

No. 742,722.

PATENTED OCT. 27, 1903.

C. H. NELSON.
AUTOMATIC AIR BRAKE.
APPLICATION FILED FEB. 27, 1903.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

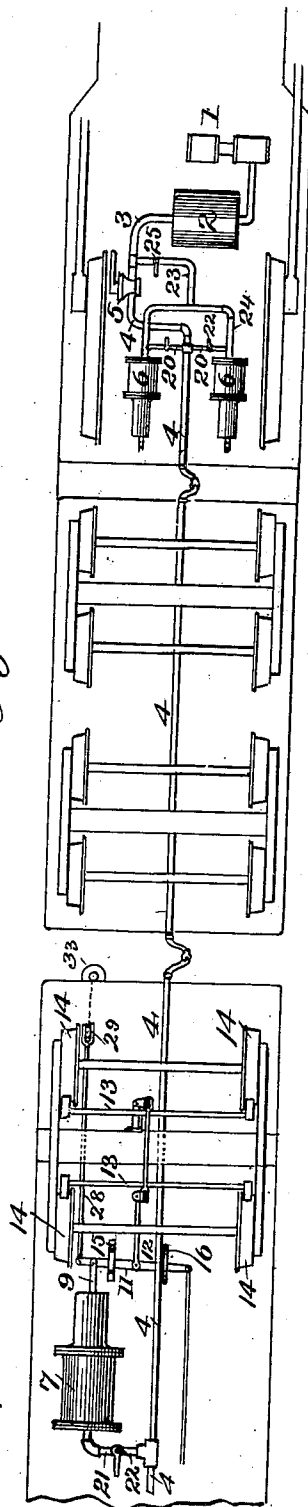


Fig. 2.

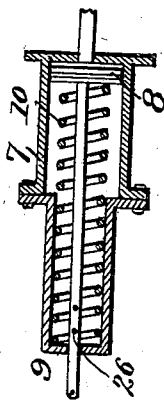
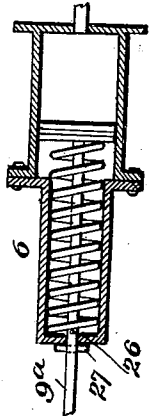


Fig. 3.



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2 SHEETS—SHEET 2.

Fig. 4.

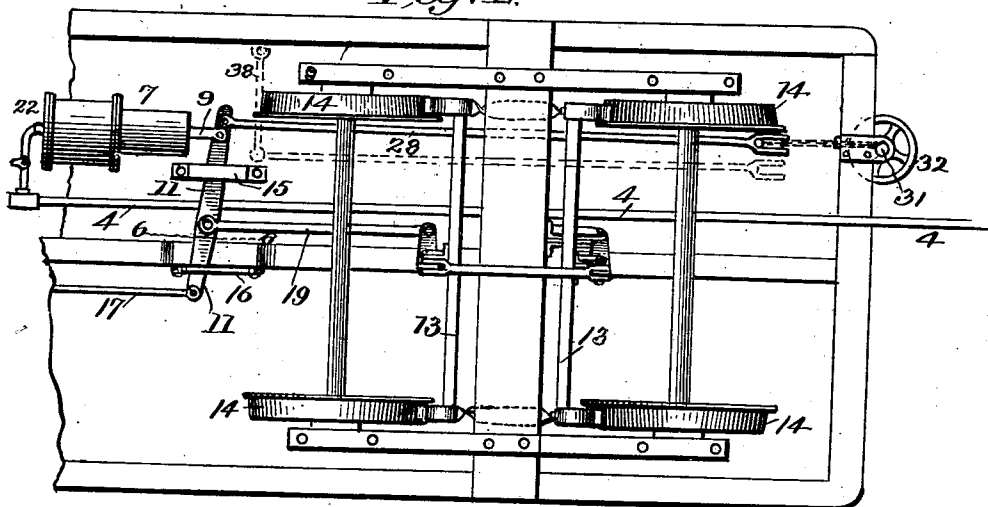


Fig. 6.

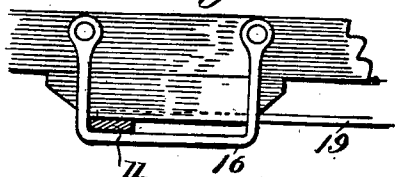


Fig. 7.

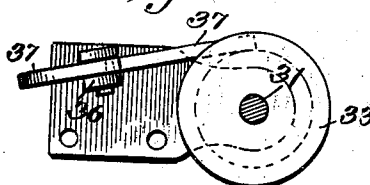
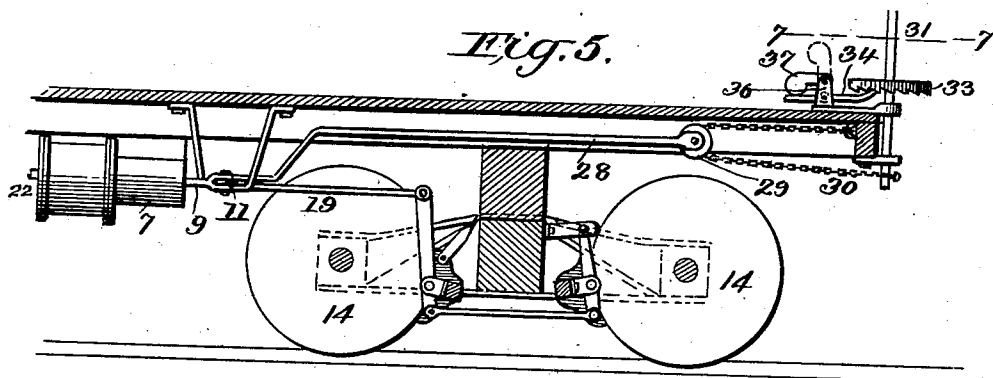


Fig. 5.



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CHARLES H. NELSON, OF TRINIDAD, COLORADO.

AUTOMATIC AIR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 742,722, dated October 27, 1903.

Application filed February 27, 1903. Serial No. 145,333. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. NELSON, a citizen of the United States, residing at Trinidad, in the county of Las Animas and State of Colorado, have made certain new and useful Improvements in Automatic Air-Brakes, of which the following is a specification.

My invention is an improvement in that class of automatic air-brakes in which an auxiliary reservoir and triple valve forming parts of the ordinary Westinghouse system are dispensed with, the brakes proper being applied by a powerful spring or springs, which are normally held out of action by air-pressure applied to a piston connected with said brakes and working in an air-cylinder which is duly connected with the train-pipe.

My invention has special reference to means for equalizing the release of air-pressure in the several brake-cylinders on the cars of a train, so that the brakes of the several cars may be applied simultaneously, also to means for equalizing the application or force of the several brakes of each car, and also to means for a quick release of air-pressure on the locomotive, as hereinafter described.

The invention is embodied in the construction, combination, and arrangement of parts operating as hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is mainly a diagrammatic representation of my invention, the same being shown in bottom plan applied to a locomotive and a car. Fig. 2 is a longitudinal section of one of the air or brake cylinders. Fig. 3 is a similar view of one of the locomotive air or brake cylinders, the piston being shown retracted. Fig. 4 is an enlarged bottom plan view of a portion of a car provided with my improved air-brake. Fig. 5 is a longitudinal vertical section of the car and apparatus shown in Fig. 4. Fig. 6 is an enlarged detail section on the line 6 6 of Fig. 4. Fig. 7 is an enlarged detail section on the line 7 7 of Fig. 5.

Referring in the first instance to Fig. 1, 1 indicates an air-pump which supplies the main reservoir 2. The latter is connected with the train-pipe 4 by a pipe 3, an engineer's valve 5 of the usual construction be-

ing applied thereto in the usual way. Two air-cylinders 6 6 are arranged on the locomotive, and a single cylinder 7 is provided for each car. As shown in Figs. 2 and 3, the locomotive-cylinders 6 and the car-cylinder 7 are provided interiorly with a piston 8, which is connected with a rod 9, that projects from the smaller end of the cylinder, and a powerful spiral spring 10 surrounds the rod 9, it being thus interposed between the piston 8 and the smaller end of the cylinder. In case it should be preferred, a second spring smaller than the one here shown may be inclosed within the larger. As shown in Figs. 1, 4, and 5, the piston-rod 9 is pivotally connected with the main brake-lever 11, which is practically fulcrumed centrally on the rod 12, which connects with the brakes proper, 13, which are applied to the wheels 14 of the front truck of the car. It will be understood that I do not propose to restrict myself to the use of any particular form of brakes proper, since various forms or styles may be employed, it being only necessary that the same shall be duly connected with the main brake-lever 11. A keeper or guide 15 is provided for the main brake-lever 11 at a point adjacent to the piston-rod 9. Another keeper, 16, which also performs the function of a stop, is arranged in connection with the opposite end of the main frame lever 11. (See Figs. 4 and 6.) As shown in Fig. 4, the end of the main brake-lever adjacent to the stop 16 is pivotally connected with a rod 17, which extends to and connects with the rear set of brakes proper. (Not shown.) It has been found in practice, that with the main brake-lever thus fulcrumed and connected with the piston of the air-cylinder and the respective front and rear brakes the brakes are not equally released, the leverage on the fulcrum-rod 19, which connects with the front set of brakes, being greater than the leverage or force applied to the rod 17. For this reason I have provided the stop 16, which, as will be understood by reference to Fig. 6, arrests the rearward swing of the main brake-lever 11 when the opposite end is acted upon by reason of the pressure of the air in the cylinder 7.

It will be noted from Figs. 1 and 4 that the

train-pipe is connected with the cylinders 6 and 7 by small pipes 20 and 21, respectively. These pipes have a less internal diameter than the train-pipe 4, so that the passage of air from the latter to the cylinders is slightly retracted. In other words, the circulation or movement of air in the train-pipe proper is freer or less restricted than in the branch pipes 20 21. Consequently, when pressure in the train-pipe 4 is released by opening the engineer's valve, there is a sudden movement of air simultaneously throughout the length of the train-pipe, and a simultaneous relief of air-pressure in the several cylinders throughout the train. In brief, it will be understood that normally, the pressure in the train-pipe which is also applied in each of the cylinders 6 and 7 throughout a train and that thereby the several pistons of the said cylinders are forced back until the tension of the compressed springs equals that of the air-pressure, and the brakes proper are consequently held out of action—that is to say, out of contact with the running wheels; but when the engineer's valve is turned to release pressure in the train-pipe 4 pressure is likewise released in the several cylinders, and the springs thereof are thus left free to apply their full force for swinging the main brake-lever 11, and thereby applying the brakes proper with corresponding force. Practice has demonstrated that if the branch or connecting pipes 20 21 between the several cylinders and the train-pipe have each the same internal diameter as the latter the brakes are not applied simultaneously throughout the train; but the brakes nearest the locomotive are first applied, then the next succeeding brakes, and so on. By my system the brakes are practically applied simultaneously throughout the train, and thus an important advantage is attained. It will be noted in Figs. 1 and 4 that a stop-cock is provided at 22, so that communication may be cut off between the train-pipe 4 and the cylinders whenever required.

In Fig. 1 I illustrate a provision whereby a quick release of the locomotive-brakes may be attained. A pipe 23 connects pipe 3 of the main reservoir 2 with a branch pipe 24, leading to the cylinders 6. A two-way cock 25 is provided in the pipe 23. The stop-cocks 22 in the branch pipes 20 may be open as usual; but by turning stop-cock 25 a more direct communication is opened between the main reservoir 2 and the cylinders 6 than is practicable through the pipes 4 and 20 by using the engineer's valve. Further, the flow of air in the pipes 23 24 is freer than in pipes 20, so that the locomotive-brakes are released quicker than in the usual way.

In Figs. 2 and 3 the piston-rods 9 and 9^a are shown provided with holes at 26, which are adapted to receive a pin 27, (see Fig. 3,) which may be inserted when it is desired to hold

the pistons retracted and the brakes out of action.

In Figs. 1, 4, 5 I show means for applying tractive force to the main lever 11 for the purpose of retracting the springs 10 within the brake-cylinders 7. For this purpose a rod 28 is pivoted to the main brake lever 11 and its outer end, and provided with a pulley 29, (see Figs. 4 and 5,) around which passes a chain 30, that is wound upon a hand-brake shaft 31. The latter is provided with a hand-wheel 32 (see Fig. 4) and also with a ratchet-wheel 33. (See Figs. 5 and 7.) A pawl 34 indicates the underside of the ratchet-wheel and is pivoted in a bracket 36. The said pawl is weighted at its engaging end, and a pivoted drop-weight 37 is arranged to act upon its outer end for holding it normally engaged. Such engagement is illustrated by full lines in Fig. 5. It will be understood that when the brake-wheel 32 is rotated the shaft 31 winds up the chain and applies great tractive force to the spring in the cylinder 7 and that it is securely located in any adjustment by means of the pawl 34. When it is desired to release the hand-brake, the pivoted counterbalance 37 is thrown up to the position indicated by dotted lines, which allows the weighted front end of the pawl 34 to drop out of engagement with the ratchet. In Fig. 4 the brake-rod 28 is shown arranged close to the truck-wheels 14; but, as seen in Fig. 5, the said rod has an upward bend or ratchet, so that practically there is no danger of the rod coming in contact with the truck-wheels. I illustrate in Fig. 4 an arrangement of the rod farther from the truck-wheels, and in such case I provide a supplemental lever 38, the same being pivoted to the side of the car-frame and also connected with the main brake-lever by a short link. By this arrangement it is practicable to arrange the brake-rod 28 at any required distance from the truck-wheels.

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

1. The combination with railway-cars and a train-pipe attached to and extending throughout the train, of air-cylinders, pipes connecting the same with the train-pipe, a spring and piston arranged in each of the several cylinders, a main brake-lever connected at one end with the piston-rod and at its opposite end and middle with the front and rear sets of brake mechanism, and a stop arranged for contact with such lever, whereby the rearward movement of the end of the lever which is farthest from the cylinder is arrested when the air-pressure is applied in the cylinder, substantially as shown and described.
2. The combination with the main reservoir, the train-pipe connected therewith, air-cylinders and branch pipes connecting the same with the train-pipe, of the supplemental quick-release mechanism consisting of the

pipe 23 and its branches which connect the main reservoir-pipe with the cylinders, and a two-way release-cock applied to the said pipe 23, and stop-cocks applied to the said branch pipes, substantially as shown and described.

5 3. The combination with brakes proper, of a cylinder, a piston and spring arranged therein, the piston-rod having transverse per-

forations, and a pin adapted for insertion therethrough for the purpose of holding the spring out of action, substantially as shown and described.

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Witnesses:

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