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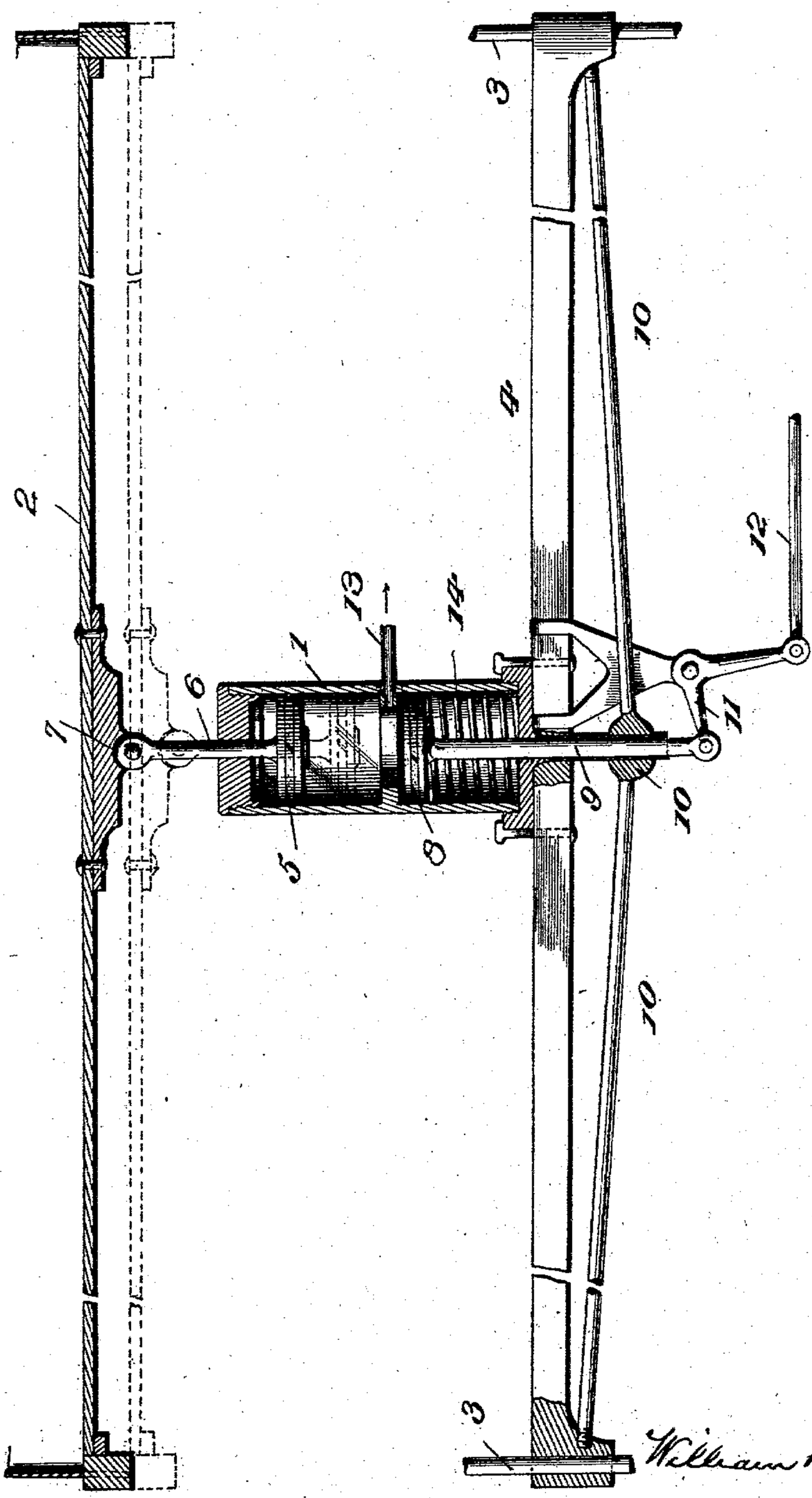
W. B. MANN.

LOAD REGULATED VALVE.

APPLICATION FILED JULY 10, 1902.

NO MODEL.



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UNITED STATES PATENT OFFICE.

WILLIAM B. MANN, OF BALTIMORE, MARYLAND.

LOAD-REGULATED VALVE.

SPECIFICATION forming part of Letters Patent No. 720,828, dated February 17, 1903.

Application filed July 10, 1902. Serial No. 115,089. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM B. MANN, of Baltimore, Maryland, have invented a new and useful Improvement in Load-Regulated Valves, which invention is fully set forth in the following specification.

My invention relates to air-brakes, and more particularly to air-brakes designed to proportion the braking power applied to the brake-shoes to the weight of the car and its load. In air-brakes as at present applied in the Westinghouse standard air-brake the same braking pressure is applied to the brake-shoe in a light car as in a heavy car, and in any given car the braking pressure per unit of surface remains the same whether the car is loaded or empty, whereas it is desirable that the braking pressure per unit of surface should be greater upon a heavy car than upon a light car, whether the weight is due to the weight of the car itself or to the fact that the car is loaded with freight.

The object of the present invention is to provide means whereby this desirable result may be accomplished.

With this object in view the invention consists in means whereby the capacity of the brake-cylinder may be adjusted to the weight of the car to which it is applied when the braking apparatus is originally installed and which thereafter will automatically adjust itself to the load on the car, so that the capacity of the brake-cylinder will be decreased in proportion as the weight is increased and, vice versa, the capacity of the brake-cylinder will be automatically increased as the load is decreased. The result of this will be that when a given amount of air at a given pressure is permitted to enter the brake-cylinder from the auxiliary reservoir the pressure upon the braking-piston per unit of surface will be greater when the cylinder is of smaller capacity than it will be when the capacity of the cylinder is greater. Various means may be utilized to thus adjust the capacity of the brake-cylinder. Preferably I employ a piston within the brake-cylinder in addition to the regular braking-piston, which first-named piston is so connected to the car that it enters farther into the brake-cylinder when the car is loaded than when it is empty, thereby decreasing the capacity of the brake-cylinder, the position of the piston within the cylinder being adjusted when the braking apparatus is applied to the car, so as to proportion the capacity of the cylinder to the weight of the car when empty. Preferably I mount the car-body upon the usual or any suitable springs and attach the regulating-piston to the car-body in such way that as the car settles on its springs by reason of the load thereon it acts to push the regulating-piston farther into the cylinder, thereby decreasing the volume of the cylinder between the regulating-piston and the braking-piston. A convenient means for accomplishing this consists of a braking-cylinder placed vertically under the car, with the piston-rod of the regulating-piston projecting upwardly toward and secured to the car-body, while the braking-piston projects from the lower end of the brake-cylinder and is attached by suitable lever mechanism to the brake-shoes.

While the inventive idea may be embodied in various mechanical forms, I have chosen the one last described as the one best adapted to the end in view and have illustrated the same in the accompanying drawing, which is a broken longitudinal section of a car-bottom and brake-cylinder with its supporting means, some of the parts being shown in side elevation.

Referring to said drawing, 1 is the brake-cylinder, of any usual or desired construction.

2 is the bottom of the car-body, which car-body is preferably mounted so as to pivot at its respective ends, as around pivots 3 3, and is capable of yielding upon any suitable form of spring under its load. The cylinder 1 is mounted in a vertical position and secured to the beam 4, here shown as extending from end to end of the car, and has a regulating-piston 5 therein, which piston is connected by a piston-rod 6 to the car-body by any suitable joint 7. When the braking mechanism is originally installed, the regulating-piston is positioned in the cylinder, with the piston-rod 6 shortened somewhat for a light car and lengthened for a heavy car, so that the volume of the cylinder between the lower face of the regulating-piston 5 and the upper face of the braking-piston 8 is in inverse proportion to the weight of the car. The braking-piston 8 is provided with a piston-rod 9, ex-

tending through the bottom of the cylinder 1 and through proper guides in the bottom 4 and a truss-rod 10 to the lever mechanism leading to the brake-shoes, which mechanism is here indicated by a bell-crank lever 1 and rod 12, it being understood that there is sufficient play in the bearings through the beam 4 and the truss-rod 10 to permit the slight play of the piston-rod 9 incident to the movement of the bell-crank lever 11. Air is admitted for braking purposes to the brake-cylinder 1 at 13 from the auxiliary reservoir, the admission being controlled by a suitable triple valve, which reservoir and valve are not shown. The braking-piston 8 operates against the tension of the usual brake-spring 14 in a way which will be well understood.

The operation of the device is as follows: Assuming that the regulating-piston 5 has been positioned (at the time of installing the apparatus) in the brake-cylinder 1 so as to afford the desired volume within the brake-cylinder when the car is empty, it will be understood that when the car is loaded the car-bottom 8 descends under the influence of the load to the position shown in dotted lines, thereby depressing the regulating-piston farther within the brake-cylinder to the position indicated in dotted lines. If now the engineer causes a given reduction to be made in the train-pipe, say, of five pounds, air will flow from the auxiliary reservoir to the brake-cylinder until the pressure in the brake-cylinder equalizes with that in the train-pipe—*i. e.*, a sufficient amount of air will pass from the auxiliary reservoir to the brake-cylinder to reduce the auxiliary reservoir-pressure five pounds. If this given amount of air had passed into the brake-cylinder when the car was empty and the regulating-piston 1 was in its position shown in full lines, the volume within which it might expand would be greater than if such air had been permitted to flow into the brake-cylinder with the regulating-piston in the dotted-line position, and it follows that the pressure per unit of surface within the braking-cylinder would be greater with the regulating-piston in the dotted-line position than in the full-line position—*i. e.*, the braking pressure upon the brake-piston would be greatest when the car is loaded. It will be observed that the amount of depression of the regulating-piston will vary with the load upon the car and that therefore the braking pressure per unit of surface will be greatest when the load is greatest and, vice versa, will be least when the load is least.

Having thus described the invention, what I claim is—

1. In an air-brake for railways, the combination of a brake-cylinder and means automatically adjusting the volume of the brake-cylinder in inverse proportion to the load on the car.

2. In air-brakes for railways, the combination of a brake-cylinder, a car-body yielding under the influence of its load, and means operated by the yielding action of the car-body to decrease the volume of the brake-cylinder as the load upon the car increases.

3. In air-brakes for railways, the combination of a brake-cylinder, a regulating-piston therein, with means advancing said piston within the cylinder as the load on the car increases.

4. In air-brakes for railways the combination of a brake-cylinder having a braking-piston therein, with a regulating-piston also in said cylinder, which piston is connected to the car-body and is advanced within the cylinder as the load upon the car increases.

5. In air-brakes for railways, the combination of a brake-cylinder and a braking-piston therein suitably connected to the brake-shoes, with a regulating-piston in said cylinder and a piston-rod connecting said regulating-piston to the car-body.

6. In air-brakes for railways, the combination of a brake-cylinder vertically supported under the car-body, a braking-piston therein suitably connected to the brake-shoes, with a regulating-piston in said cylinder having a piston-rod connected to the car-body whereby the position of said regulating-piston within the cylinder is regulated by the load on the car to decrease the volume of the cylinder between the pistons as the load upon the car increases.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

WILLIAM B. MANN.

Witnesses:
AUG. W. BRADFORD,
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