

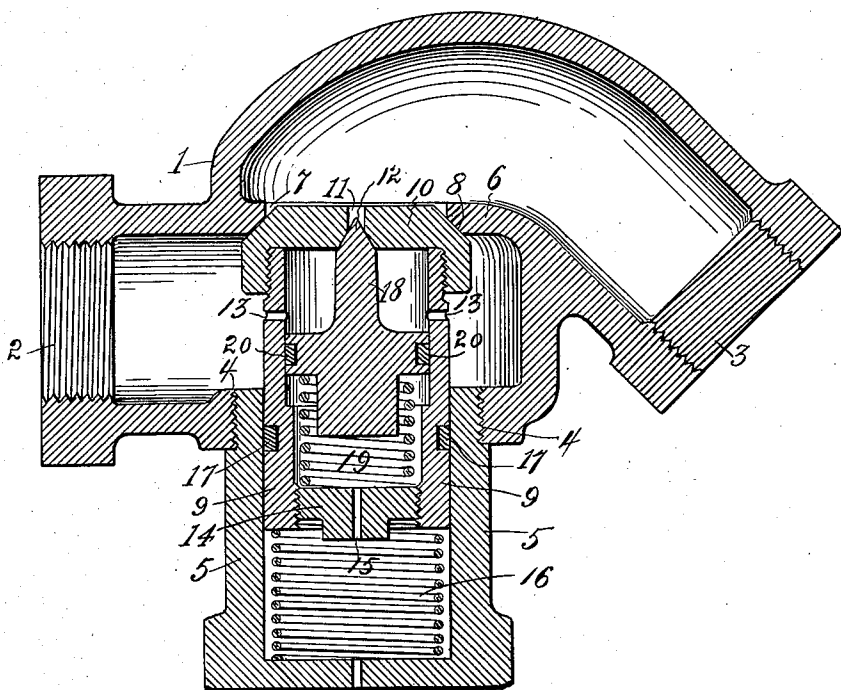
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PATENTED DEC. 12, 1905.

F. D. HILDEBRAND.

ANGLE COCK.

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WITNESSES:

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UNITED STATES PATENT OFFICE.

FRERICH D. HILDEBRAND, OF TOLEDO, OHIO.

ANGLE-COCK.

No. 807,269.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRERICH D. HILDEBRAND, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Angle-Cocks; 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 figures of reference marked thereon, which form a part of this specification.

My invention relates to and its object is to provide an automatic angle-cock and air-brake safety device.

My invention is designed to dispense with the necessity for manually opening and closing the angle-cocks at each end of the cars in a train provided with air-brakes, also to furnish a construction which will regulate the air-pressure in the train-line, preventing undue pressure and preventing the sliding of wheels, with the familiar accompanying damage and loss.

My invention is also designed to furnish a cheap, simple, durable, and efficient automatic device by which when a break occurs anywhere in the line of air-pipe or air-hose the escape of the compressed air will invariably be so arrested that the stop of the separated parts of the train, and especially that part forward of the break in the line, will be gradual, giving the engineer time to control his brakes and, if necessary, to get out of the way of the oncoming detached rear portion of the train.

I attain these objects by means of the devices and arrangements of parts hereinafter described and shown, and illustrated in the single figure of the accompanying drawing, which represents my device in central longitudinal sectional elevation.

In the drawing, 1 is a casing designed to take the place of the ordinary angle-cock, having at one end a threaded portion 2 for connection with the train-line pipe and at its other end a threaded portion 3 for connection with air-hose between cars. In the bottom of the casing 1 is tapped an opening 4, threaded for the reception of the correspondingly-threaded end of a cup-shaped piece 5. Across the passage in the casing 1 is a partition 6, through which is an opening 7, the margin of which is formed as a valve-seat 8.

9 is a hollow plunger which fits in such manner as to reciprocate in the chamber of the cup-shaped piece 5. The piece 9 is open at both ends, the upper end being threaded exteriorly, the lower end being threaded interiorly. Over the top of the piece 9 is secured a cap 10, formed as a valve to fit the valve-seat 8. Through the center of the piece 10 is a vertical opening 11, the interior part of which is formed as a valve-seat 12. Through the side walls of the piece 9 are orifices 13 13. The lower end of the hollow piece 9 is closed with screw-plug 14, having through its center an orifice 15. Interposed between the bottom of the cup-shaped piece 5 and the bottom of the plunger 9 is a spring 16, which holds the plunger normally elevated and the valve 10 closed. In the outer surface of the part 9 is a circumferential channel in which is a packing-ring 17.

In the hollow of the plunger 9 is a reciprocating valve 18, which by means of spring 19, interposed between the screw-plug 14 and a shoulder on the valve, keeps the orifice 11 normally closed.

20 is a packing-ring for the valve 18. This valve is at its top greatly reduced to afford a considerable area just below the orifices 13. These orifices at all times maintain communication between the air-line and the interior of the plunger 9 above the valve 18.

The tension of the spring 16 is such that it requires, say, about fifteen pounds pressure to the square inch on top of the plunger to open the valve 10. The tension of the spring 19, which may be adjusted by means of the screw-plug 14, is such that it requires above seventy pounds pressure (the ordinary train-line pressure) to the square inch to open the valve 18.

The operation of my device is as follows: Assume that the casing 1 is connected up with the train-line pipe and the air-hose. Now if the air is admitted into the angle-cock through the air-hose end a pressure of about fifteen pounds per square inch on the face of the main valve will compress the spring 16, and the valve will be opened and will remain open as long as the pressure of fifteen pounds and upward is maintained in the line. If air is admitted from the train-pipe end of the angle-cock, the air will pass through ports 13, and the train-pressure of about seventy pounds per square inch on the face of the inner valve will compress the spring 19 and open port 11. The air now

passing through ports 13 and 11 produces a pressure on the face of the main valve, which causes it to open and to remain open as long as this pressure is maintained on its face. To
 5 automatically close the angle-cock, simply part the air-hose and relieve the pressure on the face of the main valve, and it will instantly be closed by the pressure of spring 16 and the rush of the escaping air. It will be seen
 10 that the coupling together of the cars in a train and the admission of air to the train-line from the engine automatically opens all the angle-cocks and that the disconnection of the air-hose coupling instantly automatically
 15 closes the two nearest angle-cocks. It will also be observed that the rear angle-cock on the rear car of a train is held automatically closed, for the reason that there is insufficient pressure on the face of the main valve to open
 20 it. This angle-cock is therefore never opened except when there is excessive pressure in the train-line. In such case the valve 18 is automatically opened just sufficient to properly reduce the pressure. Should an air-
 25 hose be broken or should any break or serious leak occur in the train-line, the pressure upon the face of the main valves nearest the break will be instantly reduced, so that the valves will instantly close, preventing the
 30 undue escape of air and the setting of the brakes.

The advantages of my device are—

First. That the manual operation of "cutting in" and "cutting out" the air at the
 35 angle-cocks is dispensed with, this operation being automatically performed, as above described. This overcomes the objection that the angle-cocks are sometimes forgotten or the handles are turned into improper position,
 40 the result being that when the train arrives at a stopping-place the air-brakes fail to work, sometimes causing great damage to person and property.

Second. It sometimes happens that engineers leave their brake-valves in "full release" position too long and charge the train-line with excessive pressure of air instead of the correct working pressure, and when the
 45 brakes are next applied the car-wheels are gripped so tightly by the brakes that the wheels are caused to slide and to wear flat, thus causing the destruction and loss of the wheels, as well as injury to the rails and the detention of trains. With my angle-cock all the
 50 air-pressure in the train-line over seventy pounds per square inch or other predetermined pressure is discharged to the atmosphere through the rear angle-cock in the train, thus maintaining correct pressure and
 60 saving car-wheels.

Third. In case the train parts my automatic angle-cocks will automatically close nearest where the break occurs, giving the engineer ample opportunity to control the forward
 65 part of the train and to thus prevent the two

parts from coming together with the familiar disastrous results accompanying such collisions.

In high-speed trains, where greater air-pressures are maintained than in trains running
 70 at ordinary speeds, the spring-pressures of my automatic angle-cock may be adjusted to meet the requirements of the case.

If it should be deemed desirable to apply my device at some other point in the train-
 75 line than at the ends of the cars where the air-hose sections are coupled, it will be obvious that this may be readily accomplished by merely changing the air-hose end of my device to a horizontal position instead of the inclined
 80 position indicated in the drawing.

Other modifications will suggest themselves to those skilled in the art, and I do not, therefore, limit my invention to the specific construction here illustrated.
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Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a device of the described character, an air-conduit, a valve-seat in the conduit, a hollow valve in operative relation with said valve-seat, a spring for said valve, a second valve disposed within said first-mentioned valve and in operative relation with an opening through said first-mentioned valve, and a spring for
 90 said second valve, said two springs being differently tensioned.

2. An angle-cock comprising an angle-cock casing adapted for connection with a train-line and having a divided air-passage there-
 100 through, a spring-controlled valve for one part of the air-passage, and another spring-controlled valve for the other part of the air-passage, the springs for said two valves being
 105 differently tensioned.

3. In a device of the described character, a casing adapted for connection in a train air-line and having an air-passage therethrough, a valve in said air-passage arranged to open
 110 by a predetermined pressure upon one side thereof, and devices for opening said valve by means of a different pressure upon the other side of said valve.

4. In a device of the described character, a casing having therethrough an air-passage
 115 adapted at one end for engagement with an air-pipe and at its other end for engagement with an air-hose, and two valves in said casing, one of said valves being arranged to open at a pressure greater than service-pressure, the
 120 other of said valves being arranged to open at a less pressure than service-pressure.

5. A combined automatic angle-cock and air-brake safety device, comprising an angle-cock casing adapted at one end for connection
 125 with a train-line and the other end for connection with an air-hose, a valve-seat in the air-passage through said casing, a hollow plunger in said casing having apertures through its
 130 side walls, a valve on said plunger in opera-

5 tive relation with said valve-seat and having a central orifice therethrough, a spring which holds the valve normally closed, a second plunger within the chamber of the plunger first mentioned, a valve on the second plunger in operative relation with the orifice through the first-mentioned valve, and a spring which holds the valve on the second plunger normally

closed, one of said springs being of greater tension than the other.

In testimony whereof I affix my signature in presence of two witnesses.

FRERICH D. HILDEBRAND.

Witnesses:

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