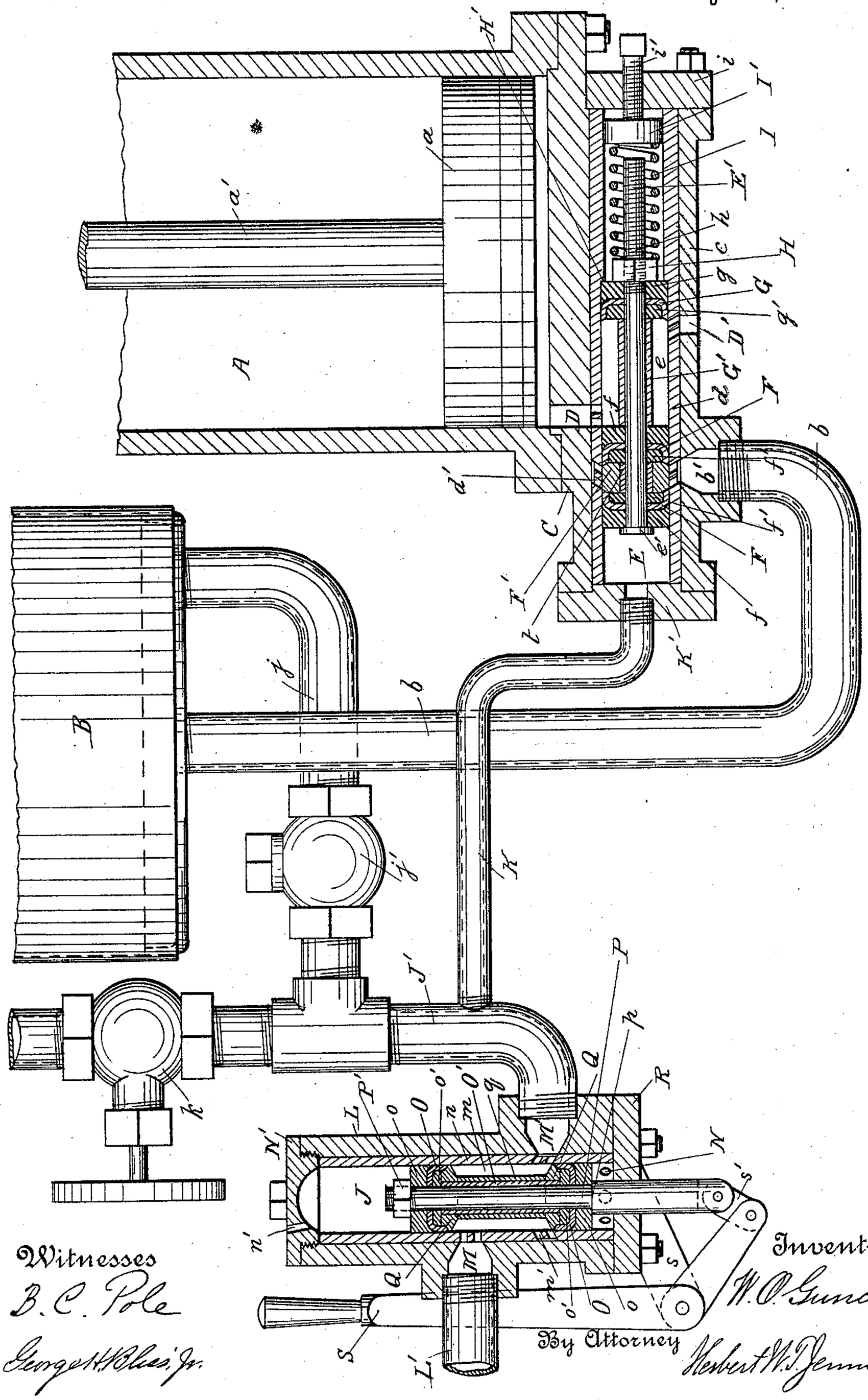
(No Model.)

W. O. GUNCKEL.

AIR BRAKE.

No. 582,391. Patented May 11, 1897.



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AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 582,391, dated May 11, 1897.

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To all whom it may concern:

Be it known that I, WINFIELD O. GUNCKEL, a citizen of the United States, residing at Terre Haute, in the county of Vigo and State of Indiana, have invented certain new and useful Improvements in Air-Brakes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to the valve mechanism used for operating the air-brakes of railroad-trains; and it consists in the novel construction and combination of the parts hereinafter fully described and claimed.

The drawing shows a sectional plan view of the valves and their connections.

A is an air-brake cylinder provided with a piston *a* and a piston-rod *a'*, of any improved construction. A similar cylinder A is secured under each car, and its piston-rod is operatively connected with brakes which bear against the car-wheels in any approved manner. These brakes are not shown, as they do not form a part of the present invention. The brakes are pressed against the wheels by admitting compressed air to the cylinder A and are released when the compressed air is let out of the cylinder.

B is an auxiliary reservoir for compressed air. A similar reservoir B is secured under each car.

C is the cover of the air-brake cylinder, and *c* is the casing of the cylinder supply-valve, formed on or otherwise rigidly secured to the said cover.

A supply-pipe *b* is secured to the reservoir B and is connected to the supply-port *b'* of the casing *c*.

D is the supply-port leading from the casing *c* into the cylinder, and D' is the exhaust-port leading from the casing *c* into the air. A liner *d* is preferably forced into the casing *c*, so that the various ports can be formed of series of drilled holes to avoid undue wear upon the cup-leathers of the valve. A blind port *d'* is arranged opposite the supply-port *b'* and is connected with it by an annular groove, so that the air-pressure is equal on both sides of the valve.

E is the automatic air-supply valve. This valve is preferably a piston-valve and has an annular air-space *e*, through which the air rushes from the port *b'* to the port D and from the port D to the port D'.

E' is the valve-stem, provided at one end with a head *e'*. F are two cup-leathers on the end of the stem E' next to the head *e'*. These cup-leathers are held in position by two external disks *f* and two internal disks *f'*, and *t* is a tube for holding the disks *f'* at the proper distance apart.

F' is a block of elastic material, such as india-rubber, interposed between the internal disks and the edges of the cup-leathers. This spring-block operates to press the beveled edges of the cup-leathers outwardly against the periphery of the casing *c*. A single cup-leather G is mounted on the stem E', on the other side of the space *e*, between two disks *g* and *g'*, which are similar to the disks *f* and *f'*.

G' is a tube encircling the stem E' and retaining the cup-leathers and disks at the proper distance apart. The stem has a screw-threaded portion *h*, and H is a nut screwed thereon and clamping the tube, the cup-leathers, and the said disks and block in position.

H' is a shoulder or stop for the disk *g* to bear against. I is a spring bearing against the nut H and against a cap I'. A cover *i* closes the rear end of the casing *c* behind the cap I', and *i'* is a set-screw screwed through the cover *i* and bearing against the cap I'. This screw is for the purpose of adjusting the pressure or tension of the spring I.

J is the main valve, and J' is the main air-supply pipe. The pipe J' extends the full length of the train and is connected to each reservoir B by a similar branch pipe *j*, having a check-valve *j'*, so that air cannot pass backward from any reservoir B into the pipe J'.

K is a relief-pipe connected to the pipe J' and to the cover K', which closes the front end of the casing *c*. Each supply-valve is provided with a similar relief-pipe K, and *k* is a stop-valve in the main air-pipe J' on the opposite side of the first relief-pipe K from the main valve J. Additional stop-valves can be inserted in the main air-pipe J at different points in the length of the train, if desired.

The main valve J is preferably under the control of the engineer on the steam-engine. The main valve is preferably a piston-valve which slides in a casing L. L′ is a pipe connected to the casing L and to any approved source or supply of compressed air, such as the main reservoir of an air-compressor on the engine.

The main valve J is preferably a piston-valve and has an annular air-space *m*. The casing L has an air-port M, connecting it with the air-pipe L′, and another air-port M′, connecting it with the main air-pipe J′. A blind port *m′* is formed opposite the port M′ and is connected with it by an annular groove, so that the air-pressure is equal on both sides of the valve. The casing L is preferably provided with a liner *n*, so that the various ports can be formed of small drilled holes to avoid undue wear upon the cup-leathers of the valve.

N is the air-outlet below the valve J.

N′ is the top cover of the casing L, which is provided with a small air-hole *n′*, which serves as a vent-hole and also for the purpose of oiling the valve.

The main valve J is provided with two similar cup-leathers O, secured between external disks *o* and internal disks *o′*.

O′ is a tube or pipe interposed between the disks *o′* and holding them at the proper distance apart.

P is the valve-stem, which passes through the said disks and tube and is provided with a shoulder *p*.

P′ is a nut screwed on the upper end of the stem P and clamping the said disks and tube against the shoulder *p*.

Q are washers, of elastic material, such as india-rubber, arranged inside the beveled end portions of the cup-leathers, and *q* is a tube encircling the tube O′ and holding the washers Q in position. The washers Q force the beveled edges of the cup-leathers into contact with the casing.

R is the bottom cover of the casing L. The stem P passes through this cover and is operated by any approved means. S is a hand-lever pivoted to a lug *s* on the cover R and pivotally connected with the lower end of the stem P by a link *s′*.

Cup-leathers are preferably used to keep the piston-valves air-tight in their casings, as they are not cut away so quickly by the sand or dust which is carried into the valves by the compressed air as metal packing-rings, and they are easily replaced when worn out.

The operation of the devices is as follows: When the main valve J is in the position shown, the compressed air is admitted from the pipe L′ through the ports M and M′ into the main air-pipe J′ and relief-pipe K. The reservoir B is filled with compressed air, and the air-supply valve E is propelled to the right in its casing against the pressure of the spring I until it strikes against its stop. When the parts are in this position, the brakes are not in action. In order to admit compressed air to the cylinder A to operate the brakes, the main valve is raised in its casing until the port M′ is placed in communication with the outlet N. The pressure of the air in the main and relief pipes is now lowered, and the supply-valve E is moved over to the left by the spring I, closing the exhaust-port D′ and connecting the ports *b′* and D. The compressed air from the reservoir B now rushes through the pipe *b* and ports *b′* and D into the cylinder and causes its piston and piston-rod to actuate the brakes. Whenever the train parts asunder, all the brakes are applied automatically, because the main air-pipe J′ is broken and the air escapes from the relief-pipes. The use of the stop-valve *k* is to provide a means for closing the main pipe when the engine and front car have parted from the rest of the train, so that the brakes of the front car may be released to let the engine back up and recouple to the rest of the train.

What I claim is—

1. The combination, with an air-brake cylinder, an auxiliary reservoir for compressed air, a piston-valve arranged between the said reservoir and cylinder, and a spring for operating the piston-valve in a direction permitting air to pass into the cylinder; of a main air-supply pipe, a check-valve arranged between the said main pipe and reservoir, a relief-pipe connecting the said main pipe with the opposite end of the said piston-valve from the said spring, and a main valve for controlling the pressure in the said main and relief pipes, whereby air is admitted to the air-brake cylinder when the pressure in the relief-pipe is reduced below the tension of the said spring, substantially as set forth.

2. The combination, with an air-brake cylinder, a cylindrical valve-casing connected to one end thereof, and a piston-valve slidable in the said casing; of a relief-pipe at one end of the said casing, a supply-pipe at one side of the casing, and a spring at the other end of the casing from the relief-pipe, said spring operating to move the valve into a position to permit air to pass from the supply-pipe through the valve-casing into the cylinder when the pressure in the relief-pipe is reduced below the tension of the said spring, substantially as set forth.

3. The combination, with a cylindrical valve-casing provided with a stop, a supply-port *b′*, an exhaust-port D′, and a cylinder supply-port D between the said ports; of a slidable piston-valve provided with a single annular space for connecting the port D with the ports *b′* or D′ alternately, a relief-pipe connected to one end of the said casing and permitting compressed air to enter and hold the valve against the said stop thereby connecting the ports D and D′, a spring operating to move the valve in the opposite direction when the pressure in the relief-pipe is reduced thereby closing the port D′ and connecting the ports *b′* and D, and an auxiliary reservoir

and pipe for supplying compressed air to the port b' separate from the relief-pipe, substantially as set forth.

4. The combination, with a cylindrical valve-casing provided with ports; of a slidable piston-valve comprising a stem, two cup-leathers at one end of the said stem, external and internal disks holding the said cup-leathers in position, a tube interposed between the two internal disks, a block of elastic material pressing outward the edges of the cup-leathers, a single cup-leather mounted on the said stem, an external and an internal disk for holding the single cup-leather in position, a tube surrounding the stem and holding the single cup-leather at a distance from the two cup-leathers, and means for securing all the said parts on the stem, substantially as set forth.

5. The combination, with a cylindrical valve-casing provided with ports; of a slidable piston-valve comprising a stem, two cup-leathers, internal and external disks holding said cup-leathers in position on the stem, a tube interposed between the two internal disks, washers of elastic material pressing outward the edges of the cup-leathers, a tube encircling the aforesaid tube and holding the said washers in position, and means for securing all the said parts on the said stem, substantially as set forth.

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

WINFIELD O. GUNCKEL.

Witnesses:
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