(No Model.)

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PRESSURE REGULATOR FOR RAILWAY BRAKES.

No. 468,618. Patented Feb. 9, 1892.

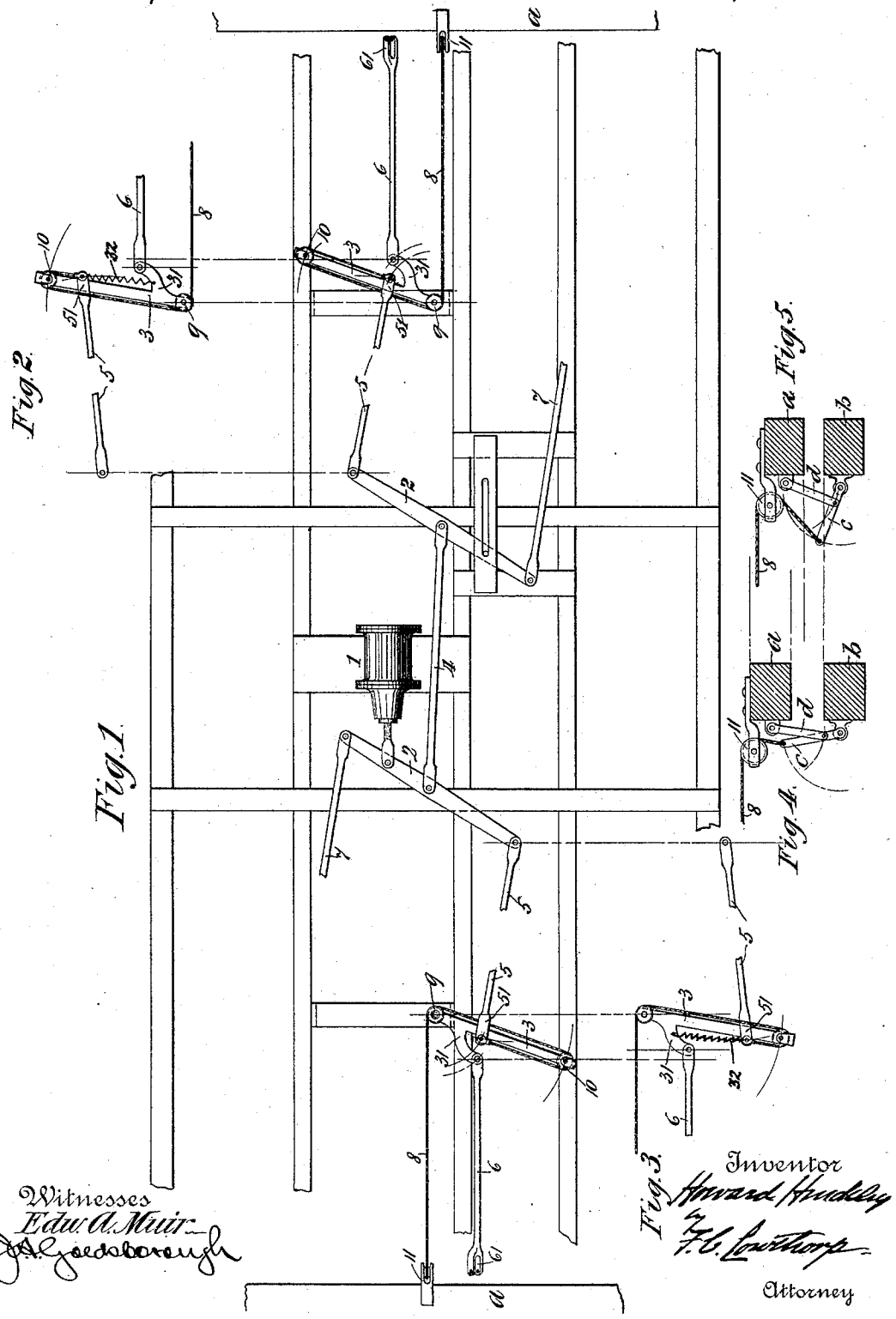

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses
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HOWARD HINCKLEY, OF TRENTON, NEW JERSEY.

PRESSURE-REGULATOR FOR RAILWAY-BRAKES.

SPECIFICATION forming part of Letters Patent No. 468,618, dated February 9, 1892.

Application filed September 13, 1890. Renewed July 20, 1891. Serial No. 400,061. (No model.)

To all whom it may concern:

Be it known that I, HOWARD HINCKLEY, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented certain new and useful Improvements in Pressure-Regulators for Railway-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.

The invention relates, particularly, to automatic power-actuated brakes, and has for its object to provide certain new and improved means for automatically regulating the pressure of the brake-shoes on the wheels proportionately to the varying weight and momentum of the car.

To operate effectually all brake systems require to be constructed so that the maximum power of the brakes shall approximate a certain relation to the maximum weight of the car. In those systems where the brake-power is constant it is therefore necessary to adjust this force with relation to the capacity of the car, the result of which is that when the power is properly proportioned to the work it will be required to do when the car is loaded it will be altogether out of proportion to what is required of it when the car is empty, being frequently so much in excess of what is actually needed that the rotation of the wheels is stopped and the car is dragged along, the fixed wheels sliding over the rails. It is to overcome this latter objection that my present invention is more especially designed; and it consists, generically, in causing the primary lever to exert a variable leverage upon the live lever, the mechanism for varying this leverage being controlled by the varying vertical positions of the car under the weight of different loads.

Specifically the invention consists in the organization, arrangement, and construction of parts hereinafter described and shown.

In an application filed September 17, 1890, Serial No. 365,225, I have shown and described an invention which in its generic features is similar to this. In the mechanism in which the invention is embodied in that case the link which usually connects the primary lever with the live lever is connected to a pivoted regulating-lever, which regulating-lever is connected with the live lever, the connection of the link with the regulating-lever being through intermediate mechanism, whereby the connection is shifted, so as to cause the primary lever to exert a variable leverage on the regulating-lever and through it on the live lever.

In the present embodiment of the invention I locate and arrange the regulating-lever somewhat differently, and I divide the link usually running from the primary to the live lever and interpose the regulating-lever between its ends, making the connection between the regulator and the primary lever adjustable.

In the accompanying drawings, Figure 1 is a bottom view of a car equipped with the well-known Westinghouse air-brake system. Figs. 2 and 3 are detail views of the regulating-lever, showing how the link is shifted therealong. Figs. 4 and 5 are sectional details of the car-truck, showing the shifting mechanism.

In the drawings, 1 denotes the brake-actuating mechanism—in this instance the cylinder of the Westinghouse compressed-air system. So far as this invention is concerned, however, any other kind or type of primary actuating mechanism may be regarded as the equivalent of that shown.

2 are the primary levers, connected together by the link 4, as usual. One of these primary levers is connected with the piston of the brake-cylinder in the usual manner.

7 denotes the rods leading to the hand-brakes.

Ordinarily the primary levers are connected with what are known as the "live" levers by a single link. In carrying out my invention, however, I divide this single link into two parts 5 and 6, and I interpose between the adjacent ends of these parts an intermediate regulating-lever 3. This is an ordinary lever of the second or third order. It is pivoted at one end to the car bottom or framing or to an extension of the truck, and is provided with a short arm 31, projecting laterally from one side and extending thence for a short distance toward its outer end, as shown. The link 6, which connects this regulating-lever with the live lever (not shown)

at 61, has a fixed connection with the regulating-lever by being pivoted to the arm 31. The link 5, which connects the primary lever 2 with the regulating-lever, instead of being connected to the latter at a fixed point, has a sliding or adjustable connection therewith. This connection is made by providing the link 5 with a yoke-shaped piece 51 at its outer end, which yoke encircles the regulating-lever and is adapted to slide to and fro along its length. It will thus be seen that the primary lever, instead of exerting a constant leverage upon the live lever, as heretofore, is by my present invention adapted to exert a variable leverage thereon. This variation of the leverage may be effected by means under the control of the brakeman, if desired. I prefer, however, to make its regulation entirely automatic, and this is accomplished in the present illustration of this invention by the following means:

To the spring-plank *b* or other part of the car-truck whose vertical position is not changed by variations in the weight of the load is pivoted the take-up lever *c*, similar to that described in my application filed August 13, 1889, Serial No. 320,557. To the end of the lever, as in the application just referred to, is connected one end of a rope 8, the other end of the rope being attached to the yoke-piece 51 on the link 5. The take-up lever is arranged to be operated by the rise and fall of the bolster *a*, as in the other application; but in this case I connect the bolster *a* with the lever *c* by a link *d*, which causes the lever to be actuated both ways by the bolster instead of only being depressed, as before. The chain or rope 8 passes on its way from the take-up lever *c* to the yoke 51 over a pulley 11, fixed at any convenient point on the car bottom or truck, it being shown secured by a suitable casting to the bolster.

The manner in which the rope is connected with the end of the link 5, so as to move its yoke 51 along the regulating-lever without interfering with the free action of the lever, is as follows: A friction-roller 9 is mounted coincidently with the pivot of the lever, and in the outer end of the lever another friction-roller 10 is arranged. The rope is lead directly from the roller 11 on the bolster to and around the roller 9 at the pivot of the regulating-lever. Thence it is carried along the lever to its outer end, where it is passed around the roller 10 and has its end attached to the yoke-piece 51. Arranged in this manner it will be noted that any strain on the lever imposed by pulling on the rope will be in the direction of the lever's length and will not affect its free swinging motion.

It is one of the advantages of this invention that it can be adapted to any of the systems now in use by simply dividing the link connecting the primary and live levers and interposing the regulating-lever, after which the take-up or shifting mechanism is put in place. This can be done at very small cost and by any mechanic of ordinary intelligence.

In applying the improvements herein described to cars the leverage and the amount of slack in the connections may be adjusted so that when the car is empty the two parts 5 and 6 of the connection between the primary and live levers will lie normally in a line with each other; but I prefer, especially if the car is of unusual maximum capacity or the difference between the minimum and maximum brake-pressures is great, to arrange and set the parts so that the point of connection between the link 5 and the regulating-lever may be normally somewhat nearer to the pivot of the regulating-lever. In this way I am enabled to provide for an available maximum brake-power of the highest degree for loaded cars and yet reduce the brake-shoe pressure for empty ones much below what is now common, thus entirely preventing the flattening of the wheels which results from sliding on the rails when locked. It is also to be noted that provision is made for the unequal loading of cars. To this end each truck has its own regulating-lever and take-up or shifting mechanism, so that in case the bolster of one truck is more depressed by the weight of the load than the other a correspondingly greater brake-pressure will be applied to the wheels of that truck.

The operation of the invention is as follows: With an empty car (the parts being in the position shown in Fig. 1) when the pull comes on the link 5 its point of connection with the regulating-lever travels on a shorter radius than the point of connection between the lever and the link 6, leading to the live lever. The effect of this, it will be seen, is to transmit the minimum amount of pressure to the brake-beams. When, however, the bolster is depressed by the increased weight of a load on the car, the take-up lever *c* is thrust downward, drawing on the shifting rope and pulling the yoke 51 farther out toward the power end of the regulating-lever, thereby taking up any slack in the connections and in effect lengthening the lever so as to greatly augment its transmission of power to the live lever. Thus, assuming a given amount of power in the primary brake-actuating mechanism, by the interposition of the above-described devices it is transmitted to the brake-beams through a lever whose length is practically variable, the extent of the variations being controlled entirely by the weight of the loaded car.

Any suitable slack-take-up may be used in connection with this invention, it being particularly adapted to that shown and described in my application filed August 22, 1890, Serial No. 362,715.

I wish it understood that I am not restricted to any of the details of the construction shown. The form of the regulating-lever may be changed and any other mechanism employed

to shift the yoke-piece 51 along the lever. If found necessary or desirable a spring 32 may be connected at one end near the pivot of the lever and at the other with the yoke, as shown in Fig. 2, and so as to restore the parts promptly to normal position when the brakes are released, and a turn-buckle or other device for shortening up the rope 8 may be used, if necessary. I believe myself to be the first to transmit the power applied to the primary lever in varying degrees to the live lever and thence to the brake-beams.

What I claim, and desire to secure, is—

1. In a brake system, the combination of the actuating mechanism, the primary lever, the live lever, and a regulating-lever, the latter being link-connected with the primary and live levers and the primary lever's connection with the regulating-lever being adjustable, substantially as described.

2. In a brake system, the combination of the actuating mechanism, the primary lever, the live lever, an intermediate pivoted regulating-lever, a fixed connection between the latter and the live lever, and an adjustable connection between the regulating-lever and the primary lever, substantially as described.

3. In a brake system, the combination of the actuating mechanism, the primary lever, the live lever, an intermediate pivoted regulating-lever, a fixed connection between the latter and the live lever, a connection between the regulating-lever and the primary lever, and mechanism whereby the latter connection may be adjusted along the regulating-lever, substantially as described.

4. In a brake system, the combination of the actuating mechanism, the primary lever connected thereto, the live lever, means connecting the primary lever with the live lever, and mechanism controlled by the vertical movement of the car for adjusting the connection, so that the primary lever exerts an increased leverage on the live lever as the car is depressed by the increasing weight of its load, substantially as described.

5. In a brake system, the combination of the actuating mechanism, the primary lever, the live lever, an intermediate pivoted regulating lever, a fixed connection between the latter and the live lever, an adjustable connection between the primary lever and the regulating-lever, and shifting mechanism operated by the vertical movement of the car to adjust the connection along the regulating-lever, substantially as described.

6. In a brake system, the combination of the actuating mechanism, the primary lever, the live lever, and a two-part connection between the latter, one part having a fixed connection with an intermediate pivoted regulating-lever and the other having an adjustable connection therewith, and shifting mechanism interposed between this connection and the car, whereby it is adjusted lengthwise along the regulating-lever as the vertical position of the car is varied, substantially as described.

7. In a brake system, the combination of the actuating mechanism, the primary lever, the live lever, a pivoted regulating-lever interposed between the two, a link connecting the live lever with a fixed point on the regulating-lever, a link connecting the primary lever with the regulating-lever, and means for adjusting the point of the latter's connection along the length of the regulating-lever, substantially as described.

8. In a brake system, the combination of the actuating mechanism, the primary lever, the live lever, a pivoted regulating-lever interposed between the two, a link connecting the live lever with the regulating-lever at a fixed point, a link connecting a primary lever with the regulating-lever, and a shifting mechanism interposed between the car-body and the link leading from the primary to the regulating-lever, whereby its point of connection with the regulating-lever is altered as the vertical position of the car changes, substantially as described.

9. The combination of the spring-plank, the bolster, the lever pivoted upon the former, and the link connected at one end to the bolster and at the other to the lever, substantially as described.

10. The combination of the spring-plank, the bolster, the lever pivoted at one end to the former and having the rope connected with its opposite end, and the link connecting the bolster with the lever and causing the latter to swing and operate the rope as the bolster rises and falls, substantially as described.

11. The combination of the actuating mechanism 1, the primary levers 2, the intermediate pivoted regulating-levers 3, the links 6, leading thence to the live levers, the links 5, connected at one end with the primary levers and having a sliding connection with the regulating-levers at the other, the rollers 9 and 10 in opposite ends of the pivoted regulating-levers, the ropes 8, connected at one end to the links 5 and passing around the rollers 9 and 10, the lever *c*, pivoted on the spring-plank and having the opposite end of the ropes connected thereto, and the links *d*, connecting the levers *c* with the bolsters, substantially as described.

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

HOWARD HINCKLEY.

Witnesses:
L. SCHOONOVER,
JOS. L. WATSON.