

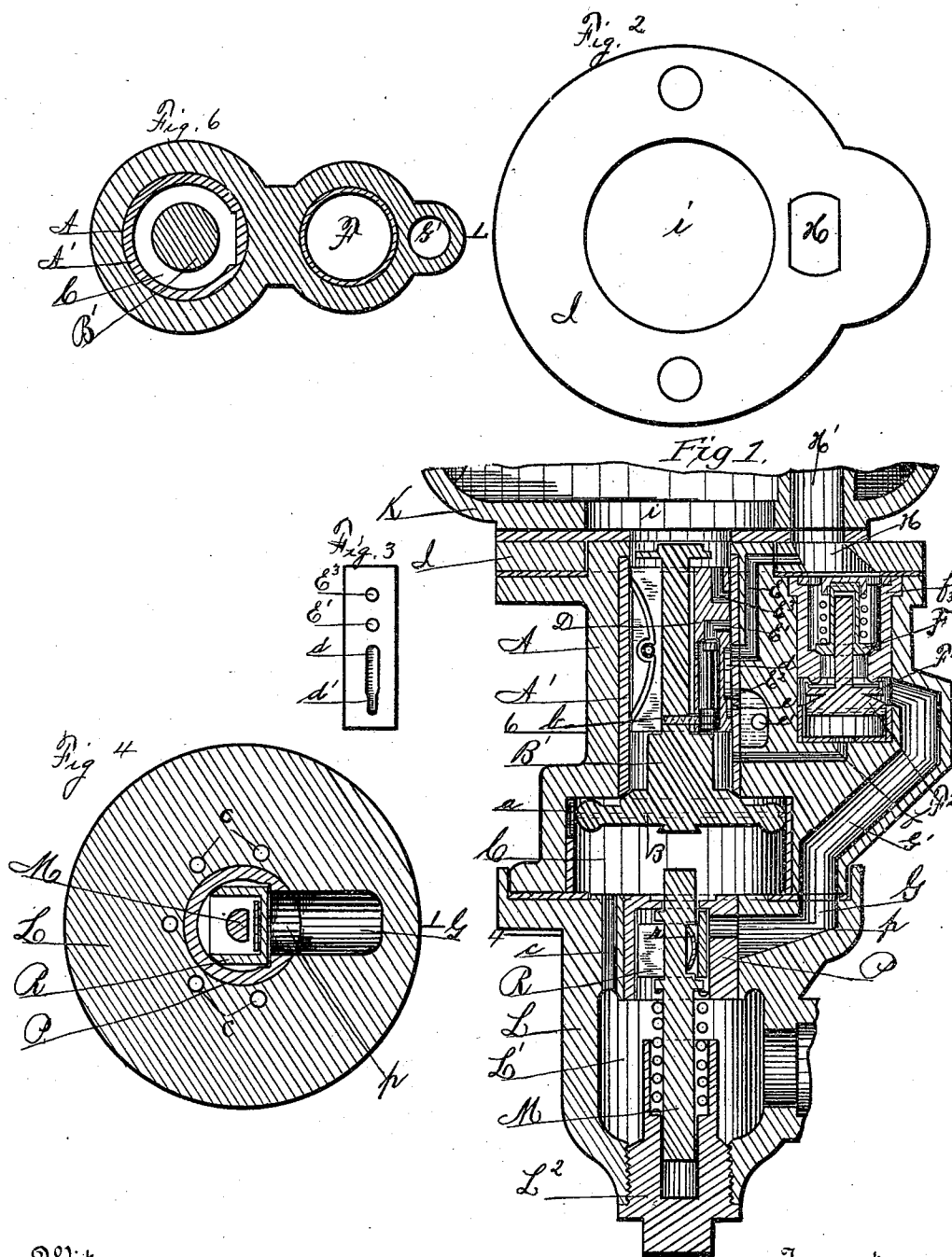
(No Model.)

2 Sheets—Sheet 1.

H. S. PARK.
FLUID PRESSURE BRAKE.

No. 554,086.

Patented Feb. 4, 1896.



Witnesses
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Inventor
Harvey S. Park

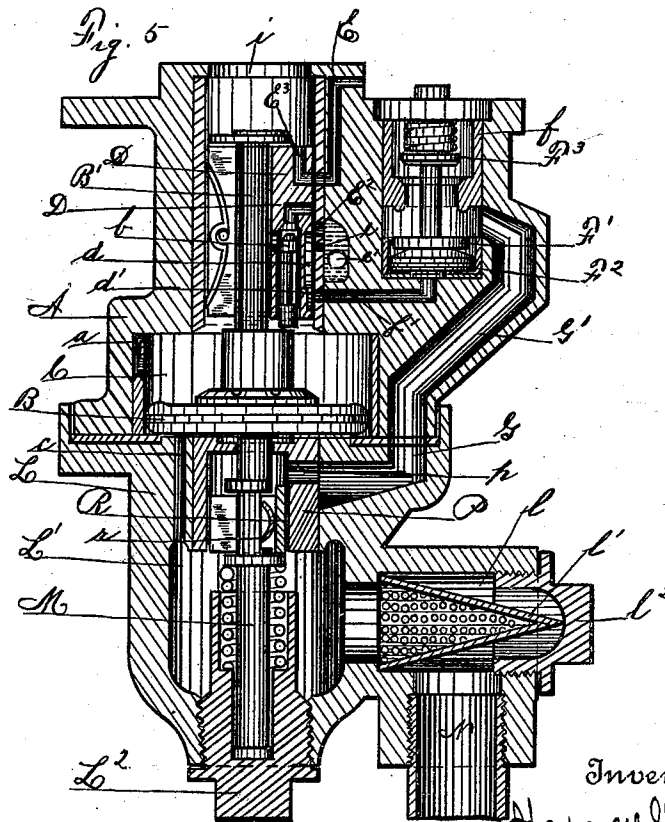
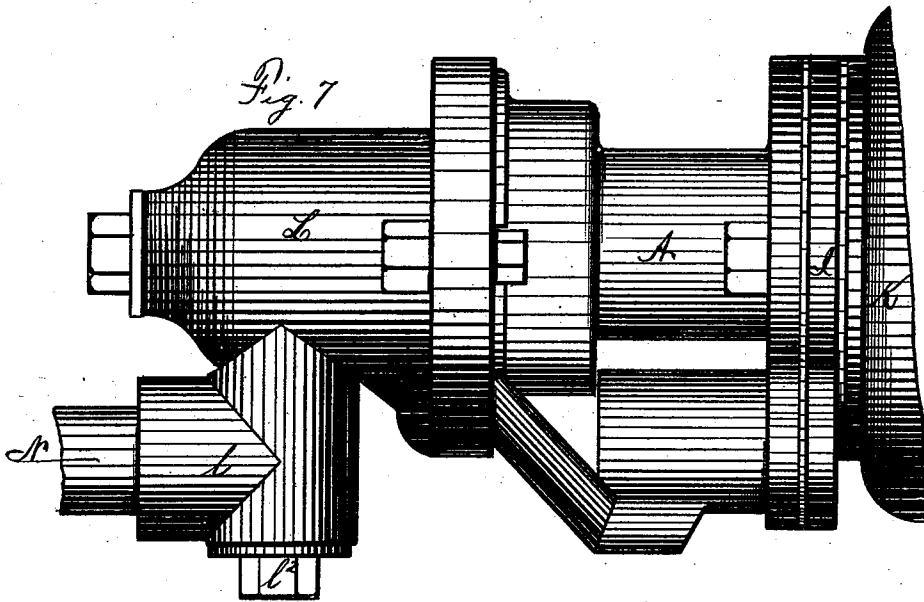
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2 Sheets—Sheet 2.

H. S. PARK.
FLUID PRESSURE BRAKE.

No. 554,086.

Patented Feb. 4, 1896.



Witnesses
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UNITED STATES PATENT OFFICE.

HARVEY S. PARK, OF CHICAGO, ILLINOIS.

FLUID-PRESSURE BRAKE.

SPECIFICATION forming part of Letters Patent No. 554,086, dated February 4, 1896.

Application filed July 15, 1895. Serial No. 556,048. (No model.)

To all whom it may concern:

Be it known that I, HARVEY S. PARK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented or discovered certain new and useful Improvements in Fluid - Pressure Brakes, of which the following is a specification.

The object of my invention is to provide a quick-acting brake which shall be simple in construction and positive and reliable in operation; and my invention consists in the features and details of construction herein-after described.

In the accompanying drawings, Figure 1 is a cross-section of the valve apparatus on line 1 of Fig. 4; Fig. 2, a view in elevation of a plate fixed between the apparatus and the car-reservoir. Fig. 3 is a view in elevation of the slide-valve for venting air from the car-reservoir to the brake-cylinder and from the brake-cylinder to the atmosphere and from the car-reservoir to a chamber in the passage from the train-pipe to the brake-cylinder and from this chamber to the atmosphere. Fig. 4 is a cross-section on line 4 of Fig. 1. Fig. 5 is a cross-section on line 5 of Fig. 6. Fig. 6 is a cross-section on line 6 of Fig. 1, and Fig. 7 a view in elevation of the valve apparatus fixed to a car-reservoir.

The brake-cylinder is fixed to the opposite end of the car-reservoir and connected with the valve apparatus by a passage leading through the car-reservoir.

The actuating of railway-brakes by means of a slide-valve operated by a piston, whereby the reduction of the train-pipe pressure sets the brakes and the restoration of the train-pipe pressure releases the brakes, is well known and need not be dwelt upon further than is necessary to describe my invention.

In the drawings, A is a wall or casing, forming the chamber in which the apparatus actuates.

A' is a bushing firmly fixed in the casing, fitted to be air-tight.

C is a chamber formed by the case and is in the form of a cylinder, having its upper part smaller in diameter than its lower part.

In the upper part is located and operated the slide-valve D, actuated by the piston B, working and operating in the lower part of the

chamber C, where the diameter is the greater. The slide-valve is actuated by means of the stem B', extending into and to the upper part of chamber C and provided with a shoulder on its lower end and a head on its upper end. The stem actuates the slide-valve D on its downward traverse by its head abutting the arms extending from the rear and upper part of the valve. This stem also actuates the slide-valve in its upward traverse by its shoulders abutting against the arms extending from the back of the slide-valve. These arms cross the chamber C and form a guide for the valve, whereby the latter may move downward and upward in a channel or guideway cut in the bushing A'.

In the casing is the passage E, leading to the brake-cylinder K, downward and into the chamber C, and from the chamber C is a passage E², leading through the wall or casing to the atmosphere. From the chamber C is also a passage e in the wall or casing leading to the atmosphere. The passages E² and e lead from the chamber C to a recess formed in the wall or casing, this recess being open to the atmosphere through the port e'. A passage f' leads from the chamber C through the wall or casing to a chamber F, also formed in the wall or casing.

The slide-valve D is provided with a passage E', which on the slide-valve's preliminary traverse forms a connection or passage between the car-reservoir and brake-cylinder by means of the passage E, thus admitting air to the brake-cylinder for service stops. The amount of air flowing through this passage E' may be controlled, if desired, by a graduating-valve b connected to the stem B'. The recess d in the slide-valve D connects the ports E and E², and forms an open way to the atmosphere from the brake-cylinder, whereby the brakes are released. The recess d and recess d' in the slide-valve D form a connection between the ports E² and e and passage f' when the slide-valve makes its full travel, and forms an open passage from the lower part of chamber F to the atmosphere.

A casing L is fixed to the lower end of casing A, closing its lower end and forming a chamber L', provided with a communicating side chamber l, into which is fixed the train-pipe N. Chamber L' has a passage or pas-

sages *c* communicating with chamber C. In chamber *l* is located a perforated dirt and dust screen *l'*, with its larger end inward and its small and closed end outward, so that dirt and dust entering from the train-pipe N will be deflected into a cup formed in a nut *l*², and screwed into the chamber *l* in such way that the nut can be removed and the screen can be taken out and cleaned without interfering with any other part of the apparatus.

A bushing P is fixed in the upper part of the casing L, fitting close so as to be air-tight. In this bushing is located and operated a slide-valve R actuated by a stem M located in the chamber L', this stem having shoulders that abut the valve as the stem moves downward and upward, whereby the valve is operated. This stem M has its lower end working in a guide formed in a nut L² screwed into the lower end of the casing L. The upper end of the stem works in a guide formed by an opening in the upper part of bushing P. The stem M actuates the slide-valve R in emergency stops by reason of the piston B abutting the stem and carrying it and the valve R with it to the full travel of the piston, at which time the valve R opens the port *p* in the bushing P, which port connects with the passage G formed in the casing L. The passage G connects with the passage G' formed in the wall or casing A. The passage G' extends upward, its upper end opening into chamber F, which communicates with the brake-cylinder by means of a flange or plate I, fixed between the car-reservoir K and the valve apparatus. This flange or plate has a passage *i* arranged to connect chamber C with the car-reservoir, and a passage H to connect chamber F with a passage H' leading through the car-reservoir to the brake-cylinder.

In the chamber F is located a tubular flange *f*, on which is seated a lift-valve F³, which remains seated when the brakes are set for service stops by air from the car-reservoir and lifts when air flows from the train-pipe to the brake-cylinder. A valve F' is fixed to a piston F² and seats against the under side of flange *f*, and is held to its seat by air from the car-reservoir entering through the passage *f'* into chamber F and against the under side of piston F². The piston is not fitted to chamber F so as to be perfectly air-tight, and the air will slowly pass the piston and enter the passage G', passage G, and passage *p* to the under side of the valve R, giving equal pressure on each side of this valve and balancing the valve. To hold the valve to its seat a spring *r* is provided, pressing against the valve and the stem M. A gasket is located in the bottom part of chamber F, on which piston F² seats when it has made its full downward travel, and forms an air-tight seating.

In operation the pressure is slightly reduced in the train-pipe, when the piston B will travel downward by the excess of pressure

on its opposite side, and its preliminary traverse will unseat the graduating-valve *b*, its further traverse moving the slide-valve D downward by reason of the head on its upper end abutting the valve. Piston B will continue its downward traverse until it abuts the stem M, when its movement will be arrested by the resistance of the spring around the stem. At this time the passage E' in the slide-valve D will connect with passage E, and the air from the car-reservoir will flow through the passages H and H' to the brake-cylinder and set the brakes. When the pressure in the car-reservoir has been reduced slightly lower than that in the train-pipe, by reason of the air flowing to the brake-cylinder, the piston will move upward, carrying the graduating-valve *b*, and close the passage E', and the brakes will remain set. On restoring the train-pipe pressure the piston B will carry the slide-valve D to its normal position, as shown in Fig. 1, and release the brakes.

To set the brakes quickly for an emergency a reduction in the train-pipe pressure is made to have the excess of pressure above the piston B to overcome the resistance of the spring around the stem M, and carry the slide-valves D and R with it to its full traverse. As the emergency slide-valve R opens the port *p*, the slide-valve D will connect the passages *f'* and *e* by means of recesses *d* and *d'* in the slide-valve D, thereby forming an open way from the lower part of chamber F to the atmosphere, when the air-pressure on the upper side of piston F² will force the piston downward and seat it on the gasket in the bottom part of chamber F. This will unseat the valve F' and form an open way from the train-pipe to the brake-cylinder through the passages *p* G G', chamber F, passages H and H' to the brake-cylinder, and the air from the train-pipe will lift the valve F³ and flow direct to the brake-cylinder. This will quickly empty the train-pipe and set all the brakes. In the position to which the slide-valve D has now traveled it will connect the passage E³ with the passage E and car-reservoir air will flow to the brake-cylinder. When the car-reservoir air is added to the train-pipe air in the brake-cylinder, the pressure in the brake-cylinder will be greater than that in the train-pipe, and the valve F³ will close. The position of all the parts in this last operation is shown in Fig. 5.

On the restoration of the train-pipe pressure piston B will travel upward, and the spring around the stem M will move the stem upward to its normal position, as shown in Fig. 1, and close the port *p*, and as the slide-valve D moves upward it will first close the passage from the chamber F to the atmosphere. Its further travel will uncover the passage *f'* and the car-reservoir air will flow into chamber F and move the piston F² upward and seat the valve F', and the further travel of the piston B will carry the slide-

valve D to its normal position, as shown in Fig. 1, and release the brakes.

I have in this invention constructed in a railway-brake mechanism a valve apparatus for venting car-reservoir air direct to a brake-cylinder, in combination with a balanced emergency slide-valve for venting train-pipe air direct into the brake-cylinder, whereby the emergency-valve is moved with the same reduction of train-pipe pressure as is required to move the main valve, so that an emergency setting of the brakes is produced with but a slightly greater reduction of the train-pipe pressure than is required for service stops, the additional reduction being only sufficient to overcome the resistance of spring around the stem M and to overcome the frictional contact between the valve and its seat, existing on the under surface of the valve, except over the port *p*, thereby quickening the time for the emergency action of the brakes, and saving the train-pipe air that it may be vented into the brake-cylinder. Moreover, in my construction the port which is opened by the emergency-valve can be increased to any necessary amount without loading the valve.

Although I have described more or less precise forms and details of construction, I do not intend to be understood as limiting myself thereto, as I contemplate changes in form, proportion of parts, and substitution of equivalents, as circumstances may suggest or render expedient, without departing from the spirit of my invention; and, furthermore, where I have designated certain parts by their reference-letters in the specification or claims it is obvious that I do so for clearness and certainty and not as intending to limit myself to their particular form and location, as shown in the drawings.

I claim—

1. In a brake apparatus, the combination of a train-pipe, an auxiliary reservoir, a brake-cylinder, a triple valve and a balanced slide-valve actuated by the piston of the triple valve and independent of the main valve thereof, for controlling the admission of air direct from the train-pipe to the brake-cylinder.

2. In a brake apparatus, the combination of a train-pipe, an auxiliary reservoir, a brake-cylinder, a triple-valve device having a slide-valve adapted to control the admission of air from the auxiliary reservoir to the brake-cylinder, and a balanced emergency slide-valve independent of the said slide-valve of the triple-valve device, and adapted to control the admission of air direct from the train-pipe to the brake-cylinder.

3. In a brake apparatus, the combination of a train-pipe, an auxiliary reservoir, a brake-cylinder, a triple-valve device having a slide-valve adapted to control the admission of air from the reservoir to the brake-cylinder by its preliminary traverse and a balanced slide-

valve independent of the slide-valve of the triple device, and actuated by the triple-valve piston in its further traverse to admit air direct from the train-pipe to the brake-cylinder.

4. In a fluid-pressure brake, for actuating railway-brakes, a train-pipe, a car-reservoir, a brake-cylinder, and a slide-valve, for admitting air from the car-reservoir to the brake-cylinder, in combination with a balanced emergency slide-valve, for admitting air direct from the train-pipe to the brake-cylinder.

5. In a railway-brake mechanism, for actuating railway-brakes, the piston B, the stem M, in combination with the balanced emergency-valve R, the passage *p*, passage G, passage G', chamber F, passage H, and passage H', with means for actuating the piston, substantially as described.

6. In a fluid-pressure brake mechanism, for actuating railway-brakes, a balanced emergency slide-valve independent of the main valve, in combination with a balancing-valve.

7. In a fluid-pressure brake mechanism, for actuating railway-brakes, a balanced slide-valve, independent of the main valve thereof, controlling a port and passage from a train-pipe to a brake-cylinder, and a valve located in such passage operated by auxiliary-reservoir air and adapted to maintain a balanced condition for the slide-valve, proportionate to the area of the port controlled by the slide-valve.

8. In a fluid-pressure brake mechanism, for actuating railway-brakes, a balancing-valve, an emergency-valve, in combination with the main valve thereof, arranged to be unseated by the full travel of the main valve, and to be seated by the return of the main valve to its normal position.

9. In a brake system, the combination of a train-pipe, an auxiliary reservoir, a brake-cylinder, a triple valve having a piston, a main slide-valve and a balanced emergency slide-valve independent of the main valve, the piston in its preliminary traverse actuating the main slide-valve to admit reservoir-air to the brake-cylinder and in its further traverse contacting the emergency-valve to admit air direct from the train-pipe to the brake-cylinder.

10. In a brake apparatus, the combination of a train-pipe, an auxiliary reservoir, a brake-cylinder, a triple-valve device, a balanced slide-valve controlling a direct passage from the train-pipe to the brake-cylinder, such passage being provided with a chamber, a balancing-valve located therein, a passage leading from the triple-valve chamber to the balancing-valve chamber and means for exhausting the chamber behind the balancing-valve at an emergency stop.

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