(No Model.)

J. F. CARPENTER.

VALVE FOR AIR BRAKES.

No. 478,846. Patented July 12, 1892.

Fig. 1

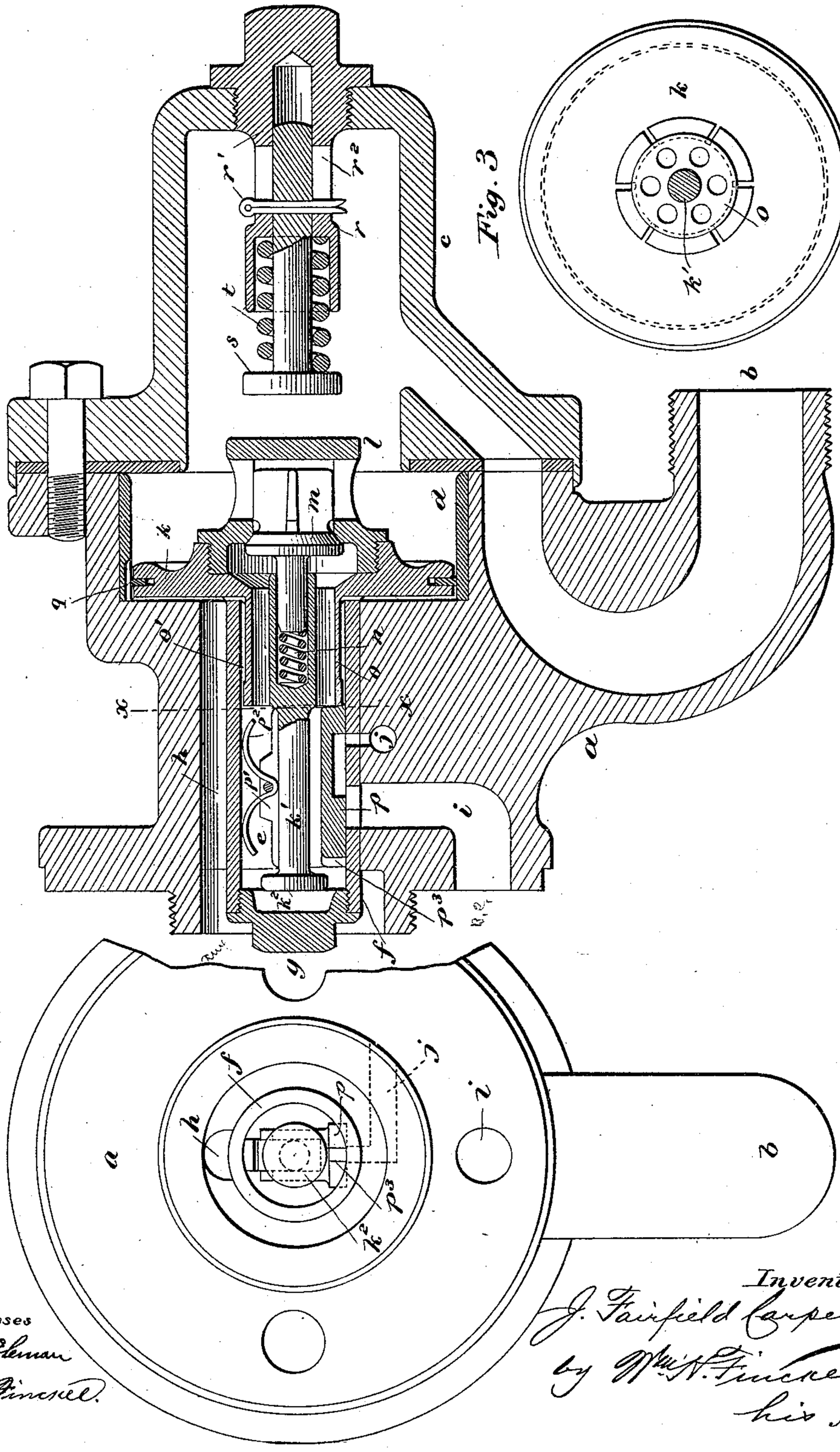

Fig. 3

Fig. 2

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UNITED STATES PATENT OFFICE.

JESSE FAIRFIELD CARPENTER, OF WASHINGTON, DISTRICT OF COLUMBIA.

VALVE FOR AIR-BRAKES.

SPECIFICATION forming part of Letters Patent No. 478,846, dated July 12, 1892.

Application filed March 18, 1892. Serial No. 425,410. (No model.)

To all whom it may concern:

Be it known that I, JESSE FAIRFIELD CARPENTER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented a certain new and useful Improvement in Valves for Air-Brakes, of which the following is a full, clear, and exact description.

This invention relates to that class of automatic air-brake valves for railway-trains which are now commonly known as "quick-acting," and the object is to render certain the application and release of the brake.

The main features of the invention are the contraction of the effective equivalent of reservoir-pressure in the application of the brake in such manner as to obtain through the aid of a check-valve and independent passages a supply of pressure from the train-pipe, and the provision of a spring stop or buffer for assisting in the releasing movement of the valve to insure a quick release of the brakes, these features entering into combination one with the other and with the other parts of the valve, substantially in the manner and for the purpose hereinafter set forth and claimed.

In the accompanying drawings illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is a longitudinal section; Fig. 2, an end view with the end cap removed; and Fig. 3, a sectional elevation of the piston-valve alone, looking toward the right of line $x\,x$, Fig. 1.

The valve-casing a is supplied with the train-pipe nipple b, bonnet c, piston-chamber d, reservoir-chamber e, bushing f, end cap g for such bushing, auxiliary reservoir-passage h, cylinder-port i, and exhaust-port j, substantially as usual. The piston k has a cage l, in which is arranged the check-valve m, normally seated by the spring n, and said piston is provided with a trunk o, perforated longitudinally to open communication between the reservoir-chamber e and the check-valve and so on to the piston-chamber. This trunk fills the reservoir-chamber between the slide-valve p and the piston, excepting for a slight circumferential space o', which communicates with a passage q, leading over the piston from the piston-chamber when the piston is in releasing position, Fig. 1. The center of the trunk is recessed to receive the stem and the spring n of the check-valve. The slide-valve p has wings p', which embrace the stem k' of the piston, and a spring p^2 and collar k^2 complete the union of the slide-valve and piston. The slide-valve is made with a groove p^3 in line with the cylinder-port in order to provide for a graduated application of the brake.

In the bonnet c is a recessed guide-piece r, containing a longitudinally-movable buffer or stop s, connected thereto by a pin r', fixed to the stem of the buffer and playing in a slot r^2 in the guide. The buffer is normally projected toward the piston by a strong spring t, supported in the guide, and the said buffer is in line with the cage l of the piston.

If the brake is to be applied quickly, a considerable reduction of pressure in the train-pipe is made in the usual way, and this results in so reducing the pressure in the piston-chamber d that the superior reservoir-pressure is free to return through passage h, and to act to move the piston to the right from its position in Fig. 1 against the buffer s, compressing its spring t, and moving it also to the right, whereby, also, the slide-valve is moved and communication is opened between the reservoir and the brake-cylinder through the passages h, o', p^3, and i. Now as the small space around the piston's trunk is the only avenue of escape from the axiliary reservoir to the cylinder it is obvious that the pressure in the slide-valve chamber e will soon be reduced, (owing to retardation in the inflow relatively to the large outflow.) Hence the check-valve m will be opened and the train-pipe pressure will flow in through it and the perforated trunk and thence into the cylinder. After a certain reduction of pressure has been made in the train-pipe the check-valve will be seated. In the meanwhile pressure from the auxiliary reservoir has continued to pass through the passage h and around the trunk into the cylinder until the brake is fully applied, and the spring-buffer is then free to act to force the piston to a middle position. To release the brake, the pressure in the train-pipe is increased, thereby forcing the piston to the end of its return stroke, (to the left as in Fig. 1,) moving the slide-valve to open the cylinder-port to the

exhaust and permit the cylinder-pressure to escape to the atmosphere. It will be observed that in this releasing of the brakes the increased air-pressure in the train-pipe is aided and rendered certain in action by the mechanical buffer, and so the brake is not only applied quickly, but is equally quickly released and released with a certainty and quickness not hitherto attainable in this class of mechanism. If the trunk *o*, or some equivalent contraction of the chamber *e*, or retardation and decrement of pressure from the auxiliary reservoir were not used, the reservoir-pressure would so fill the chamber *e* that the check-valve could not be opened, and if the stop or buffer *s* with its strong spring were omitted the brake might not be released for the pressure from the train-pipe could pass the check-valve in such quantity as soon to balance the piston before it had gone back toward its releasing position, whereas the buffer assists in returning the piston. Moreover in slight or graduated applications of the brake the stop or buffer arrests the piston at a part of its full stroke, so that the cylinder-port is only slightly uncovered through the groove p^3, and the reservoir-pressure, therefore, can fill and keep full the chamber *e*, and thus prevent the opening of the check-valve, while at the same time keeping the brake applied as long as need be.

Another great advantage of this invention resides in the fact that by the partial return of the piston *k* by the mechanical action of the spring-buffer *s* alone, and before the increase in the train-pipe pressure to release the brakes has taken place, the cylinder-port *i* is almost closed by the movement of the slide-valve *p* consequent upon this partial return of the piston *k*, and hence even were the check-valve *m* to open, owing to the sudden increase of pressure in the train-pipe, the release of the brake will not be prevented, because the air-passage *i* to the brake-cylinder and the air-passage *h* to the auxiliary reservoir are so contracted that the air cannot pass with any degree of rapidity.

I am aware that the piston, slide-valve, and check-valve have been used before, but the piston had no trunk with contracted or restricted passage-way between the auxiliary reservoir and brake-cylinder, combined with a stop or buffer and its strong spring. These features combined with a check-valve constitute the gist and essence of my invention, both in the form shown and also in equivalent operative form, and I mean so to claim the invention herein.

What I claim is—

1. In a quick-acting triple valve having a direct through-passage from the train-pipe to the brake-cylinder and a check-valve normally closing the same, the combination, with a contracted passage from the reservoir to the brake-cylinder and a large passage from the train-pipe to the brake-cylinder through the same chamber, of a strong spring and stop to mechanically effect the partial return of the slide-valve of the triple valve, thereby nearly closing the said large passage from the train-pipe to the brake-cylinder, substantially as described.

2. In a quick-acting triple valve for air-brakes, the combination, with its piston, its slide-valve, and a slide-valve chamber having a contracted passage from the reservoir to the brake-cylinder, of a check-valve controlling a port between the train-pipe and the slide-valve chamber and preferably located in the piston itself, a spring buffer or stop arranged in the line of movement of said piston, and the piston-trunk, substantially as described.

In testimony whereof I have hereunto set my hand this 17th day of March, A. D. 1892.

J. FAIRFIELD CARPENTER.

Witnesses:
WM. H. FINCKEL,
EDWIN A. FINCKEL.