C. W. HURL.

AIR BRAKE SYSTEM.

APPLICATION FILED AUG. 16, 1909.

966,211. **Patented Aug. 2, 1910.**

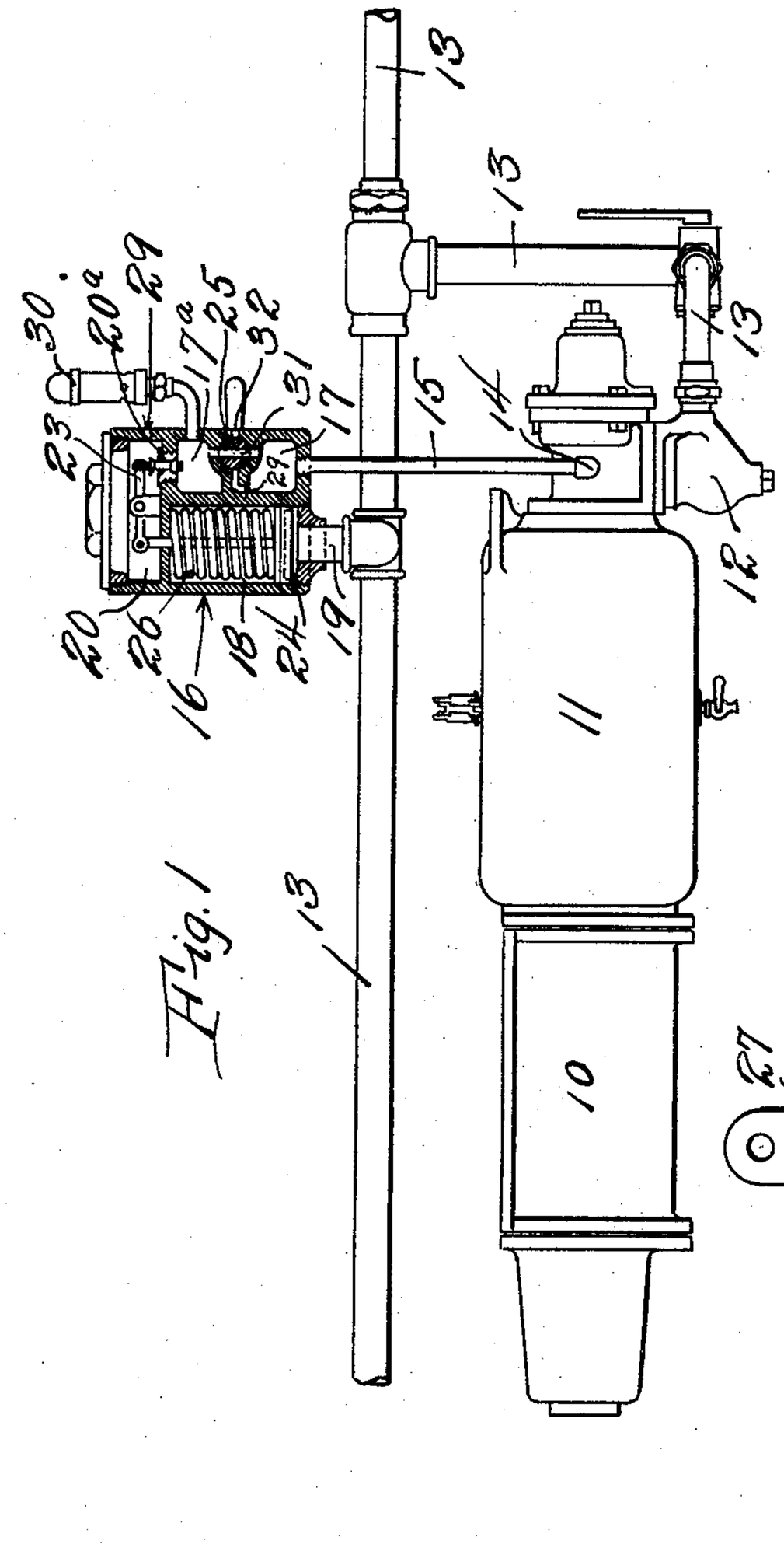

Fig. 1.

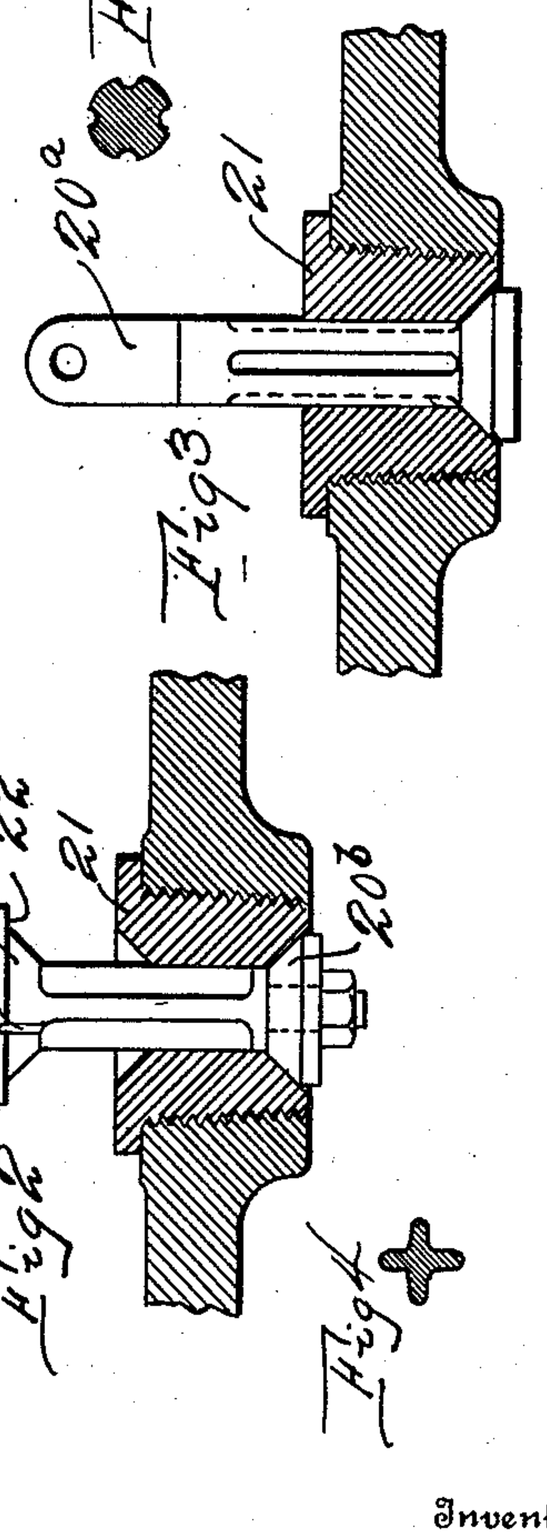

Fig. 5.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses

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AIR-BRAKE SYSTEM.

966,211. Specification of Letters Patent. Patented Aug. 2, 1910.

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To all whom it may concern:

Be it known that I, CHARLES W. HURL, a citizen of the United States, residing at Altoona, in the county of Blair and State of Pennsylvania, have invented certain new and useful Improvements in Air-Brake Systems, of which the following is a specification.

The object of my present invention is to provide improved means whereby the brakes on the last car in a train of cars will be automatically released first, thus insuring the automatic handling of trains, on long and heavy grades, without the usual danger of pulling out draw heads and piling up cars in the train, thereby increasing the brake efficiency under running service conditions. This device is designed to be used in connection with the Westinghouse air brake.

Referring to the accompanying drawings, Figure 1 illustrates the usual Westinghouse brake cylinder, auxiliary reservoir, triple valve and train pipe together with my improved automatic pressure retaining valve attached thereto. Fig. 2 is a detail sectional view of a part of the valve chamber, and illustrating the valve. Fig. 3 is a detail sectional view of a slightly modified construction of valve. Fig. 4 is a cross section of the valve stem shown in Fig. 2. Fig. 5 is a cross section of the valve stem shown in Fig. 3.

Like references designate corresponding parts in the several figures of the drawings.

Referring to the drawings, the number 10 designates the usual brake cylinder, and 11 the auxiliary reservoir, together with the triple valve 12, which is suitably connected to the train pipe 13, the auxiliary reservoir, and the brake cylinder, as well understood by those familiar with the art. A pipe 15 connects with exhaust port 14 of the triple valve, and the improved pressure retaining valve designated in its entirety by the number 16. This valve includes a casing having two main chambers, one of which, 17—17ª, communicates with the air brake triple valve exhaust, while the other of said chambers 18 communicates with the train pipe through the pipe connection 19. The upper part 17ª of one chamber is in communication with an exhaust chamber 20 through a removable ported valve seat 21 with which is associated the main controlling valve 20ª. This valve can be made in a variety of ways, as for example, the upper valve head 22 may be arranged to rest on top of the valve seat 21 when an excess pressure is created in the train line, thus enabling the engineer to retain the cylinder pressure on the front end of the train while the rear end is releasing. Or, the valve can be constructed as shown in Fig. 3, and the excess pressure in the train pipe forces the cylindrical portion of the valve down into the valve stem opening, thus closing the escape of air from the triple valve exhaust and hence, from the air brake cylinders. This controlling valve 20ª is connected, by a simple lever 23, with a spring pressed piston in the chamber 18.

Referring to the operation of the device, the engineer, in applying the brakes, reduces the pressure in the train pipe, thereby causing the triple valve to admit pressure from the auxiliary reservoir 11 to the brake cylinder 10, thus applying the brakes. In connection with the automatic valve, it will be observed that the train pipe pressure enters the chamber 18 beneath the piston 24, while the exhaust from the triple valve fills the lower part of the chamber 17 and passes through the two-way stop 25 to the upper section 17ª of the chamber 17—17ª, where it is held by the lower valve head 20ᵇ of the valve 20ª. The spring 26, which presses on the piston 24, is graduated to resist a pressure slightly in excess of that contained in the train pipe, which excess pressure keeps the valve 20ª closed and prevents the escape of any air from the triple valve exhaust. With a sudden increase of train line pressure, the piston 24 will be forced up and the upper valve head 22 will immediately seat on top of the valve seat 21, thereby preventing the immediate release of the brake on the front cars of a train, avoiding the objections hereinbefore referred to. A leakage groove 27 is preferably placed in the upper valve head 22 as shown in Fig. 2, which groove will allow the air to gradually leak off and the brakes to be more easily released after the excess pressure has been admitted to the train pipe. After the brakes have been applied on the car, and the engineer wishes to release the same, he moves the engineer's brake valve to a posi-

tion permitting air from the main air reservoir to enter the train pipe and overcome the pressure exerted by the spring 26, thus opening chamber 17[a] to the atmosphere through the chamber 20 and the port 29. A safety valve 30 is shown attached to the upper part of the chamber 17. This is designed to be used with a mixed train, wherein the exhaust pressure from the triple valve can be released into the atmosphere at a predetermined pressure in the safety valve, without the automatic action of the improved pressure retaining valve. The auxiliary reservoir having been recharged from the train pipe and the brake shoes drawn away from the wheels, the engineer is again ready to apply the brakes in the usual way. The pressure in the train pipe being reduced before the brakes can be applied, the valve 20[a] closes through the action of the spring 26 as explained. The two-way cock 25 between the two parts of the chamber 17—17[a] permits the automatic feature of the valve to be cut out and the exhaust from the triple valve discharged directly into the atmosphere through the ports 29, 31, and 32.

When the engineer in charge of the train wishes to release the brakes, he moves the brake valve handle to release position, thus allowing the pressure in the main air reservoir to flow back through the train pipe, and the latter being made up, more or less, of couplings, unions and angles in the line, the result is that there is an accumulation of pressure at the front end of the train. This accumulated or excess pressure in the train pipe 13 forces up the piston 24 and opens the valve 20[b], so that the air from the triple valve exhaust would immediately flow to the atmosphere if the valve seat was not covered by the top valve 22. After the engineer's brake valve has been held in release position for a few seconds it is again brought back to running position, and the excess pressure in the front end of the train line will gradually flow back through the train line, and the brakes will release, after the valve 22 has left the valve seat 21. The last car will naturally release first, and the first car last.

The invention described and claimed in this application is intended as an improvement upon the invention set forth and claimed in my former application Serial Number 493,598, filed May 3, 1909.

Without further description, it is believed that the construction and advantages of the invention will be apparent to those skilled in the art.

I claim:

1. In an air brake system, the combination with the train pipe and the triple valve, of a valve casing having two main chambers and an exhaust chamber, one of the main chambers being in communication with the train line and the other with the triple valve exhaust, a double acting controlling valve interposed between one of the main chambers and said exhaust chamber, and a pressure controlled piston arranged in the other main chamber and having a lever connection with said valve.

2. In an air brake system, the combination with the train pipe and the triple valve, of a valve casing having two main chambers and an exhaust chamber, one of the main chambers being in communication with the train line, a cut-off valve arranged in the other of said main chambers, a pipe connection between said latter chamber at one side of the cut-off valve and the triple valve exhaust, a double acting controlling valve interposed between the last mentioned chamber at the opposite side of its cut-off valve and the said exhaust chamber, a safety valve in communication with said last mentioned chamber at one side of its cut-off valve, and a pressure controlled piston arranged in the other main chamber and connected with said double acting controlling valve.

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

CHARLES W. HURL.

Witnesses:

N. E. GEE,

ADAM LEAKE.