed movements of the handle in opening and closing the cocks and would be liable to cause confusion and accidents. The universal rule in mounting the cocks is to provide for the opening of the cock when the handle is turned straight out in a direction longitudinally of the car or in line with the pipe 3 or 4 and the closing of the cock when the handle is turned inwardly toward the coupling 2 and at right angles to the pipe 3 or 4.

By providing the arm 12, which is adapted to extend outwardly, at right angles to the pipe 3 or 4 when the cock is open and to extend straight out in a direction longitudinally of the pipe when the cock is closed I make provision for the proper connection of the chain 19 without reversing the usual movements of the valve, so that all liability of confusion and erroneous turning of the cock is avoided.

The operation is as follows: The chain 19 normally hangs slack and is of a greater length than the distance between the end of the car 2 and the arm 12 of valve 9 of pipe 4, being of such length that it does not become taut until a short interval—say a second or more, or even a fraction of a second—after the hose-couplings 5 and 6 have been pulled apart. As an example, the chain does not pull upon the arm 12 until the hose-couplings have straightened out to their fullest extent and become disconnected, when a quick pull upon the arm

12 occurs. Now assuming the train to be running in the direction of the arrows shown in Figs. 1 and 2 and the couplings 2 should part, the pull of the front section of the train will quickly draw apart the hose-couplings 5 and 6 and allow air to escape from the train-pipe to the atmosphere. The brakes of the rear section of the train, of which car No. 2 is the forward one, will be almost instantly applied, due to the escape of air through the cock 3, whose position of course has not been changed by the separation of the train. Only a small escape of air from the cock 4 to the atmosphere and a partial reduction of pressure—say ten pounds—in the train-pipe of the forward section occur, however, as the chain 14 tightens almost instantly after the hose-couplings 5 and 6 part and draws upon the arm 12 to pull it outward, and thereby close the valve 4, thus cutting off the flow of air. This slight or momentary discharge of air from the cock 4 is, however, sufficient to effect the pressure in the train-pipe of the forward section and partially apply the brakes and notify the engineer that his train has parted, so that he can look to the safety of the forward section of the train.

It will be noted that by constructing the arm 12 with an oval or elliptical head or knob 13, beveled at one end, the ring or eye 22 of the lever-arm 21 cannot be slipped straight over said head, but must be first slipped over the beveled end before it can clear the head 13 to lie in the groove 15. By this means accidental disengagement of the ring in the normal working position of the parts cannot occur; but when the arm swings around to the dotted-line position shown in Fig. 4 to close the cock the ring readily slips off the beveled end of the knob, thus effecting a quick and easy release when the cars part, and the arm 12 is drawn upon to close the valve.

From the foregoing description, taken in connection with the accompanying drawings, the construction, operation, and advantages of my improved air-brake will be readily understood, and it will be seen that the invention is simple of construction, that said construction permits of its manufacture at small cost, and that it is exceedingly well adapted for the purpose for which it is designed.

Various changes in the form, proportion, and details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

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

1. In an air-brake system, the combination, with adjoining cars of a train provided with air-cocks and couplings to connect the same, of a valve-closing connection between one of the cars and the cock on the other car to close said cock upon the parting of the cars, said connection being of such length and arrangement as to leave the cock momentarily open upon the parting of the cars and couplings to



effect a partial reduction of pressure, and then to close the cock to prevent further reduction of pressure, substantially as set forth.

5 2. In an air-brake system, the combination with the train; of air-pipes one of which is provided with an air-cock having a member, the outer end of which is formed with a stop-shoulder and a knob of less diameter than said shoulder, air-tubes connecting said pipes,  
10 and a connection comprising a chain adapted to be secured to one car and having a swiveled ring at one end adapted to be slipped over the outer end of said valve member and to lie in the groove between the shoulder and knob,  
15 said connection being of greater length than the distance between the car to which it is attached and the valve member in the open position of the latter, so as to close the air-cock after the parting of the air-tubes, substantially as set forth.  
20

3. In an air-brake system, an air-cock having a handle and an operating-arm arranged at right angles to the handle and formed at its outer end with a stop-shoulder and an oval

knob of less diameter than said shoulder and having a beveled end, and a valve-closing connection provided with an oval ring or eye adapted to slip over said knob and lie between the knob and shoulder, substantially as set forth. 25 30

4. In an air-brake system, an air-cock having an operating member, and a valve-closing connection comprising an attaching-bracket having a hook, and a chain connected at one end to the bracket and provided at its free end with a ring or eye adapted to engage said valve-operating member when the parts are to be connected and to engage said hook when the connection is not in use, substantially as set forth. 35 40

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN R. RICHARDSON.

Witnesses:

BENJ. COWL,  
H. B. WILLSON.