No. 692,948. Patented Feb. 11, 1902.

T. H. VAN DYKE.

AIR BRAKE SYSTEM.

(Application filed Mar. 11, 1901.)

(No Model.)

Fig. 1.

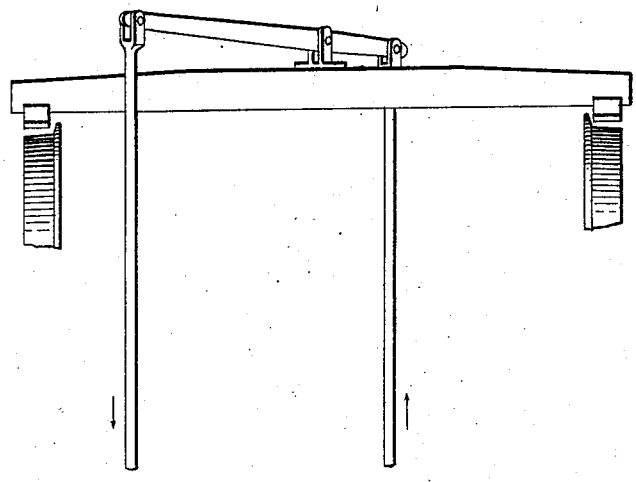


Fig. 2.

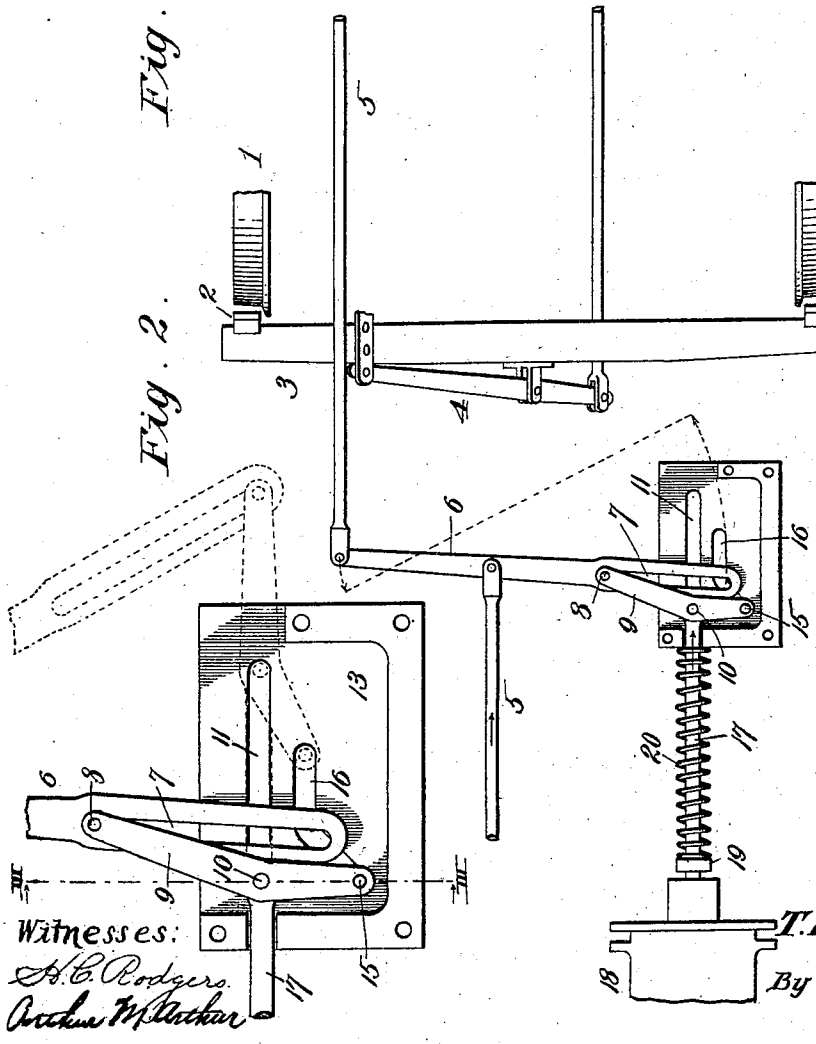
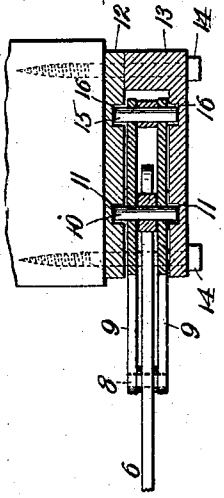


Fig. 3.



Witnesses:
H. C. Rodgers.
Archer M. Arthur.

Inventor
T. H. Van Dyke.
By Fisher & Thorpe
attys.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

THOMAS H. VAN DYKE, OF KANSAS CITY, MISSOURI, ASSIGNOR OF ONE-THIRD TO JOHN W. TAYLOR, OF KANSAS CITY, KANSAS.

AIR-BRAKE SYSTEM.

SPECIFICATION forming part of Letters Patent No. 692,948, dated February 11, 1902.

Application filed March 11, 1901. Serial No. 50,598. (No model.)

To all whom it may concern:

Be it known that I, THOMAS H. VAN DYKE, a citizen of the United States, residing at Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Air-Brake Systems, of which the following is a specification.

My invention relates to air-brake systems. As installed the air passing from the auxiliary reservoir into the cylinder operates the piston thereof with a gradually-diminishing power. In the initial part of the piston movement the slack is taken out of the system of levers constituting the brake mechanism, the brakes being eventually applied when the pressure of the piston is weakest. It is obviously a desideratum, therefore, to provide means whereby the slack may be taken up without the loss of very much power, because if this is possible the brakes can be operated with considerably less pressure than at present. I attain this object without increasing the stroke of the piston by decreasing the leverage of the brake mechanism during the period of taking up the slack when it is not needed and giving a greater leverage when the engagement of the shoes with the wheels takes place than is obtained with the systems now in use, the increase of leverage compensating for the diminished pressure exerted by the piston.

In order that the invention may be fully understood, reference is to be had to the accompanying drawings, in which—

Figure 1 represents a plan view of a portion of an air-brake system, the same being constructed in accordance with my invention. Fig. 2 is an enlarged view of a part of the same. Fig. 3 is a vertical section taken on the line III III of Fig. 2.

In the said drawings, 1 designates the wheels; 2, the brake-shoes; 3, the brake-beams; 4, the brake-levers, and 5 the draft-rods connecting the brake-beam levers, certain of said draft-rods being connected also to the floating lever 6 at such point that the movement of the opposite end of said lever shall exceed the piston movement, as hereinafter referred to, and said lever is provided with a longitudinal slot 7 at its widely-moving or free end. 8 designates a pin extending through said slot and carried by a slotted lever 9, preferably of obtuse-angle form, its angle occurring at a point between the ends of said slot 7 and carrying thereat a pin 10, whose projecting ends engage and are adapted to travel back and forth in the longitudinal slot 11 of a casing secured to the under side of the car, said casing being constructed, preferably, in the form of a plate 12 and a plate 13, secured by screws or bolts 14 to the car. The opposite end of lever 9 from that which carries pin 8 projects, preferably, beyond the contiguous end of lever 6 and carries a pin 15, whose projecting ends engage obtuse-angle guide-slot 16 in the casing, the rear portion thereof converging forwardly with respect to slot 11 and the fore portion extending parallel with said slot, as shown clearly in Figs. 1 and 2.

17 designates the stem or rod of the piston (not shown) of brake-cylinder 18, said stem extending in longitudinal alinement with slot 11 and having its front end pivotally connected to guide-pin 10 of lever 9, and spirally encircling said rod and bearing at its opposite ends against a collar 19 thereon and the casing is a spring 20.

When it is desired to set the brakes, which normally occupy the relative positions shown in Fig. 1, the engineer permits the air from the auxiliary reservoir to enter cylinder 18 and force the piston forwardly, overcoming in such action the slight resistance offered by spring 20. In the initial part of this piston movement lever 9 fulcrums on pin 15 and pressing against lever 6 at the inner end of its slot throws the latter about three-quarters of its full stroke before half of the piston movement has taken place, whereas with the systems at present in use it takes about three-quarters of the piston-stroke to impart corresponding movement to the floating lever, approximately two-thirds of the full stroke being usually consumed in taking up the slack, by which time the seventy pounds pressure usually maintained in the reservoir is reduced to approximately fifty on the piston. With my arrangement by decreasing the leverage on the floating lever during the period of slack, and thereby throwing it a greater distance with less piston movement, it is obvious that the fall of the pressure in the reservoir is pro-

portionately diminished, and consequently need not be originally so high. As the piston advances the leverage is increased on the floating lever, this increase being very gradual, however, because of the fact that the fulcrum end of lever 9—viz., pin 15—moves upwardly or convergingly toward pin 10, the result being that the movement of pin 8 downward in slot 7 is retarded. By the time pin 15 arrives at the angle of guide-slot 16 the floating lever has almost completed a stroke of much greater length than the piston movement and has left a distance to travel equal to that of the piston, the latter at such time applying its pressure against the extreme end of the floating lever, as shown clearly by dotted lines in Fig. 1. It will thus be seen that before there is any material diminution of pressure in the cylinder the slack is all taken up and the pressure remaining is sufficient to apply the brakes, the original pressure on the lever being lower than that necessary in the brake systems in common use. When the engineer manipulates the valve (not shown) to release the brakes, the relaxation through the entire brake mechanism causes it to resume its original position, the floating lever also swinging back to its original position, as shown in full lines, and in order that this relaxation of the brakes shall be more positive and reliable I provide the spring 20, which is of sufficient strength to return the piston-rod and lever 9 to their original positions and perhaps assist the floating lever in its return. It is obvious by reference to dotted lines, Fig. 2, that without the use of the spring to pull rearward on pin 10 through the medium of the piston-rod the tendency of the floating lever to resume its original position might cause the pin 15 to bind on the upper wall of its guide-slot, and thus prevent the proper relaxation of the brakes and the return of the piston.

From the above description it will be apparent that I have produced a means whereby air-brake systems may be operated at a lower pressure than those at present in use, which is of simple, strong, durable, and cheap construction and which may be applied as an attachment to the cars equipped with air-brake mechanism of the usual type, and while I have illustrated and described its preferred embodiment it is to be understood that the structure may be modified in various particulars without departing from the principle involved and without sacrificing any of its advantages.

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

1. The combination in an air-brake system, of a lever having a movable fulcrum suitably guided, having a relation with the floating lever whereby its leverage thereon is gradually increased, and pivoted at an intermediate point to the piston-rod, substantially as described.

2. The combination in an air-brake system, of a lever having a movable fulcrum suitably guided, having a relation with the floating lever whereby its leverage thereon is gradually increased, and pivoted at an intermediate point to the piston-rod, the path of said pivotal point converging with the path of the fulcrum-point, substantially as described.

3. In an air-brake system, the combination of a lever, having a movable fulcrum, having a relation with the floating lever whereby its leverage thereon is gradually increased, and pivoted to the piston-rod at an intermediate point, and means for withdrawing the piston-rod, substantially as described.

4. In an air-brake system, the combination of a casing, provided with a longitudinal guide-slot in the plane of the piston-rod, and with an angle-slot, the oblique portion of the latter converging forwardly with respect to the first-named slot, and having its remaining portion parallel with the first-named slot, a lever having a fulcrum upon one end engaging said second slot, and having a relation with the floating lever whereby its leverage thereon is gradually increased, and pivotally connected at an intermediate point to the piston-rod, the pivot-pin operating in said first-named slot, substantially as described.

5. In an air-brake system embodying a longitudinally-slotted floating lever, the combination of a casing having a longitudinal guide-slot in the plane of the piston-rod, and a companion angle-slot, the rear portion of which converges with respect to the first-named slot while its front portion extends parallel with the latter, a lever having a fulcrum-pin engaging said angle-slot, and having a pin engaging the slot of the floating lever, and pivoted at an intermediate point to the piston-rod, the pivot-pin at such point projecting into the first-named guide-slot, substantially as described.

6. In an air-brake system embodying a longitudinally-slotted floating lever, the combination of a casing having a longitudinal guide-slot in the plane of the piston-rod, and a companion angle-slot, the rear portion of which converges with respect to the first-named slot while its front portion extends parallel with the latter, a lever having a fulcrum upon and engaging said angle-slot, and having a pin engaging the slot of the floating lever, and pivoted at an intermediate point to the piston-rod, the pivot-pin at such point projecting into the first-named guide-slot, and a spring encircling the piston-rod and arranged to insure its withdrawal after the brakes are released, substantially as described.

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

THOMAS H. VAN DYKE.

Witnesses:
H. C. RODGERS,
G. Y. THORPE.