(No Model.) 2 Sheets—Sheet 1.

J. S. TROTT.

AIR BRAKE FOR CARS.

No. 536,002. Patented Mar. 19, 1895.

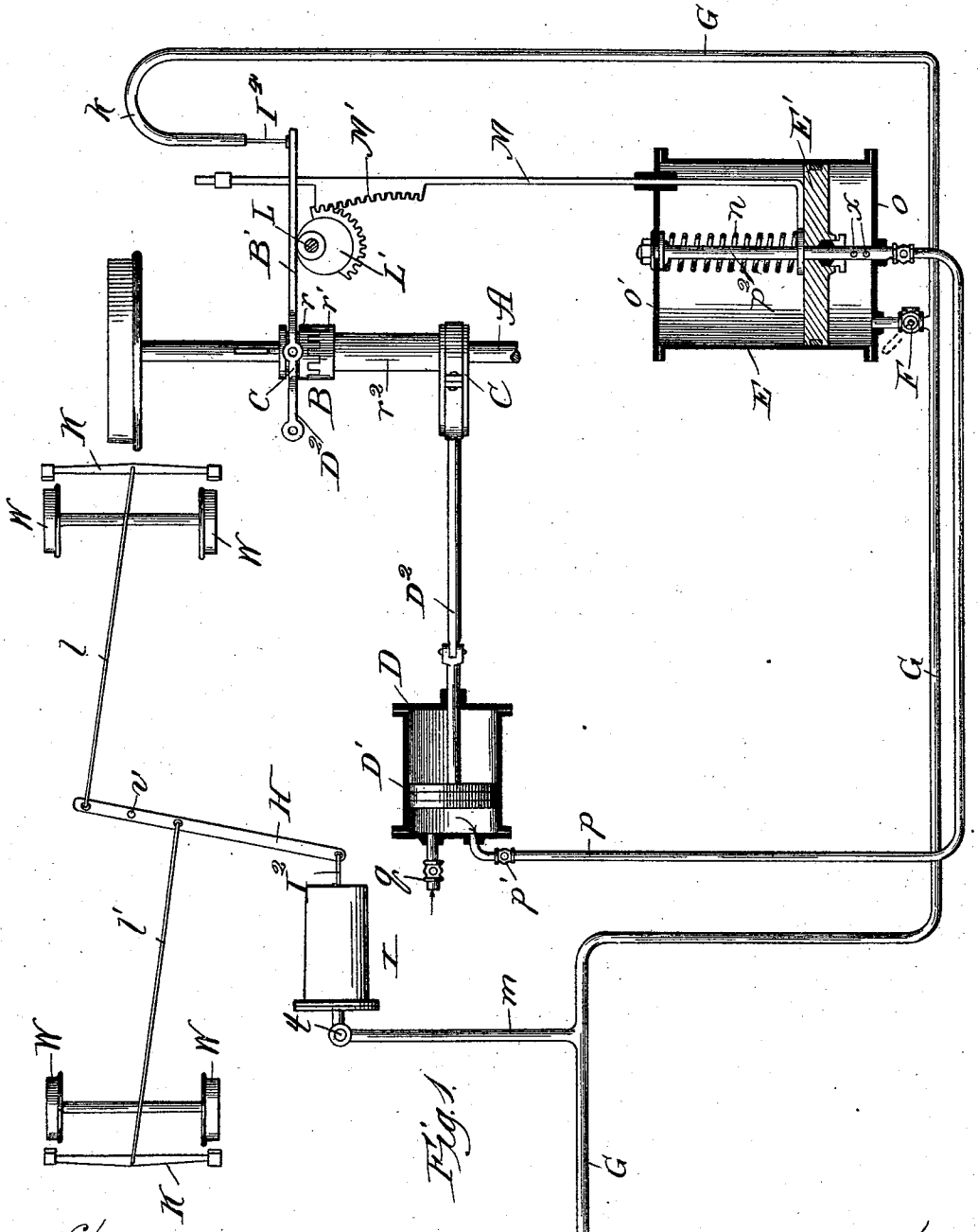

Fig. 1.

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(No Model.) 2 Sheets—Sheet 2.

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Fig. 2.

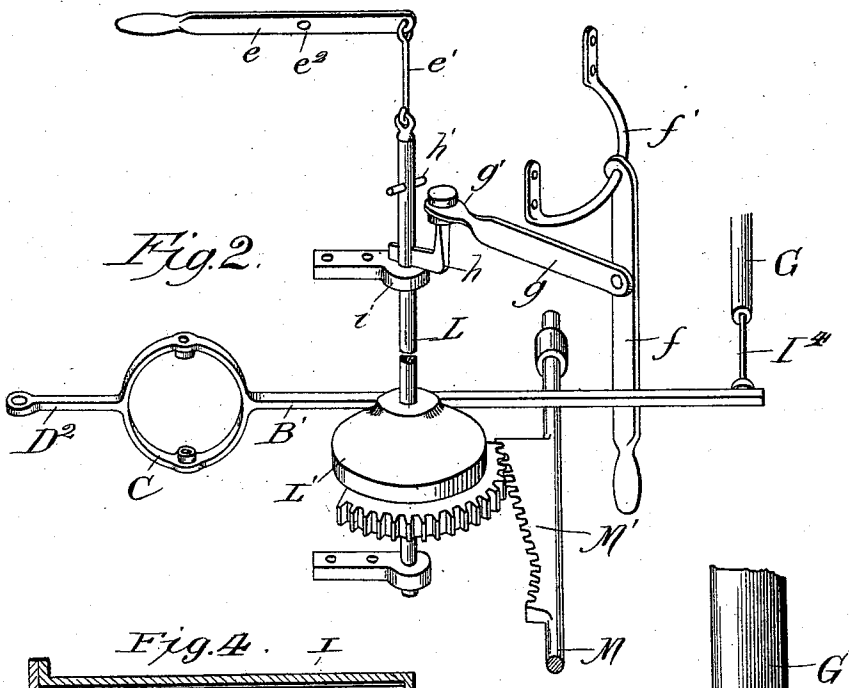


Fig. 4.

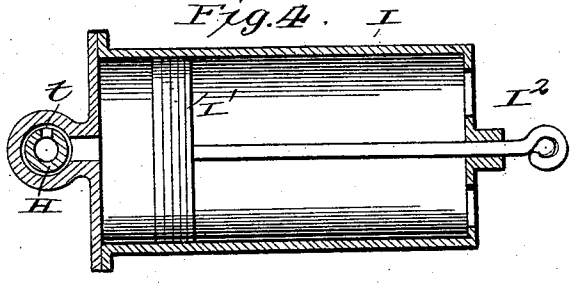
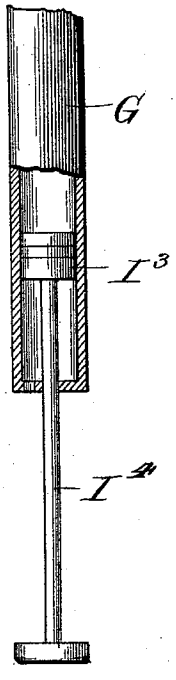


Fig. 3.



Witnesses:
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UNITED STATES PATENT OFFICE.

JOSEPH S. TROTT, OF CHICAGO, ILLINOIS, ASSIGNOR OF TWO-THIRDS TO WILLIAM K. CARLISLE AND WILLIAM J. STRONG, OF SAME PLACE.

AIR-BRAKE FOR CARS.

SPECIFICATION forming part of Letters Patent No. 536,002, dated March 19, 1895.

Application filed December 16, 1893. Serial No. 493,811. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH S. TROTT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Air-Brakes for Cars, of which the following is a specification.

My invention relates to an improvement in the class of pneumatically operated mechanism for setting the brakes on cars by direct air-pressure brought to bear against the brake-mechanism.

The primary object of my improvement is to provide simplified mechanism operative by the movement of the car, or train of cars, to bring it to a stand-still by compressing air against the brakes to set them. By this provision I attain the important advantage of utilizing the power of the motion of the car or train, while being stopped by the application of the brakes, to assist in bringing it to a stand-still.

Further objects of my improvement are to provide a novel and peculiarly effective construction of mechanism for operating the brakes of railway cars generally by pneumatic pressure.

Referring to the accompanying drawings—Figure 1 is a plan view, partly broken and sectional, and diagrammatic in its nature, of my improved apparatus. Fig. 2 is a broken perspective view in the nature of a diagram of the mechanism whereby the operation of storing air under pressure by the motion of the car is controlled. Fig. 3 is an enlarged broken sectional view of a detail, and Fig. 4 is a similar view of another detail.

A denotes one of the axles of a locomotive; and B is a clutch thereon, of any suitable variety, but shown as having its two members provided with engaging teeth, one member r being fastened on the axle to slide thereon but to rotate with it, and the other member, r', being on a sleeve, r^2 loosely surrounding the axle and carrying an eccentric C. The eccentric C has fastened to it the jointed piston-rod D^2 of a piston D′ in a pump-cylinder D, having an air-inlet q and an outlet-pipe p containing an outwardly opening check-valve p' and leading into the cylinder E of an air-compressor. Within the cylinder E the pipe p is perforated, as at x, and from the perforations it is solid and is fastened at its farther end on the rear head o' of the cylinder; and it carries, to slide back and forth upon it in the cylinder, a piston-head E′, between which and the head o' is confined a spring n wound spirally about the solid extension p^2 of the pipe p, and the normal resistance of which is sufficient (say eighty to one hundred pounds) to withstand the air-pressure (say sixty to eighty pounds) employed to set the brakes. In the forward head o of the cylinder E is a pipe having a three-way valve F, within easy reach of the engineer or driver and of usual or any suitable construction, and adapted, by proper adjustment, to produce, at will, communication between the cylinder and the train-pipe G, or between the train-pipe and its discharge-outlet, as to the outer air while shutting off the communication between the compressor and train-pipe.

The pipe G leads in one direction from the valve F backward under the cars between which it should be suitably coupled; and it communicates, for the brake-lever H of each car, as through a branch m, with a cylinder I having a pivotal connection, at t, with the branch m, and containing an extensible connection shown as a piston I′ (Fig. 4) having its rod I^2 pivotally connected with the free end of the brake-lever. The lever H is fulcrumed at v; and from opposite sides of its fulcrum it is connected by rods l and l' with the brake-beams K, whereby turning of the lever in one direction shall pull the brake-beams toward each other and draw the brake-shoes against the wheels w, which is accomplished by admitting air-pressure into the pipe G to force out the piston I′.

In the opposite direction from the three-way valve F, the pipe G leads to the clutch-controlling mechanism, where it is formed with a return-bend k containing an extensible connection, shown as a piston I^3 (Fig. 3) on a rod I^4, which is connected with the clutch-lever B′, engaging the sliding member of the clutch in the illustrated, or in any suitable, manner. Adjacent to the lever B′ is a vertical rotary shaft L carrying eccentrically, in normal contact with one side of the clutch-

lever, a mutilated gear L′, with which there normally meshes a segment M′ near the outer supported end of a reciprocating rod M, which abuts at its inner end against the rear side of the sliding piston E′ in the cylinder E.

The shaft L is normally supported on a suitable bearing, as the collar *i* (Fig. 2) by a bent key *h*, passing through a slot in the shaft and encircled by the end *g′* of a link *g* pivotally connected at its outer end with a lever *f* fulcrumed on and depending from a horizontally curved guide-bracket *f′*. When the key *h* is withdrawn from the shaft L, the latter drops till it rests on the upper cross-head *h′*, thereby disengaging the eccentric gear L′ from the rack M′; and for raising the shaft to its normal position, wherein the eccentric gear and rack again intermesh, the lever *e* is provided, being fulcrumed at e^2 and connected by a link *e′* with the shaft L.

The operation is as follows: With the parts in their relative positions illustrated the brakes are off. To set them, the valve F is turned to open communication of the pipe G with the cylinder E, with the result that confined air under pressure from the compressor exerts its force against the piston I′ on each car to drive out its rod I^2 against the brake-lever H and set the brakes; and with the further effect of the air-pressure operating against the piston I^3 in the forward end of the pipe G and forcing its rod I^4 against the clutch-lever B′ to set or engage the clutch B. Thus the rotation of the axle A, while being stopped by the setting of the brakes, works the pump D (thereby bringing the resistance of the pump to bear against the rotating clutch-axle and consequently against the motion of the car) to force air under pressure into the compressor in as great a volume as that used to effect an ordinary stop or "slow-up," and continues, increasingly, the supply to the brake-pistons, pipes and compressor until the stop or slow-up is accomplished, and the expansive force of the air confined in the compressor forces the piston E′ against the spring *n* and pushes out the rod M to cause the segment M′ to turn the eccentric gear L′ against the clutch-lever and unship the clutch, thereby stopping the pump. When, therefore, the car or train starts up again, the pump D will not be actuated to resist the motion until the brakes are again applied. When it is desired to release the brakes after the car or train has thus been brought to a standstill, or slowed up sufficiently, the valve F is turned to close the compressor E to the pipe G and open the latter to the outer air, thereby permitting the air under pressure to escape.

In a case of emergency it is desirable to force all pressure possible continuously into the cylinder E and thence into the train-pipe by maintaining the clutch B set, or in engagement with the axle A, but which would be interfered with by the consequent outward movement of the rack M′.

To annul the releasing effect on the clutch lever of the eccentric gear L′, I provide for pulling the lever *f* to withdraw the key-support *h* of the shaft L, when the latter drops and takes the gear L′ out of engagement with the rack, the movement of which, then, is inoperative to prevent the continued action of the pump.

What I claim as new, and desire to secure by Letters Patent, is—

1. In an air-brake apparatus for cars, an air-pump normally connected inoperatively with a car-axle, a clutch-device on said axle, an air-compressor communicating with the discharge-end of the pump and having a piston a clutch-unshipping connection between the piston and clutch-device operated by air confined under pressure against the piston in the compressor to maintain the normally unshipped condition of said clutch-device, and having a clutch-engaging connection with the clutch-device operating to produce engagement of the clutch when said pressure is released and a valve-controlled pipe-connection between the compressor and brake-lever mechanism, through which to set the brakes by air from the compressor, substantially as described.

2. In an air-brake apparatus for cars, an air-pump connected with an axle on the car to be operated by its motion, a clutch-device on the axle, provided with an operating lever for producing and releasing engagement of the pump-connection with the axle, an air-compressor communicating with the pump and from which the brakes are operated, a spring-controlled piston in the compressor-cylinder, a rotary eccentric abutting against the clutch-lever, and a reciprocating rod connected with the eccentric and engaged by said piston to turn, under the air-pressure confined in the compressor, the eccentric against the clutch-lever to release the clutch, substantially as described.

3. In an air-brake apparatus for cars, an air-pump connected with an axle on the car to be operated by its motion, a clutch-device on the axle, provided with an operating lever for producing and releasing engagement of the pump-connection with the axle, an air-compressor communicating with the pump, an air-pipe leading from the compressor and having an extensible connection with the brake-lever and an extensible connection with the clutch-lever whereby it is actuated by air-pressure in the pipe to engage the clutch, a valve in the pipe operative to control, at will, communication thereof with the compressor and the pipe-outlet, a piston in the compressor-cylinder and a releasing-connection between the piston and clutch-lever operating to disengage the clutch by the air-pressure confined in the compressor against the piston, substantially as described.

4. In an air-brake apparatus for cars, an air-pump connected with an axle on the car to be operated by its motion, a clutch-device on the axle, provided with an operating lever

for producing and releasing engagement of the pump-connection with the axle, an air-compressor communicating with the pump, an air-pipe leading from the compressor and having an extensible connection with the brake-lever and an extensible connection with the clutch-lever, whereby it is actuated by air-pressure in the pipe to engage the clutch, a valve in said pipe operative to control, at will, communication thereof with the compressor and the pipe-outlet, a piston in the compressor-cylinder, a rotary eccentric releasably supported to abut against the clutch-lever and provided with means for dropping and raising it at will, and a reciprocating rod normally engaging at one end the eccentric and engaged at its opposite end by said piston to turn, under the air-pressure confined in the compressor, the eccentric against the clutch-lever to release the clutch, substantially as described.

5. An air-brake apparatus comprising, in combination with an axle and a brake-lever on a car, a pump D having its piston provided with a flexibly jointed stem connected with an eccentric C on a clutch-sleeve r^2 loosely surrounding the axle, a clutch on the axle provided with a clutch-lever, a cylinder E connected by a pipe p with the pump, said pipe opening into the cylinder and having a solid extension therein surrounded by a spring n, a piston E′ in the cylinder, a pipe G having a cylinder I, pivotally connected with it and containing a piston I′ having its rod connected with the brake-lever and, at its forward end, a piston I^3 connected by its rod with the clutch-lever, a valve F in said pipe, a rotary shaft L carrying, eccentrically, a gear L′ adjacent to the clutch-lever, said shaft having a withdrawable key-support h on a bearing i, and a secondary higher support h', a link and lever connection with the said key, and a rack M′, to engage the eccentric gear, on a reciprocating rod engaged at its rear end by the piston E′, the whole being constructed and arranged to operate substantially as described.

JOSEPH S. TROTT.

In presence of—
W. N. WILLIAMS,
M. J. FROST.