G. WESTINGHOUSE, Jr.

Automatic-Brake Relief-Valve.

No. 217,838. Patented July 22, 1879.

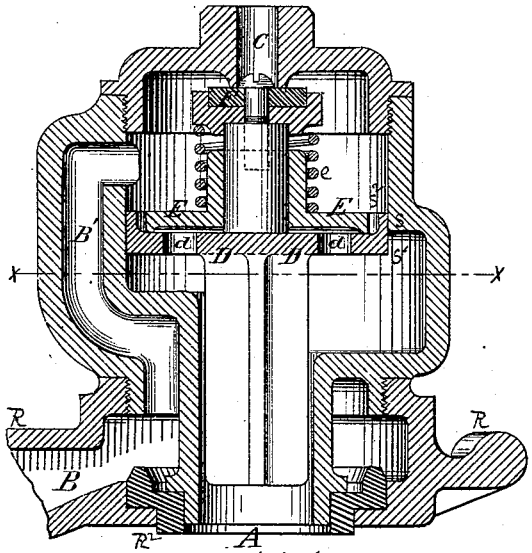

Fig. 1.

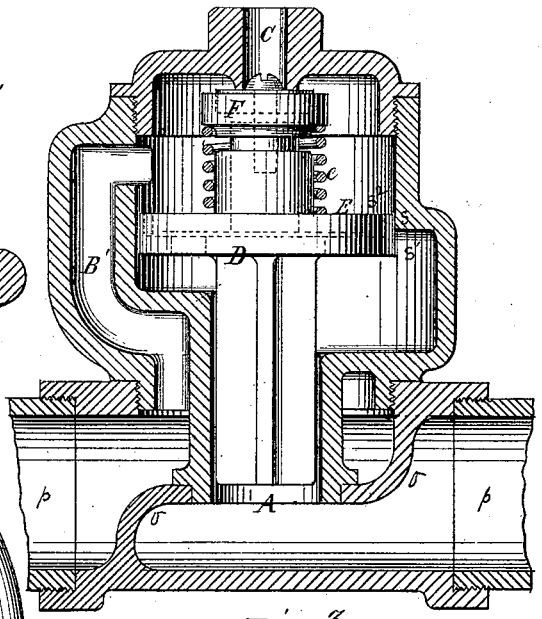

Fig. 3.

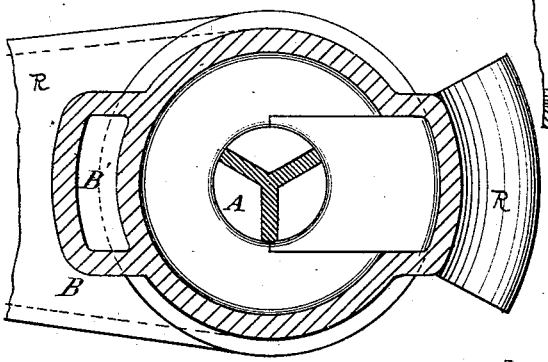

Fig. 2.

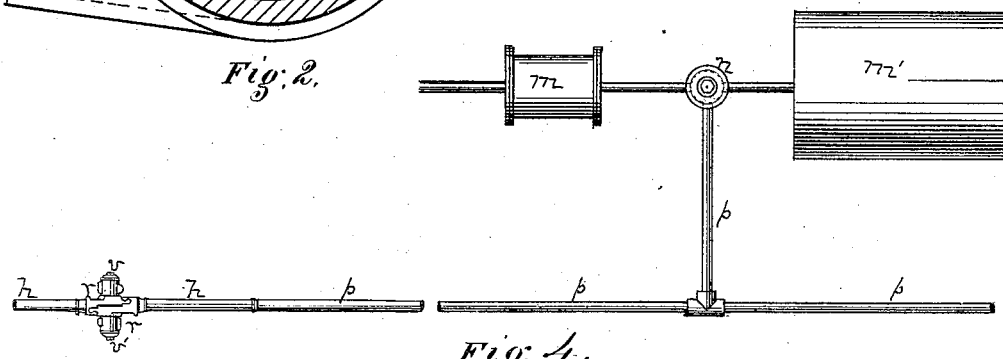

Fig. 4.

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IMPROVEMENT IN AUTOMATIC-BRAKE RELIEF-VALVES.

Specification forming part of Letters Patent No. **217,838**, dated July 22, 1879; application filed May 21, 1879.

To all whom it may concern:

Be it known that I, GEORGE WESTINGHOUSE, Jr., of Pittsburg, county of Allegheny, State of Pennsylvania, have invented or discovered a new and useful Improvement in Automatic-Brake Relief-Valves; and I do hereby declare the following to be a full, clear, concise, and exact description thereof, reference being had to the accompanying drawings, making a part of this specification, in which—like letters indicating like parts—

Figure 1 is a vertical sectional view of a relief-valve applied to and combined with a coupling of the class described in reissued Patent No. 8,291, granted to me June 18, 1878. Fig. 2 is a horizontal section thereof through the line *x x* of Fig. 1. Fig. 3 is a vertical sectional view, showing the relief-valve applied directly to a ported diaphragm in the pipe; and Fig. 4 shows in outline the main elements of an automatic brake of the kind or class to which the present invention is particularly applicable.

The present device is more especially designed for use with and as a part of brake apparatus of the class commonly represented by the Westinghouse automatic brake, in which the brake-power available for immediate use in the brake-cylinders is contained in auxiliary reservoirs, one under each car. The brake-pipes are also kept full of air under pressure, in order to keep the reservoirs fully charged, and the charge of compressed air in the auxiliary reservoirs is brought into action in the brake-cylinders by opening an escape-port leading from the brake or communicating pipes to the external air. A like effect follows when the train separates, or couplings become disconnected, or other accident ruptures or opens the air-conduit pipes. The brakes are then automatically applied.

Such an apparatus is partly shown in outline in Fig. 4, wherein *m* represents one of a series of brake-cylinders; *m'*, an auxiliary reservoir. *n* is the valve which governs the flow of compressed air from reservoir to cylinder, and from cylinder to escape. *p p* are the brake-pipes; *h*, the hose, and *r* the couplings. The main reservoir and operating-cock on the locomotive are of the usual construction. The relief-valves are represented at *v v'*.

It sometimes happens with such brake apparatus, especially in case of accident, that material advantage could be effected by having all the brakes of the train applied or brought into action simultaneously, or as nearly so as possible. To accomplish this it is only necessary to make provision for the simultaneous opening of one or more ports in the air-conduit passages at points not remote from each auxiliary reservoir. For this purpose I arrange at such various parts of the air-conduit or communicating pipes as may be desired, but by preference at the couplings, relief-valves of the kind shown in the drawings. In the construction there shown the valve-box forms a part of the coupling itself.

The aperture A of the valve-box is seated in the lateral port-opening of the coupling R, so as to come in the line of the flow of air through the brake-pipe, hose, and couplings.

The aperture A communicates with the port of the next half-coupling, and the aperture B leads to hose and brake-pipe. A third aperture, C, opens to the external air.

Within the valve-box is a piston, D, with holes *d* through it, covered by a valve, E, held down by a spring, *e*. On the stem of the piston is fixed a valve, F, which covers the aperture C.

When compressed air enters the valve-box by the aperture A from the front portion of the communicating pipe, it raises by its pressure the valve E, passes through the holes *d* in the piston D, keeps the valve F closed, and passes on by the passage B' and aperture B to the hinder part of the pipe to charge the auxiliary reservoirs, in the usual way. But should the pressure in the front part of the pipe communicating with A be reduced intentionally or by accident, then, the valve E closing the holes in the piston D, that piston is pressed down by the pressure from B, and the valve F is drawn from its seat, leaving the orifice C open for the escape of air from the hinder portion of the pipe which communicates with B; and by giving the piston D and valve E a sufficient length of stroke or motion, such that it will drop below the shoulder *s*, an open passage-way will be formed for the escape of fluid-pressure from the enlarged space or port s^1 to s^2, and thence out at C. In this way provision is made

for the escape of fluid-pressure through C from the brake-pipes both forward and back of the couplings.

By arranging such valve-boxes at several points along the communicating pipe, each section of that pipe becomes relieved from pressure almost immediately on the section in front of it being relieved, and consequently the several sets of brakes throughout the train are put in action without the loss of time which would be involved if, for the relief of pressure throughout the pipe, the air contained in the hinder portions of it had to flow all the way to the escape-aperture, which might be near its front part, and is usually on the locomotive.

The same device may be applied at any part of the communicating pipes *p* by making therein, across the bore of the pipe, a ported diaphragm, *o*, Fig. 3, such as is used in ordinary stop-cocks, and arranging therein a relief-valve of the construction described, as shown in said Fig. 3; and so far as relates to the relief-valve, the ported diaphragm *o* and the ported part R^2 of the coupling are the mechanical equivalents each of the other. The form or construction of the relief-valve, its function and operation being substantially retained, may be varied considerably, in so far as it is an element in the described combination, without any material departure from the scope of the invention.

I am aware of the prior use of escape-valves, in combination with brake-cylinders, for the purpose of effecting a reduction of the working-pressure in such cylinders; but in the present invention the escape-valve enters into combination not only with the brake-cylinder, but also with the auxiliary reservoir, and in such a manner as to secure a result the reverse of that just stated—viz., to facilitate the charging of the compressed air from the auxiliary reservoir into the brake-cylinder.

I claim herein as my invention—

1. In combination with the brake-cylinders and auxiliary reservoirs of an automatic-brake apparatus, a ported diaphragm arranged in the line of fluid-pressure communication, and a valve device, which, under operative fluid-pressure, closes the external air or escape port, and opens a through passage-way for the air, and on the reduction of air-pressure in the main air-conduit, by accident or otherwise, will open the escape-port, substantially as set forth.

2. A relief-valve applied directly to and made as a part of a coupling, the combination of such two elements being substantially as described.

3. The valves E F, and ported piston D, in combination with ports or ways A B C, substantially as set forth.

In testimony whereof I have hereunto set my hand.

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