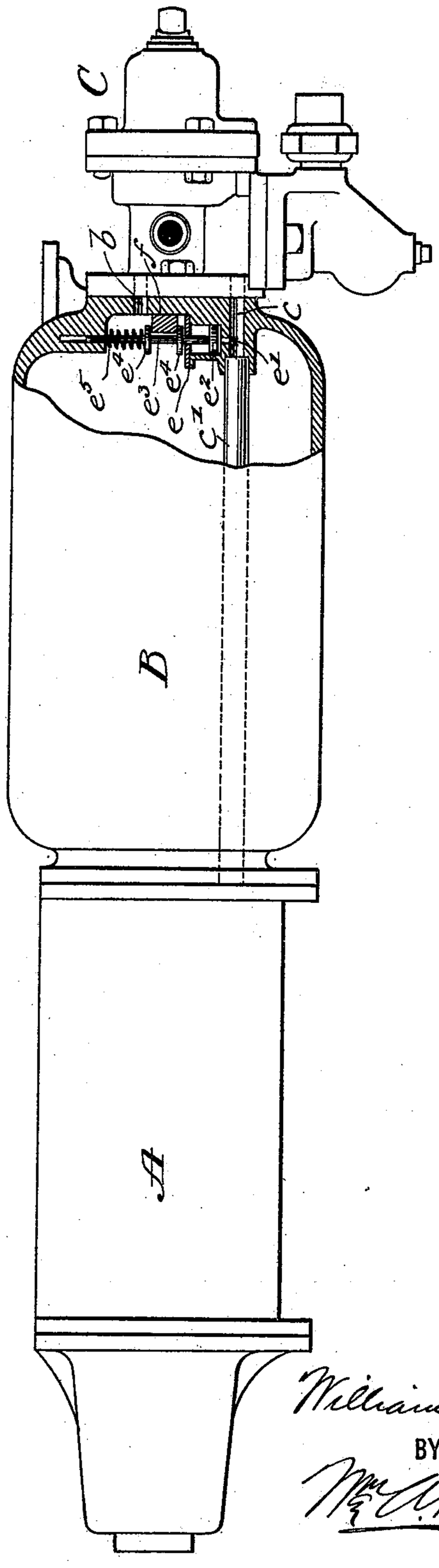
(No Model.)

W. H. CLARKE.

AUTOMATIC FLUID PRESSURE TRAIN BRAKE.

No. 552,234. Patented Dec. 31, 1895.



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AUTOMATIC FLUID-PRESSURE TRAIN-BRAKE.

SPECIFICATION forming part of Letters Patent No. 552,234, dated December 31, 1895.

Application filed April 3, 1895. Serial No. 544,228. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. CLARKE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Automatic Fluid-Pressure Train-Brakes, of which the following is a full, clear, and exact description.

This invention relates to automatic fluid-pressure train-brakes.

In automatic air-brake systems such as the Westinghouse it is the practice in making an emergency application of brakes to vent both the auxiliary reservoir and the train-pipe into the brake-cylinder, in order that an extra pressure may be obtained. This venting of the train-pipe into the cylinders not only hastens the stop, by furnishing extra pressure, but incidentally hastens the response of the triple valves throughout the train. This second advantage is naturally more pronounced when the train-pipe is vented into the atmosphere instead of into the brake-cylinder; but in so doing it becomes necessary and desirable to devise other means for securing the maximum braking stress upon the brake-shoes, and compensating for the loss of air from the train-pipe.

By my invention I utilize the standard (Westinghouse) capacity relation between the auxiliary reservoir and the brake-cylinder, and limit the pressure which shall enter the brake-cylinder in either service or emergency application of brakes to a predetermined amount in each, regardless of the pressure in the train-pipe or the action of the ordinary triple valve; and then by changing the leverage of the brake-rigging I am able to secure a maximum braking stress in emergencies without venting extra pressure into the brake-cylinder from any source or sources other than the auxiliary reservoir. Hence the air vented into the brake-cylinder from the train-pipe under the present practice may be vented into the atmosphere, not only without loss of brake-pressure, but with the gain of quicker action.

My invention may be carried out by merely supplying an automatic valve adapted to limit the pressure which shall enter the brake-cylinder in a service application of brakes to a predetermined small amount of, say, forty pounds, and which will also limit the pressure which shall enter the brake-cylinder in an emergency application of brakes to a predetermined large amount of, say, fifty pounds, and by an adjustment of the leverage of the brake-rigging, so that these pressures will create the same braking stress upon the brake-shoes as is now created by the aid of higher air-pressures.

My invention is illustrated in the accompanying drawing, in which the figure is a side elevation of a standard brake-cylinder, auxiliary reservoir, and triple valve, such as are used ordinarily on freight-cars, parts being broken away to illustrate the devices constituting my invention.

Referring to the drawing by letter, A represents an ordinary brake-cylinder, B an ordinary auxiliary reservoir, and C a triple valve. *b* is the port ordinarily provided for admitting air from the auxiliary reservoir to the interior of the triple valve, and *c* is the port admitting air from the triple valve into the brake-cylinder, by way of a pipe *c'*, which extends from one end of the reservoir to the other, connecting the triple valve and cylinder together. In the usual understood operation of these parts the triple valve controls communication between the auxiliary reservoir and the brake-cylinder, and between the train-pipe and both the brake-cylinder and auxiliary reservoir. In adapting my invention to this form of apparatus, I provide a small cylinder *e*, opening at one end through a restricted passage *e'* into the pipe or passage *c'*, leading from the triple valve to the brake-cylinder. In the cylinder *e* is a piston e^2 having a stem e^3, which by means of lugs e^4 embraces a slide-valve *f*, arranged to cover and uncover the port *b*, leading from the auxiliary reservoir to the triple valve. The piston is acted upon by the spring e^5 with a tendency to hold the piston at the inner end of its stroke, in which position the port *b* is uncovered. This spring will be of such power as to resist any pressure beneath the piston coming from the brake-cylinder passage, less than the pressure adopted for service application

of brakes, but to yield to permit the piston to move outward and thus close port *b* as soon as the pressure beneath the piston reaches the service amount.

The operation of the apparatus is as follows: In a service application of brakes the pressure in the auxiliary reservoir is admitted slowly into the brake-cylinder, and the pressure rises at about the same speed beneath piston e^2 as it does in the brake-cylinder, and as soon as the pressure reaches the maximum for a service stop the piston e^2 is forced outward and the port *b* is closed, thus preventing any further admission of air into the brake-cylinder from the auxiliary reservoir. In emergency applications of brakes the action of the triple valve is to open a comparatively large and free passage for the air into the brake-cylinder, and the pressure therein instead of rising slowly builds up very suddenly and because of the restricted passage between pipe *c'* and cylinder *e* piston e^2 will not feel the rise of pressure as rapidly as it enters the brake-cylinder. The result will be that an accumulation of pressure in the brake-cylinder will take place, amounting to a number of pounds above that at which the spring e^5 is set, the excess depending upon the size of passage *e'*. When the pressure in cylinder *e* overcomes the spring, port *b* will be closed. It will thus be seen that by gaging the power of the spring e^5 and the size of the passage *e'* the working pressures used in both service and emergency applications of brakes are predetermined.

My intention is to use in connection with this invention a triple valve which on an emergency reduction of pressure at the engineer's valve will open the train-pipe to the atmosphere and not to the brake-cylinder, as in the present practice. Atmospheric exhaust will give a very quick action throughout the train and possesses other advantages unnecessary to mention here. With brake-rigging adjusted to give the maximum stress upon full expansion of the auxiliary reservoir I do not need the train-pipe pressure in the cylinders and therefore can afford to vent it to the atmosphere. I am aware that an increase in the leverage of the brake-rigging means an increased length of stroke for the brake-cylinder piston, but this increase will be slight and of little consequence.

Although my intention is to use an atmosphere-exhaust in connection with my invention, it is obvious that if a standard Westinghouse triple valve, venting both the train-pipe and auxiliary reservoir into the cylinder upon emergencies, is used, the action will be the same, for the piston e^2 will be moved under the same conditions as before, and the auxiliary pressure will be shut off before the pressure in the brake-cylinder rises above the normal. It is well understood that if a pressure above the normal should enter the brake-cylinders with my increased leverage the wheels would become locked and slide. This, however, cannot happen, and my system is therefore interchangeable with the standards now in use.

I have shown and described my valve as located inside of the auxiliary reservoir, but this is desirable only when the cylinder, reservoir, and triple valve are combined as illustrated. It is obvious that my invention is not limited to any particular location, nor to the application to freight-cars alone. It contemplates a piston acted upon by brake-cylinder pressure through a restricted passage to control the port leading from the auxiliary reservoir to the triple valve.

Having thus described my invention, I claim—

1. In an air brake system, the combination of a brake cylinder, an auxiliary reservoir, and a triple valve with a port between the reservoir and triple valve, and a valve controlling said port the valve being moved to close the port, under the pressure in the brake cylinder.

2. In an air brake system, the combination of a brake cylinder, auxiliary reservoir and a piston subjected to the pressure in the brake cylinder, said piston moving under such pressure to control a port leading from the auxiliary reservoir to the triple valve, substantially as described.

3. In an air brake system, the combination of a brake cylinder, auxiliary reservoir and a piston subjected to the pressure in the brake cylinder, said piston moving under such pressure to control a port leading from the auxiliary reservoir to the triple valve, and a spring acting upon the piston in opposition to such pressure.

4. In an air brake system, the combination of a brake cylinder, auxiliary reservoir, and a piston subjected on one side to the pressure in the brake cylinder, through a restricted passage, and on the other side to a fixed counter pressure, said piston controlling a port leading from the auxiliary reservoir to the triple valve, substantially as described.

5. In an air brake system, the combination of a brake cylinder, auxiliary reservoir, triple valve and a piston subjected to the pressure in the brake cylinder through a restricted passage, said piston controlling a port leading from the auxiliary reservoir through the triple valve to the brake cylinder, substantially as described.

6. In an air brake system, the combination with a brake cylinder, auxiliary reservoir and triple valve, the brake cylinder and triple valve being connected by a pipe leading through the auxiliary reservoir, and the auxiliary reservoir and triple valve by a port, of a cylinder and piston located inside of the auxiliary reservoir, the cylinder communicat-

ing with the said pipe through a restricted passage and a valve moved by said piston and controlling the port between the auxiliary reservoir and triple valve, substantially as described.

7. In an air brake system, the combination of a brake cylinder, auxiliary reservoir and triple valve, with a valve controlling a port between the reservoir and triple valve and constantly subjected to the pressure in the brake cylinder, substantially as described.

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

WILLIAM H. CLARKE.

Witnesses:
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