No. 841,751. PATENTED JAN. 22, 1907.

H. H. WESTINGHOUSE.

AIR BRAKE.

APPLICATION FILED OCT. 6, 1904.

Fig 1

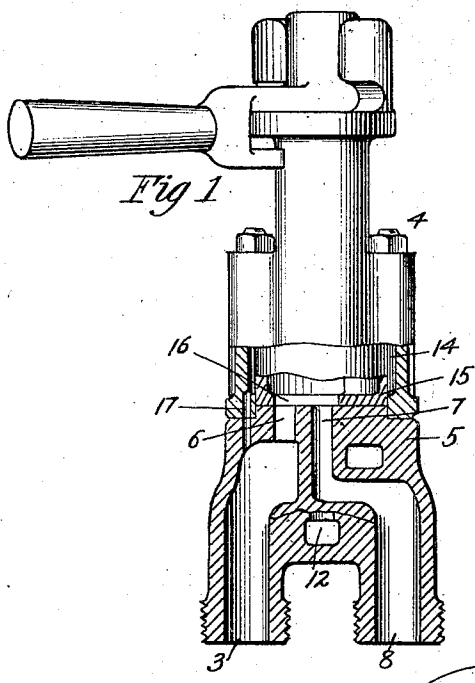


Fig 2

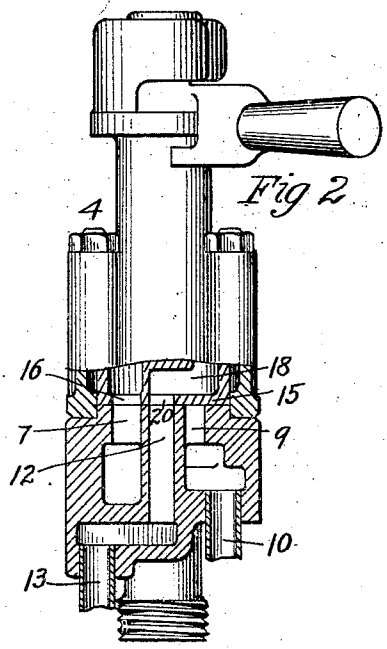


Fig. 4

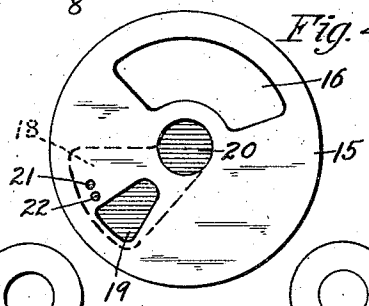


Fig 3

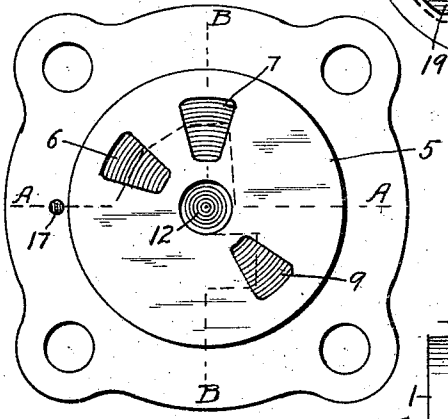


Fig. 5

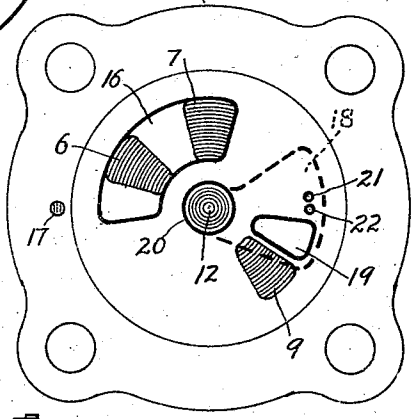
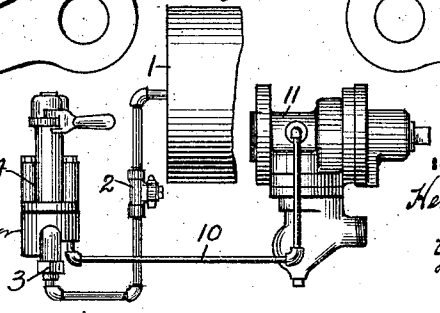


Fig 6



WITNESSES

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AIR-BRAKE.

No. 841,751. Specification of Letters Patent. Patented Jan. 22, 1907.

Application filed October 6, 1904. Serial No. 227,374.

To all whom it may concern:

Be it known that I, HENRY H. WESTINGHOUSE, a citizen of the United States, residing in New York city, county and State of New York, have invented a certain new and useful Improvement in Air-Brakes, of which the following is a specification.

This invention relates to automatic air-brakes for railway-cars, and has for its principal object to provide means for controlling the release of the brakes upon the locomotive or head car independently of the other cars of the train, whereby the train-brakes may be released while the brake on the locomotive or head car may be retained applied as long as desired.

This invention may be applied either to locomotives or to electrically-propelled cars, but is more particularly designed for use in the latter service.

It has heretofore been proposed to provide a retainer for the locomotive driver-brake triple valve and control the same by the engineer's brake-valve, so that when the brake-valve was moved to full release position for supplying air from the main reservoir to the train-pipe for releasing the train-brakes the exhaust from the triple valve on the locomotive would be held closed and the brake applied until the brake-valve was returned to running position, at which time the locomotive triple-valve exhaust-port was opened to the atmosphere and the brake released. With this prior device, however, the brake-valve could be left in full release position for only a short period of time for fear of overcharging the train-pipe, and consequently the locomotive-brake could not be held applied for any appreciable length of time when the train-brakes were released.

It is often desirable in the operation of trains, and particularly of electric cars or trains, to be able after the brakes are applied to reduce the braking pressure or to partially release the same and then to hold or grade down or entirely release the remaining pressure, as desired, in order to accurately gage the position of the train in stopping and to completely control the same. This result may be accomplished by means of my improvement, which comprises a motorman's or engineer's brake-valve having ports for supplying air to the train-pipe at the usual standard degree of train-pipe pressure for releasing the train-brakes and at the same time operating to hold the exhaust from the brake-cylinder on the head car closed. As the air is supplied through the feed or reducing valve to the train-pipe, there is no danger of overcharging the train-pipe, and the brake-valve may therefore be left in this position as long as it is desired to retain the braking pressure on the head car. By a further movement of the brake-valve this remaining brake-cylinder pressure may be graded down or released, as desired.

Another feature of the invention comprises a simple and compact form of brake-valve in which the ports are so arranged as to reduce to a minimum the amount of metal required in the structure and to produce an efficient and durable device.

In the accompanying drawings, Figure 1 is a vertical sectional view of my improved brake-valve, the valve and seat being indicated in a section taken on the line A A of Fig. 3; Fig. 2, a similar view showing the valve in section, taken on the line B B of Fig. 3; Fig. 3, a plan view of the valve-seat of the brake-valve; Fig. 4, a face view of the rotary valve; Fig. 5, a diagrammatic plan view showing the relative positions of the ports in the rotary valve and its seat when the brake-valve is in position for supplying air to the train-pipe for releasing the train-brakes and holding the head brakes applied; and Fig. 6, a diagram showing the main reservoir, brake-valve, feed-valve, and triple valve connected up in accordance with my invention.

As shown in the drawings, the main reservoir 1 communicates, through the feed or reducing valve 2, with the main-reservoir-pipe connection 3 of the motorman's brake-valve 4, so that the air admitted from the main reservoir to the train-pipe by the brake-valve for releasing the train-brakes and recharging the train-pipe and auxiliary reservoirs is reduced to the desired normal degree of train-pipe pressure for which the feed-valve is adjusted.

The brake-valve comprises a seat-section 5, having port 6 communicating with the main-reservoir-pipe connection 3, port 7 leading to the train-pipe 8, port 9 communicating with the pipe 10, leading from the exhaust of the triple valve 11, and a centrally-

located exhaust-port 12, leading to the atmosphere through pipe 13, if desired.

On the valve-seat in chamber 14 is mounted the rotary valve 15, having a large through-port 16 for connecting ports 6 and 7 in the valve-seat, and a large cavity 18, which is provided with a central opening 20 in the face of the valve in constant open communication with the central exhaust-port 12 in the valve-seat, a port-opening 19 for registering with either the train-pipe port 7 or the triple-valve exhaust-port 9, and two small ports 21 and 22 for connecting with the train-pipe port 7 in making train-pipe reductions for producing service applications of the brakes.

A small passage 17 may be used for admitting air at all times from the main-reservoir connection 3 to the chamber 14 above the rotary valve. Each car is equipped with the usual train-pipe, auxiliary reservoir, triple valve, and brake-cylinder, as will be readily understood.

The operation of my improved device is as follows: When the brake-valve is set in full release position, the port 16 connects ports 6 and 7, while port 19 registers with port 9, and air is supplied from the main reservoir through the feed-valve 2, ports 6, 16, and 7 to the train-pipe 8, charging the same and the auxiliary reservoirs to the standard degree of pressure for which the feed-valve is adjusted. At the same time the triple-valve exhaust is open to the atmosphere through pipe 10, ports 9 19, cavity 18, and exhaust-port 12. When a service application of the brakes is desired, the brake-valve is turned to a position in which one or both of ports 21 and 22 register with port 7, thereby making a reduction in train-pipe pressure, which discharges through cavity 18 and exhaust-port 12, and causing the usual action of the triple valves to apply the brakes throughout the train. When a sufficient reduction has been made, the valve is turned back to lap position, in which all ports are closed. The emergency application is produced by turning the valve to a position in which the large port 19 registers with the train-pipe port 7, whereby a sudden and greater reduction is made in train-pipe pressure, causing quick action of the triple valves through the train in the usual way. If then it be desired to reduce the braking pressure without entirely releasing the same, the brake-valve may be turned to the train-brake-release position, (indicated in Fig. 5,) in which the air is supplied from the main reservoir through the feed-valve and ports 6, 16, and 7 to the train-pipe for releasing the triple valves throughout the train; but the port 9 is held closed, so that the pressure is retained in the brake-cylinders of the head car or locomotive, and this brake may be held applied as long as desired, while the train-pipe and auxiliary reservoirs of the train are recharged, since there is no danger of overcharging the train-pipe. This brake-cylinder pressure may then be graded down by turning the brake-valve to full release position momentarily and then back to train-brake-release position or may be released entirely at any time by placing the brake-valve in full release position. In both of these release positions the train-pipe is supplied with air from the main reservoir through the feed-valve, thereby maintaining the train-pipe pressure at the normal standard degree.

By designing the brake-valve with a centrally-located exhaust-port in the valve-seat and a rotary valve having an exhaust-cavity for controlling both the train-pipe discharge and the triple-valve exhaust a very simple and compact form of device is produced.

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

1. In an air-brake apparatus the combination with a train-pipe and triple valve, of a feed-valve, a brake-valve having ports for supplying air through the feed-valve to the train-pipe in one position and means operated by the movement of the brake-valve to this position for closing the exhaust from the triple valve.

2. In an air-brake apparatus the combination with a main reservoir, train-pipe, reducing-valve, and triple valve, of a brake-valve having ports for supplying air from the main reservoir through the feed or reducing valve to the train-pipe in one position, and means operating upon the movement of the brake-valve to this position for holding the triple-valve exhaust closed.

3. In an air-brake apparatus the combination with a main reservoir, train-pipe, reducing-valve, and triple valve, of a brake-valve having ports for supplying air from the main reservoir through the feed or reducing valve to the train-pipe in two positions, and means operating upon the movement of the brake-valve to one of said positions for holding the triple-valve exhaust closed and to the other of said positions for opening said triple-valve exhaust.

4. In an air-brake apparatus the combination with a main reservoir, train-pipe, reducing-valve and triple valve, of a brake-valve having ports adapted in one position to open communication from the main reservoir through the feed-valve to the train-pipe, and to close the triple-valve exhaust.

5. In an air-brake apparatus the combination with a main reservoir, train-pipe, reducing-valve and triple valve, of a brake-valve having ports adapted in one position to open communication from the main reservoir through the feed-valve to the train-pipe, and to close the triple-valve exhaust, and in another position to maintain the communication open from the main reservoir through

the feed-valve to the train-pipe and open the exhaust from the triple valve.

6. In an air-brake apparatus, the combination with a reservoir, a train-pipe, and a triple valve, of a brake-valve provided with a seat having ports communicating respectively with the train-pipe and the triple-valve exhaust, and a centrally-located exhaust-port, a rotary valve mounted on said seat and having a cavity communicating with said exhaust-port and adapted in one position of the valve to connect with the train-pipe, and in another position with the triple-valve exhaust.

7. A brake-valve comprising a valve-seat having ports communicating with the train-pipe, the triple-valve exhaust and the main reservoir respectively, and an exhaust-port leading to the atmosphere, a rotary valve mounted on said seat and having an exhaust-cavity adapted in one position to connect the train-pipe with the exhaust-port, and in another position to connect the triple-valve exhaust with the exhaust-port.

In testimony whereof I have hereunto set my hand.

HENRY H. WESTINGHOUSE.

Witnesses:
R. F. EMERY,
JAMES B. MACDONALD.