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AIR BRAKE.

(Application filed Sept. 7, 1901.)

(No Model.)

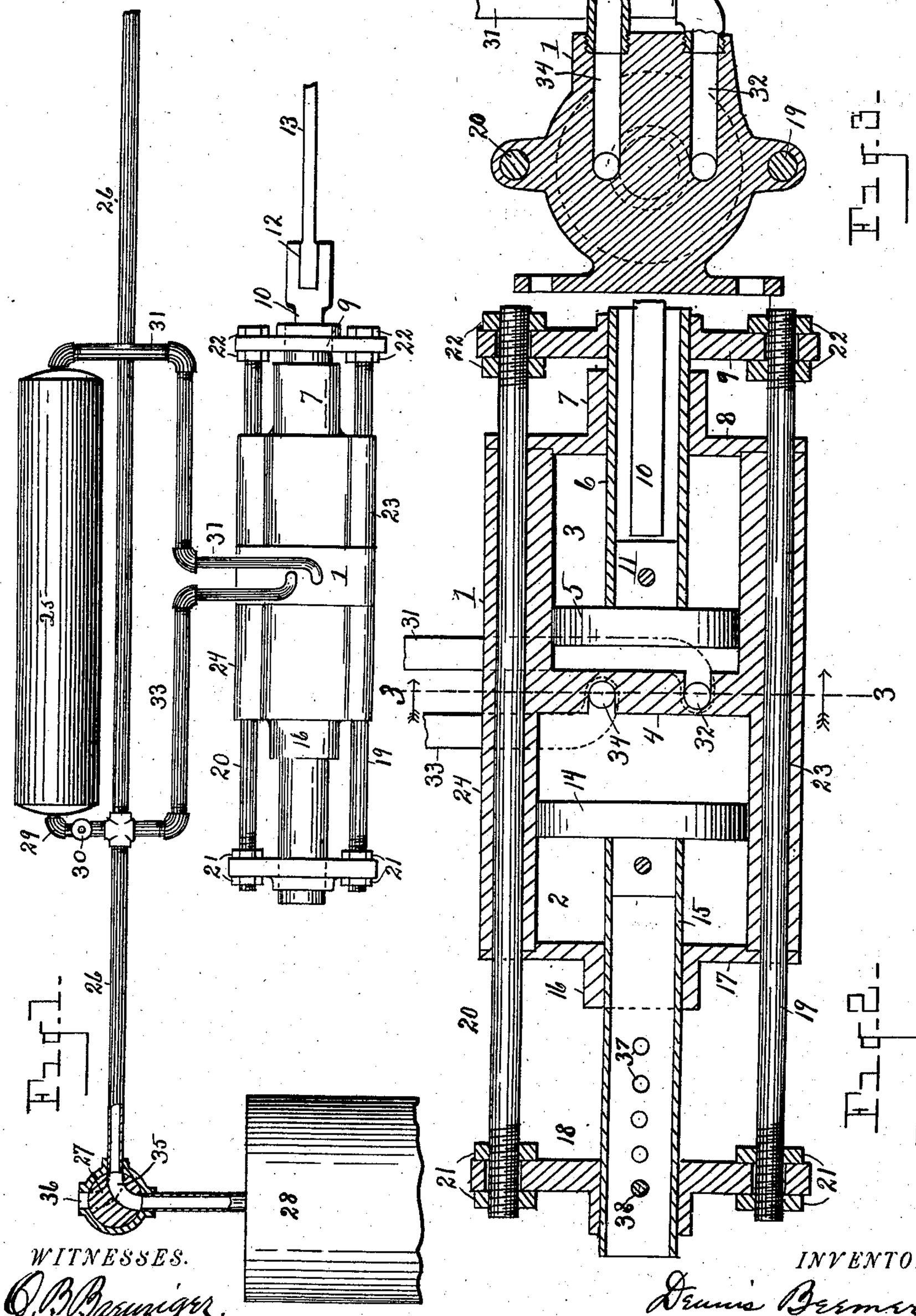

FIG. 1.

FIG. 2.

WITNESSES.

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AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 701,988, dated June 10, 1902.

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To all whom it may concern:

Be it known that I, DENNIS BEEMER, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Air-Brakes; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to air-brakes; and it consists in the construction and arrangement of parts hereinafter fully set forth, and pointed out particularly in the claims.

The object of the invention is to provide an air-brake system wherein the use of the triple valve is obviated and the carrying of excess pressure for the release of the brakes rendered unnecessary, the arrangement being such as to effect a release of the brakes upon the entrance of air under equal pressure into the braking and releasing cylinders and prevent a jamming of the brakes when a reduction is made in the train-pipe when making an application of the brakes.

The above object is attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of an air-brake system involving my invention. Fig. 2 is a longitudinal section through the braking and releasing cylinders. Fig. 3 is a transverse section, as on line 3 3 of Fig. 2.

Referring to the characters of reference, 1 designates a double cylinder having in its opposite ends the chambers 2 and 3, respectively, of different areas divided by a solid push wall 4, producing, in effect, two cylinders formed integral with a dividing-wall between them. The cylinder 3 will be termed the "brake-cylinder" and the cylinder 2 the "releasing-cylinder."

Within the cylinder 3 is a piston 5, having a tubular piston-rod 6, which is supported in and adapted to travel through a suitable guide 7 on the head 8 of the piston, said tubular piston-rod at its outer end being secured in a cross-head 9, adapted to travel therewith. Lying within the hollow piston-rod 6 is a bar 10, its inner end abutting against the stem 11 of the piston which lies within the hollow piston-rod and its outer end being connected at 12 to the brake-rod 13, attached to the brake mechanism. (Not shown.) The bar 10 may move independently of the piston 5, but is actuated thereby when said piston moves outwardly in the cylinder 3 to operate the brake mechanism.

The cylinder 2 is of larger area than the cylinder 3 and is occupied by a piston 14 of corresponding size. Attached to the piston 14 is a tubular piston-rod 15, adapted to slide through a guide 16, carried on the head 17 of the releasing-cylinder, the outer end of said piston-rod being secured in a cross-head 18, as clearly shown in Fig. 2. The cross-heads 9 and 18 are connected by the side rods 19 and 20, whose opposite ends pass through said cross-heads and are secured therein by nuts 21 and 22. The side rods 19 and 20 are adapted to slide longitudinally through suitable guides 23 and 24 on the sides of the double cylinder and, being connected through the cross-heads with the piston-rods 6 and 15, cause the pistons 5 and 14 to travel in unison.

Each car in the train is provided with a double or divided cylinder, as above described, and for each cylinder there is an auxiliary reservoir 25. Passing through the train and connected with all of the auxiliary reservoirs is the train-pipe 26, having at a suitable point therein the brake-valve 27 under the control of the engineer or motorman, which controls the passage of air from the main reservoir 28 into said train-pipe and the discharge of air therefrom. The main reservoir 28 carries at all times the requisite pressure for the operation of the brakes, which pressure is supplied by an air-pump or other suitable means. (Not shown.) One end of the auxiliary reservoir is connected with the train-pipe by means of a pipe 29, having therein a check-valve 30, which allows the air to flow from the train-pipe into said reservoir, but prevents a backward flow of air from the reservoir to the train-pipe. Leading from the opposite end of the auxiliary reservoir is a pipe 31, which communicates with a port 32, formed in the dividing-wall of the double cylinder and communicating with the braking-cylinder 3 between said wall and piston 5. Connected with the train-pipe 26 is a pipe 33, which communicates with a port 34 in the dividing-

wall 4, leading into the releasing-cylinder 2 between said wall and the piston 14.

With the brake-valve in the position shown in Fig. 1 the full pressure of the main reservoir is carried by the train-pipe and by the auxiliary reservoir and passes through the pipes 31 and 33 into the braking and releasing cylinders. The difference in the area of the pistons 5 and 14 occupying said cylinders, upon which the air-pressure acts, holds the brakes in the released position. In making an application of the brakes the brake-valve 27 is turned so as to cause the way 35 therein to register with the train-pipe 26 and the exhaust-port 36, as shown by dotted lines in Fig. 1, whereby the air in the train-pipe is allowed to escape until a sufficient reduction of pressure is made therein to enable the air-pressure in the auxiliary cylinder to overcome the difference in the area of the pistons 5 and 14 and move piston 5 outwardly, thereby actuating the brake-rod 13 and applying the brakes. As piston 5 moves outwardly piston 14 moves inwardly and is cushioned against the air remaining therein, so that said pistons are nearly balanced at the time piston 5 reaches the limit of its outward movement, obviating a jamming of the brake-shoes against the wheels and the skidding of the wheels upon the track, whereby their treads become flattened. Should the engineer discover after the first reduction of pressure in the train-pipe that the brakes were not applied with sufficient force, a still further reduction of pressure may be effected in the train-pipe, thereby overcoming the resistance in the releasing-cylinder 2 and enabling the piston 5 to exert a still greater force upon the brake shoes. After the brakes have been applied and it is desired to release them the brake-valve 27 is turned to the position shown by solid lines in Fig. 1, when the pressure in the train-pipe is restored from the main reservoir, so as to equal the pressure of the auxiliary reservoir, whereby piston 14, because of its larger area, is moved outwardly, thereby retracting piston 5 and releasing the brakes. When piston 5 is retracted in releasing the brakes, the air occupying the end of the cylinder between the piston and the push-wall 4 is forced back into the auxiliary reservoir through the pipe 31, thereby restoring the pressure in the auxiliary and obviating any escape of air from the brake-cylinder, effecting economy in the amount of air used. The travel of the piston 14 is regulated in accordance with the movement of the brake-shoes in passing from the position of release to that of application. Where the movement of the brake-shoes is but slight, a corresponding movement only of the piston 14 is required, and to provide for adjusting said piston to regulate its movement the piston-rod 15 thereof is provided with a number of apertures 37, through which a pin 38 is passed to secure said piston-rod in the cross-head 18. By removing the pin 38 the piston may be adjusted to correspond with the travel of the brake-shoes and again secured by the pin 38.

Having thus fully set forth my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an air-brake system, the combination of the double cylinders of different areas, pistons in said cylinders, side rods connecting said pistons whereby they are caused to travel in unison, one of said pistons being connected with the brake mechanism, means for introducing air under equal pressure into said cylinders between said pistons and the opposed ends of said cylinders and means for reducing the air-pressure in the cylinder of larger area.

2. In an air-brake system, the combination of a double cylinder having a solid dividing-wall and having cylinder-chambers in its opposite ends of unequal area, pistons occupying said cylinders one of which is connected with the brake mechanism, means for connecting said pistons to cause them to travel in unison, means for introducing air under pressure into said cylinders between the pistons and said push-wall and means for reducing the air-pressure in the cylinder of the larger area.

3. In an air-brake system, the combination of two cylinders of different areas divided by a solid push-wall, pistons of different areas occupying said cylinders respectively, means connecting said pistons to cause them to travel in unison, one of said pistons being adapted to be connected with the brake mechanism, an auxiliary reservoir communicating with the cylinder of smaller area between its piston and said push-wall, a train-pipe communicating with the cylinder of larger area and means for reducing the train-pipe pressure below that of the auxiliary reservoir.

4. In an air-brake system, the combination of a duplex cylinder having a solid push-wall between the opposed chambers, the chambers in said cylinder being of unequal area, pistons located in said chambers, said pistons having outwardly-extending piston-rods, cross-heads in which said piston-rods are secured, side rods connecting said cross-heads, one of said piston-rods being adapted to be connected with a brake mechanism, the other of said piston-rods being adjustably connected to its cross-head, ports in said push-wall communicating with the cylinders respectively, an auxiliary reservoir communicating with the port of the smaller cylinder, a train-pipe communicating with the port of the larger cylinder, a main reservoir or source of pressure, communicating with the train-pipe and with the auxiliary reservoir and means for reducing the pressure in the train-pipe.

In testimony whereof I sign this specification in the presence of two witnesses.

DENNIS BEEMER.

Witnesses:
FRANK WEDDIE,
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