No. 730,315. PATENTED JUNE 9, 1903.

P. SYNNESTVEDT.

TRIPLE VALVE.

APPLICATION FILED OCT. 17, 1902.

NO MODEL.

Fig. 1

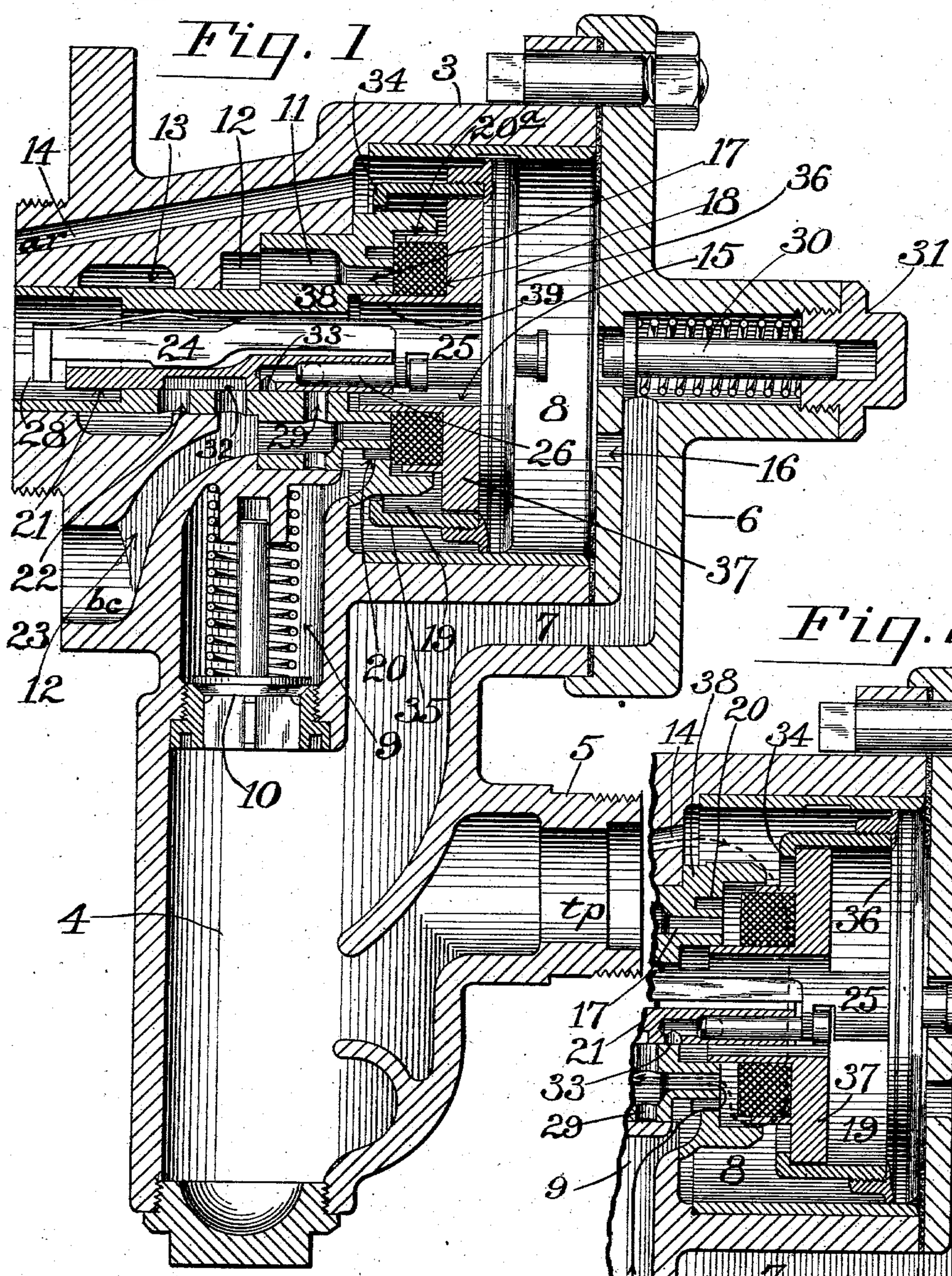

Fig. 2

WITNESSES:

F. W. H. Clay

Chas. H. Ebert

INVENTOR,

Paul Synnestvedt

No. 730,315. Patented June 9, 1903.

UNITED STATES PATENT OFFICE.

PAUL SYNNESTVEDT, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

TRIPLE VALVE.

SPECIFICATION forming part of Letters Patent No. 730,315, dated June 9, 1903.

Application filed October 17, 1902. Serial No. 127,724. (No model.)

To all whom it may concern:

Be it known that I, PAUL SYNNESTVEDT, a citizen of the United States of America, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Triple Valves, of which the following is a specification.

My invention relates to automatic air-brake apparatus and to the so-called "triple valves" employed therein. It particularly concerns that style of triple valve designed to provide in emergency applications of the brake for local venting of the train-pipe pressure in order to further reduce the pressure in the train-pipe, and thus quicken the action of the other brakes farther along the line. This style of valve as usually made has, in addition to the ordinary main valve, stem, and piston, an extra or "emergency" valve, which operates more or less independently of the main valve and opens only on extreme and sudden reduction of train-pipe pressure to vent the train-pipe air locally either into the atmosphere or the brake-cylinder, such local venting avoiding the need in emergency or quick-action applications of discharging all the air at the engineer's valve.

The objects of my present invention are to simplify and compact the construction and improve the operation of such a valve, to render the action more certain and decrease the liability to disorder, to reduce the number of pistons and friction-surfaces, to operate all the valves and parts directly from one stem and eliminate all but one packing-ring, and to secure other benefits of simpler and more economic design. I attain these objects, as well as other advantages which will hereinafter appear, by means of the novel construction and arrangement of parts which I have illustrated in preferred form in the accompanying drawings, forming part of this specification, wherein—

Figure 1 is a central vertical section of the valve-chamber and various parts therein, the valves being in their normal release position. Fig. 2 is a partial section of the same, showing the movable parts in the position they occupy in an emergency application of the brake.

The general form of the casing 3, with its drip-chamber 4, train-pipe inlet 5, valve-chamber 8, valve-chamber cap 6, passages 7 9, brake-cylinder outlet 23, check-valve 10, and graduating abutment-stem 30 in cap 31, is of the standard construction familiar in the art and needs no further description. The passages leading from the casing to the train-pipe, the auxiliary reservoir, and the brake-cylinder are respectively indicated by the letters *tp*, *ar*, and *bc*. The main-valve piston-stem 25, reciprocating in the valve-chamber 15, is notched to make room for the slide-valve 21, and the rear end of its flattened neck 24 carries a lug 28 for engagement with the slide-valve 21. The slide-valve has a port 33, controlled by the graduating-valve 26, carried by the main-valve stem 25, all as in the ordinary standard construction.

The present invention does not affect the normal operation of the valve in service applications of the brake.

As is well known to those familiar with the art the brake is applied by admitting compressed air from the auxiliary reservoir to the brake-cylinder, which is accomplished by slightly reducing the pressure in the train-pipe. This pressure is normally the same on both sides of the piston 36 by reason of the small by-passage around the piston through which air is fed to the auxiliary reservoir. The pressure being reduced on the right side of the piston 36, however, causes it to move to the right, closing the by-passage and moving the slide-valve 21, which first closes the exhaust-port leading from the brake-cylinder passage 23 and then opens port 33 to admit air from the auxiliary reservoir to the brake-cylinder. The amount of air admitted may be controlled by the graduating-valve 26 without moving the slide-valve farther, as will be understood without further explanation.

An emergency-valve seat is provided on the outer end of the main-valve bushing 38, which has an annular open port 11, leading through the chamber 12 directly to the passage to the brake-cylinder. It also has an

annular port 20, opening directly to the chamber 9 of the check-valve 10, communicating with the chamber 4 and the train-pipe. Underneath the main-valve piston 36 and loosely surrounding its stem 25 I provide an emergency-valve with head 37, having a short hollow flange-stem 39, working in the bushing 38 and provided with a soft packing 18, seating over the ports 17 20. This emergency-valve head 37 extends a little beyond the bushing and works inside a depending ring 35, screwed into a flange on the under side of the piston 36, and therefore carried fixedly thereon. This ring 35 has an inturned flange 34, which engages the head 37 of the auxiliary valve to lift the same off its seat.

The operation will now be clear. Under any ordinary service operation of the valve the emergency-valve 37 remains in place, since the movements of piston 36 have a large range without bringing the flange 34 into engagement with the said valve; but on a sudden and a large reduction of pressure in the train-pipe and passages 4 7 16 and chamber 8 the piston moves fully to the right, whereupon the valve 37 is lifted off its seat, opening the ports 17 and 20. The air is then admitted from the auxiliary reservoir through the passage 14, the annular crevice 20^a, and port 17 directly to the passage 12 and to the brake-cylinder, and since the port 17 is larger than the crevice 20^a the pressure in the chamber 4 and train-pipe will open the check-valve 10, and thus be supplied until the brake-cylinder pressure nearly equals that in the train-pipe, when valve 10 will close. The position of parts on an emergency application is shown in Fig. 2, wherein the dotted direction-line indicates the course of the air from the auxiliary reservoir and the full line that from the train-pipe into the brake-cylinder passage. On restoration of the pressure in the train-pipe the parts return to their position shown in Fig. 1, as will be evident.

By this device I avoid the necessity of packing more than one piston and save considerable leakage, besides lessening the number and complexity of parts. I am also enabled to enlarge the valve-piston without increasing the size of the casing, and the friction-surface of the emergency-valve is lessened. The parts are also more easily accessible and cheaper of construction.

Other devices have provided for lifting the emergency-valve partly by means of the main-valve piston; but in the action of the former the latter merely formed part of the piston-surface and the emergency-valve was provided with a separate piston and packing therefor. Besides avoiding such complex and clumsy structure my single piston renders it certain that the emergency-valve cannot open until the proper time.

Having thus described my invention and illustrated its use, what I claim, and desire to secure by Letters Patent, is the following:

1. A triple valve provided with an annular emergency-valve loosely carried upon, and entirely operated by, the piston of the main slide-valve.

2. In a triple valve the combination with a main-valve piston of an annular emergency-valve located on the reservoir side of said piston and unseated by the extreme movement of said piston.

3. In a triple valve the combination with a main valve and an operating-stem therefor, of a piston on said stem, carrying within said piston and surrounding the stem, an annular emergency-valve, with means attached to the piston for unseating said valve.

4. In a triple valve a single piston operating a main slide-valve, said pistons having projections to engage and unseat an annular emergency-valve located beneath the piston and surrounding the stem thereof, substantially as described.

5. A triple valve provided with a single piston, a main service-valve, and an emergency-valve surrounding the stem of the piston and located under the piston, both said valves being directly operated by said piston.

6. In a triple valve the combination with a main-valve piston having a depending projection, of an emergency-valve located within said projection and having a head or flange to engage the same when the piston is moved.

7. In a triple valve a main-valve piston provided with a projecting ring having an inturned flange to engage an emergency-valve located inside said ring.

8. In a triple valve a main-valve piston provided on its reservoir side with a flanged ring screwed on the piston and inclosing an emergency-valve adapted to engage the flange of the ring, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of the two subscribing witnesses.

PAUL SYNNESTVEDT.

Witnesses:
CLARENCE A. WILLIAMS,
CHAS. H. EBERT.