(No Model.) 2 Sheets—Sheet 1.

A. SILCOCK.

AUTOMATIC AIR BRAKE.

No. 468,701. Patented Feb. 9, 1892.

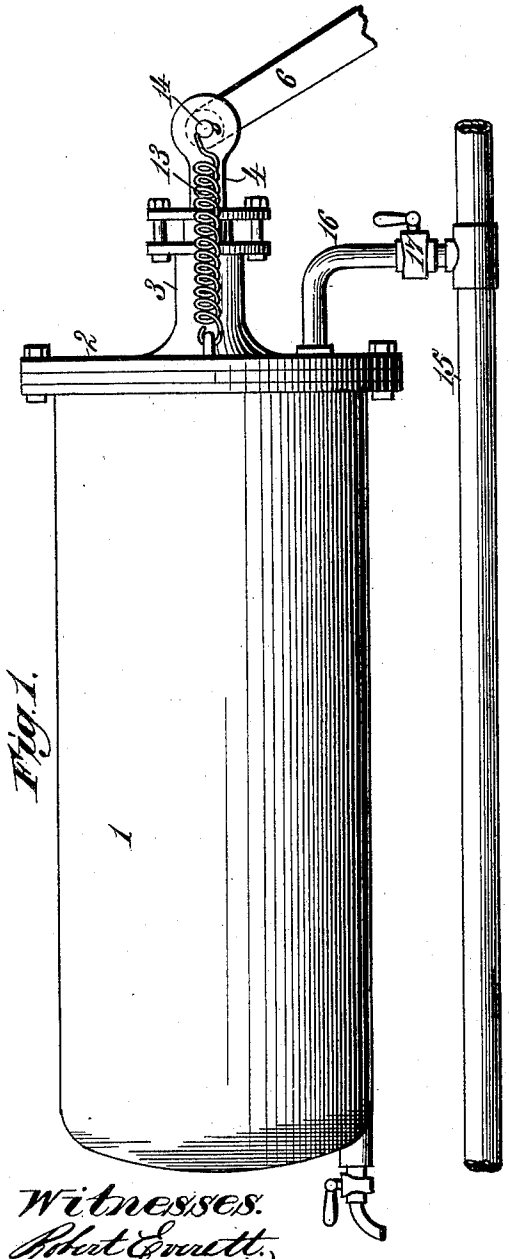

Fig. 1.

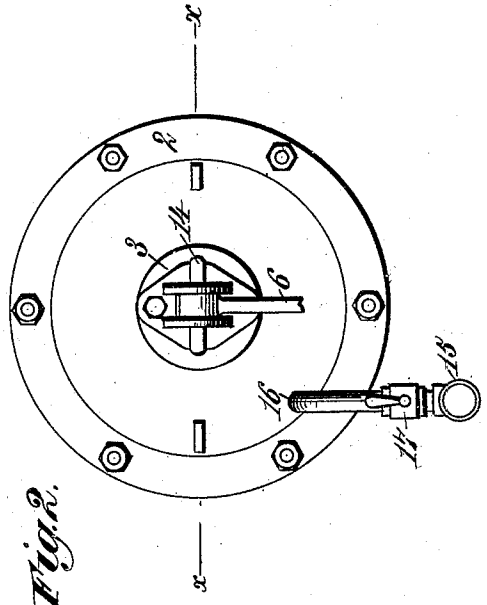

Fig. 2.

Witnesses.
Robert Everett.
J. A. Rutherford.

Inventor.
Aaron Silcock.
By James L. Norris.
Atty.

(No Model.) 2 Sheets—Sheet 2.

A. SILCOCK.

AUTOMATIC AIR BRAKE.

No. 468,701. Patented Feb. 9, 1892.

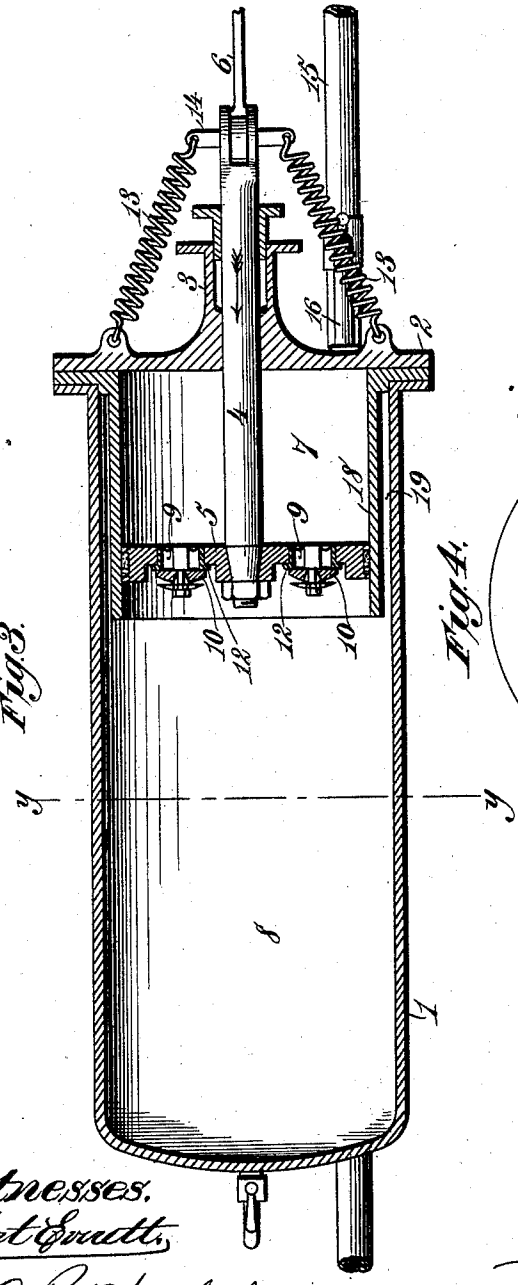

Fig. 3.

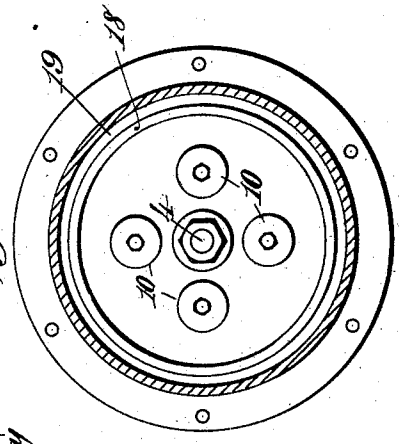

Fig. 4.

Witnesses.
Robt. Gantt.
J. A. Rutherford.

Inventor.
Aaron Silcock.
By James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

AARON SILCOCK, OF GROBY, ENGLAND, ASSIGNOR TO CHARLES G. EMERY, OF NEW YORK, N. Y.

AUTOMATIC AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 468,701, dated February 9, 1892.

Application filed January 2, 1892. Serial No. 416,845. (No model.) Patented in England November 18, 1885, No. 14,110.

To all whom it may concern:

Be it known that I, AARON SILCOCK, a citizen of England, and a resident of Groby, Leicester, in the county of Leicester, England, have invented certain new and useful Improvements in Automatic Compressed-Air Brakes, Apparatus, and Appliances Connected therewith Applicable to Railway, Tramway, and other Vehicles, (for which I have obtained a patent in Great Britain, No. 14,110, dated November 18, 1885,) of which the following is a specification.

This invention has for its object to provide a new and improved automatic brake mechanism for railway-cars; and it consists, essentially, in the combination, with a brake-cylinder, of a movable diaphragm or partition dividing the cylinder into a working chamber and an air-reservoir and having a passage-way for placing the chamber and reservoir in communication, a valve which admits air through the passage-way into the air-reservoir and prevents such air returning through the passage-way to the working chamber, the brake-operating rod connected with the diaphragm or partition for the purpose of actuating the brakes, and a spring which acts on the diaphragm or partition to force it and the rod in a direction to release the brakes for additionally compressing the air in the reservoir and holding the valve closed against its seat.

The invention is illustrated by the accompanying drawings, in which—

Figure 1 is a side elevation of the brake-cylinder, showing a portion of the train-pipe connected therewith. Fig. 2 is an end elevation of the same. Fig. 3 is a longitudinal central sectional view taken on the line x x, Fig. 2; and Fig. 4 is a transverse sectional view taken on the line y y, Fig. 3.

In order to enable those skilled in the art to make and use my invention, I will now describe the same in detail, referring to the drawings, wherein—

The numeral 1 indicates a brake-cylinder having at one end a suitable head 2, provided with a central stuffing-box 3, through which passes a brake-operating rod 4, which connects with a movable diaphragm or partition 5, arranged within the brake-cylinder. The connection 6 between the rod and the brakes may be of any well-known construction, and therefore it is not deemed necessary to illustrate the same. The movable diaphragm or partition, as here shown, is composed of a disk in the form of a piston rigidly secured at its center to the brake-operating rod and serving to divide the brake-cylinder into a working or brake chamber 7 and a closed air reservoir 8. The piston is provided with a series of passage-ways or ports 9, which serve to place the working or brake chamber 7 in communication with the closed air-reservoir 8. The passage-ways or ports are each provided with a suitable valve, here shown as a check-valve 10, adapted to rest against a valve-seat 12 in such manner as to permit the flow of air from the working or brake chamber 7 into the air-reservoir 8 and prevent the escape of air from such reservoir into the chamber. I have illustrated a series of passage-ways or ports and a series of check-valves, but do not wish to be understood as confining myself to any special number of valves or to any particular construction thereof so long as such valve is capable of operating as above set forth.

A series of spiral or other suitably-constructed springs 13 of suitable power are connected at one end with the cylinder-head 2 and at the opposite end with the brake-operating rod, as at 14. These springs are of the type known as "retractile springs," and consequently their tendency is to pull or draw the brake-operating rod in the direction of the arrow thereupon, which corresponds to the direction in which the rod moves to release the brakes. I have illustrated a pair of retractile springs 13 located outside the brake-cylinder; but I do not confine myself to any exact number of springs, as a single spring can be employed. Further, I do not confine myself to the location of the spring or springs outside the brake-cylinder, as they may be otherwise arranged, so long as their retractile power is exerted on the diaphragm or partition with a tendency to move the same in a direction to release the brakes and compress the air contained in the air-reservoir 8.

The train-pipe 15 is provided with a branch 16, which communicates with the working or brake chamber 7, and this branch is provided

with suitable valve 17 for the purpose of establishing and cutting off communication between the train-pipe and the working or brake chamber. The valve 17 may be of any ordinary or desired construction of automatic relief or exhaust valve, and since such valves are well known in the art to which my invention relates I do not deem it essential to more fully illustrate or describe the same.

In the example here illustrated the diaphragm or partition 5 is provided with a packing at its periphery in contact with the internal surface of a cylinder 18, arranged within the brake-cylinder 1 and separated therefrom by an intervening annular space 19; but I do not confine myself to the employment of this internal cylinder, since it is only essential that the diaphragm or partition be so constructed as to divide the brake-cylinder into a working or brake chamber 7 and an air-reservoir 8. If, however, the interior cylinder be employed, it should be of such length as to permit the requisite stroke of the diaphragm or partition for actuating the brakes. When the air-pressure is raised in the train-pipe and the brakes are held released, it is impossible for the valves 10 to move away from their seats, and consequently all danger of air escaping past the valves when the air-pressure in the train-pipe is reduced is entirely avoided. If the valves were employed without a spring or springs operating to move the diaphragm or partition in a direction to compress the air in the air-reservoir, the valves would likely move from their seats when the pressure at opposite sides of the diaphragm or partition is equalized. Therefore if the pressure in the train-pipe is reduced the air from the air-reservoir 8 might escape past the valves and render the brake mechanism defective and objectionable.

To explain the manner in which the closed air-reservoir 8 is charged and the operation of the retractile spring or springs to retain the valves 10 on their seats for preserving the air-pressure in the closed reservoir the following statement is made: When air at forty pounds pressure, for example, is introduced at the commencement, it will flow into the working or brake chamber 7 and through the passages 9 into the closed air-reservoir 8, thereby producing an equal pressure of forty pounds at each side of the diaphragm or partition 5. On allowing the air to escape from the chamber 7 (through the train-pipe to the outside) the diaphragm or partition moves toward the stuffing-box 3, the air in the reservoir 8 expands, thereby reducing the actual air-pressure therein, and the valves 10 instantly close against their seats 12, so that there is an air-pressure of forty pounds in the closed air-reservoir 8 and only an acting pressure of thirty pounds on the diaphragm or partition if the springs 13 have a pulling-power or retractile force of ten pounds. Consequently the diaphragm or partition will be moved by thirty pounds pressure in the reservoir 8 to its full extent for applying the brakes. In releasing the brakes the air from the train-pipe fills the chamber 7, the diaphragm or partition instantly recedes by reason of the power of the springs 13 and the fact of the reduced air-pressure in the reservoir caused by its expansion, as above stated, and the valves 10 are held against their seats. In other words, to release the brakes the air entering the chamber 7 equalizes the air-pressure in such chamber and the reservoir 8, and instantly the power of the springs 13 moves the diaphragm or partition in the direction to release the brakes, so that gradually the air in the reservoir 8 is additionally compressed and the valves 10 are held seated. The valves 10 are always held seated, except when air is renewed in the reservoir 8 to compensate for leakage from said reservoir.

In my invention the brake-operating-rod is rigidly or immovably fixed to the diaphragm or partition, so that these parts must move in unison, and by this construction the mechanism is materially simplified and rendered more reliable and economical than where a piston slides on a channeled brake-operating rod to apply and release the brakes.

Having thus described my invention, what I claim is—

The combination, with a brake-cylinder, of a movable diaphragm or partition dividing the cylinder into a working chamber and an air-reservoir and having a passage-way for placing the chamber and reservoir in communication, a valve which admits air through the passage-way into the air-reservoir and prevents such air returning through the passage-way to the working chamber, a brake-operating rod connected with the diaphragm or partition for the purpose of actuating the brakes, and a spring which acts on the diaphragm or partition to force it and the rod in a direction to release the brakes for additionally compressing the air in the reservoir and holding the valve closed against its seat, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 9th day of December, A. D. 1891.

AARON SILCOCK.

Witnesses:
HERBERT SILCOCK,
GEORGE PYM.