No. 803,614. PATENTED NOV. 7, 1905.

E. H. MILLER.

CAR BRAKE.

APPLICATION FILED NOV. 26, 1904.

Fig. 1.

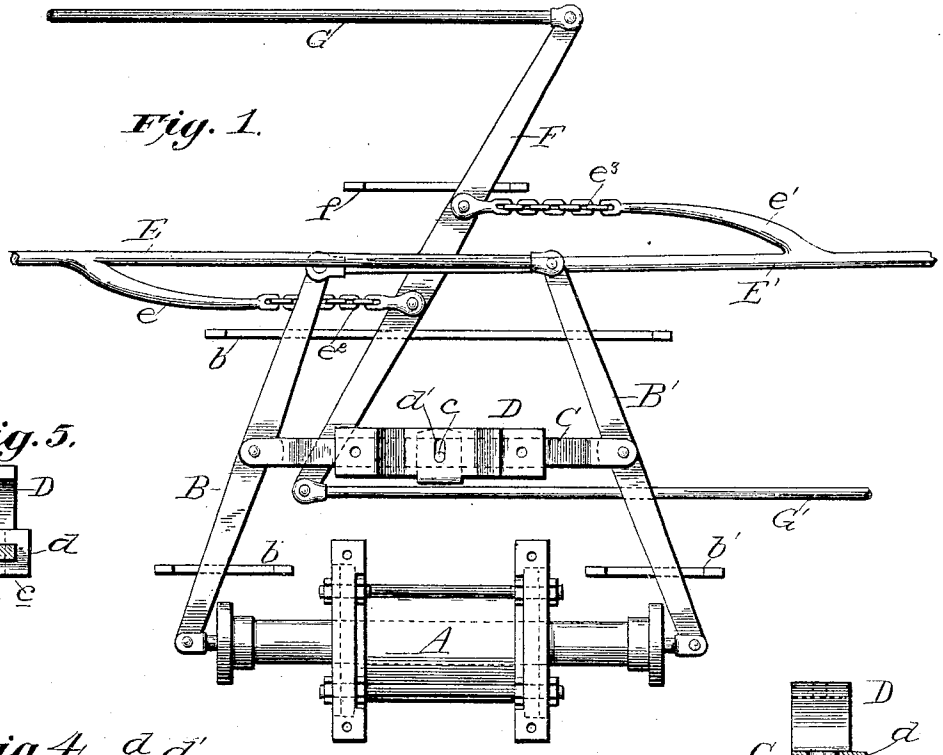


Fig. 5.

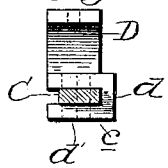


Fig. 4.

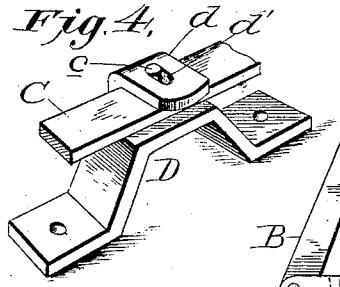


Fig. 6.

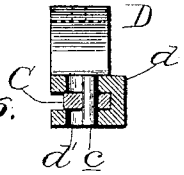
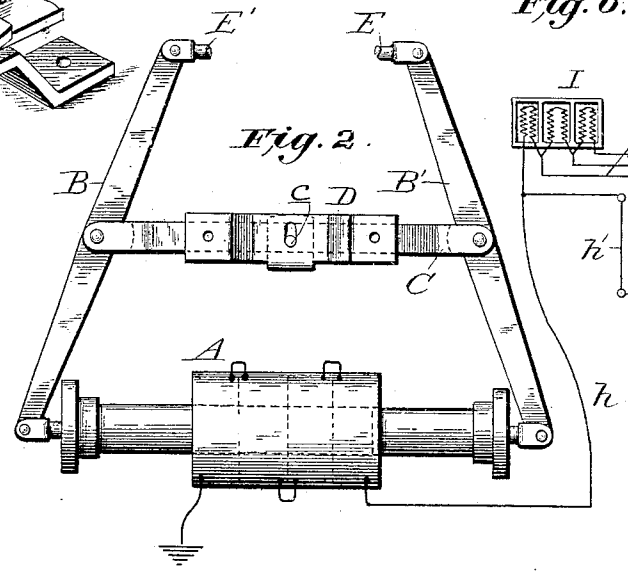


Fig. 2.



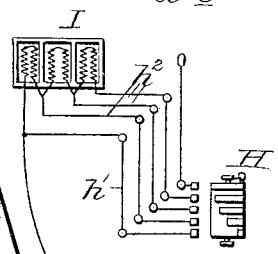
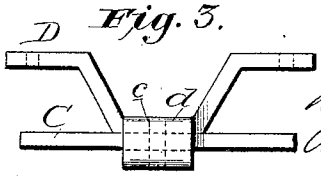


Fig. 3.



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UNITED STATES PATENT OFFICE.

ERNEST H. MILLER, OF LANCASTER, PENNSYLVANIA, ASSIGNOR OF ONE-THIRD TO JOHN W. HOLMAN AND ONE-THIRD TO CHARLES V. ROTE, OF LANCASTER, PENNSYLVANIA.

CAR-BRAKE.

No. 803,614. Specification of Letters Patent. Patented Nov. 7, 1905.

Original application filed April 25, 1904, Serial No. 204,692. Divided and this application filed November 26, 1904. Serial No. 234,424.

To all whom it may concern:

Be it known that I, ERNEST H. MILLER, a citizen of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Car-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.

This invention relates to car-brakes, and more particularly to brake mechanism in which a brake-cylinder with double oppositely-movable cores or pistons is used, preferably an electromagnet or solenoid, for applying the brakes on street-cars and ordinary railway-cars.

One object of the invention is to provide improved brake mechanism for equalizing the "pull" or force exerted upon the brakes by an electromagnet or solenoid or other suitable brake-cylinder having oppositely-movable pistons working therein for applying the brakes at or near opposite ends of a car, so as to compensate for any inequalities or variations in the requirements or conditions incident to the operation of brake mechanisms in different locations simultaneously from the same source of power or the same prime mover.

A further object is to provide efficient and reliable hand-operated devices for applying the brakes either simultaneously with and as an auxiliary to the automatically-acting brake cylinder or magnet or independently thereof, so that the brakes may be applied by the combined action of both mechanisms or the independent action of either regardless of the position of the particular mechanism that may be brought into action in applying the brakes by the independent action of one or the other of said mechanisms.

The invention will first be hereinafter more particularly described with reference to the accompanying drawings, which form a part of this specification, and then pointed out in the claims at the end of the description.

In the drawings, Figure 1 represents a plan view of an improved brake mechanism embodying my invention, showing a solenoid for automatically applying the brakes. Fig. 2 is a plan view of the solenoid and equalizing-levers connected thereto and also a diagrammatic representation of the electric connections between the solenoid and a controller. Fig. 3 is a side view of the bracket or hanger supporting the strut on which the equalizing-levers are pivoted. Fig. 4 is a perspective view of said hanger or strut inverted, the ends of the strut being broken away. Fig. 5 is an end view of said hanger, and Fig. 6 is a transverse section through the pivot of the strut.

In the preferred embodiment of my invention I employ a pair of equalizing-levers, which have their arms at one side of their pivotal supports connected with the truck or brake-levers and their arms at the other side of said supports connected with oppositely-movable reciprocating cores of an interposed electromagnet or solenoid, which is in electrical connection with a controller through which current is supplied for energizing the solenoid in applying the brakes; but any suitable brake-cylinder with oppositely-movable cores or pistons may be employed.

Referring to the drawings, in which the same letters of reference are used to denote corresponding parts in different views, A denotes a brake-cylinder consisting, preferably, of an electromagnet or solenoid having an unobstructed central opening therethrough and in each end of which is movably fitted a reciprocating core or piston having its outer end pivotally connected to an arm of one of the equalizing-levers B and B′, so as to connect said levers through the brake-cylinder or solenoid, said cores or pistons being adapted to be drawn inward when the magnet is energized, so as to approach or move in opposite directions toward each other, thereby separating the opposite arms of the equalizing-levers, which are suitably connected with the truck or brake levers for applying the brakes. Any suitable brake-cylinder may be employed; but I preferably employ a solenoid of special construction having double reciprocating cores, but which is made the subject of a separate application, Serial No. 204,692, filed April 25, 1904, of which this is a division, and such magnet need not be further described herein.

The equalizing-levers B B′ are pivoted intermediate their ends to a strut or bar C and may be supported on opposite sides of their pivots by brackets or stirrups *b b′*. The strut

C may be supported by a bracket or hanger D, which is approximately V-shaped and has on its under side a horizontally-disposed jaw *d*, between which and the bottom or main portion of the hanger said strut C is pivoted, suitably-elongated slots *d'* being provided in said jaw and bottom portion of the hanger lying in the same general plane as the brake-levers to permit sufficient play or movement of the strut to compensate for variations in the distance between the pivotal supports of the equalizing-levers and the ends of the reciprocating cores in different positions of the latter when they are drawn inward to apply or thrown outward to release the brakes, thus preventing undue strain upon or binding of the strut on its pivot. A pin *c*, passing through the strut C and rigidly secured therein, has its ends fitted in the slots *d'*, which permit a limited forward and back movement of the pin therein. E and E' denote suitable rods connecting the truck or brake levers (not shown) with the ends of the equalizing-levers B and B' at the side of the pivotal supports of the latter opposite their connections with the cores of the solenoid. F denotes a floating lever which is supported by stirrups *b* and *f* and connected by rods G and G' with the brake-staffs (not shown) at opposite ends of the car. On opposite sides of its center the floating lever is connected with the rods E and E' by means of chains e^2 and e^3, attached to branches *e* and *e'* of the rods E and E', whose main stems or branches are pivoted to the equalizing-levers B and B', respectively.

In Fig. 2 is shown a diagrammatic representation of a controller H, a rheostat I, and suitable electrical connections between the same and the solenoid A, the letter *h* denoting the main conductor, *h'* a branch conductor leading directly from the controller to the main conductor, and h^2 the conductors from the controller to the rheostat.

In operation when the solenoid is energized by the passage of the electric current through its coils its cores will be drawn inward or made to move in opposite directions toward each other, whereby the arms of the equalizing-levers which are connected with the truck or brake-cylinders will be separated or spread apart, thus applying the brakes. The same result, however, may be accomplished by a reverse movement of said parts when operating with a brake-cylinder of a different construction from that specifically referred to herein, suitable connections being provided between the equalizing-levers and truck-levers to adapt the brakes to be applied by such reverse movement. The opening through the brake-cylinder or solenoid is preferably unobstructed and the ends of the pistons or cores working therein are arranged far enough apart to prevent them from coming together or touching each other and to allow one to move farther inward than the other when the coils are energized, so that in case of any inequality or difference in movement required to apply the brakes at either end of the car or if there is more slack on one truck than on the other the piston or core acting on that truck will take up the slack, thereby equalizing the pull on both trucks. When the equalizing-levers are thus automatically actuated, the floating lever may remain stationary, sufficient slack being provided by the chains or flexible connections e^2 e^3 between said floating lever and the bibranched connecting-rods E E'; but if it is desired to supplement the automatic action the brakes may be applied by hand by operating the brake-staffs, which are connected by the rods G G' with opposite extremities or arms of the floating lever, or if for any reason the brake-cylinder or solenoid should not promptly respond when desired the brakes may be applied by hand through either brake-staff and the floating lever regardless of the position of the automatic mechanism and without interfering therewith or with the action thereof when the hand-operated devices are brought into action.

Various changes may be made in the details of construction and arrangement of parts without departing from the spirit of my invention.

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

1. A brake mechanism comprising a pair of levers pivotally supported intermediate their ends, each connected at one side of its pivot with a truck or brake lever and connected together at the opposite side of their pivots by a brake-cylinder having two cores or pistons working therein, each pivoted to one of said levers and adapted to move in opposite directions in applying the brakes together with a hand-operated floating lever having suitable connections with said equalizing and truck or brake levers for applying the brakes by hand.

2. A brake mechanism comprising a pair of levers pivotally supported intermediate their ends, each connected at one side of their pivotal supports with a truck or brake lever and connected together at the opposite side of said supports through a brake-cylinder having two cores or pistons, each connected with one of said levers and movable in opposite directions toward each other in applying the brakes together with a floating lever having a flexible connection on each side of its center with one of the connections between one of said equalizing-lever and truck or brake lever and another connection at the same side with a brake-staff.

3. A brake mechanism comprising a pair of levers pivotally supported intermediate their ends, each connected at one side of their pivotal supports with a truck or brake lever and

connected together at the opposite side of said supports through a brake-cylinder having an unobstructed central opening therethrough and two cores or pistons having a reciprocating movement in said opening and each connected with one of said levers and movable in opposite directions toward each other in applying the brakes said intermediate support of said equalizing-levers consisting of a strut mounted on a rigid support with provision to permit sufficient play or movement thereof to compensate for variations in the distance between the pivotal supports of the equalizing-levers and the ends of the reciprocating cores, in different positions of the latter.

4. A brake mechanism comprising a pair of equalizing-levers pivotally supported intermediate their ends to a transversely-arranged strut pivotally supported at or about its center; each lever being connected at one side of the strut with a truck or brake lever and at the other side thereof connected together through a brake-cylinder having two cores or pistons working therein each connected with one of said levers and movable in opposite directions in applying the brakes.

5. A brake mechanism comprising a pair of equalizing-levers each pivotally supported intermediate its ends to a strut which is pivotally supported at or about its center, each lever being connected at one side of the strut with a truck or brake lever and the two levers connected together at the other side of the strut through a brake-cylinder having an unobstructed central opening and two cores or pistons working therein, each connected with one of said equalizing-levers and adapted to move in opposite directions in applying the brakes.

6. In combination, the equalizing-levers, each pivoted intermediate its ends to a strut which is pivoted transversely of the plane of said levers, a brake-cylinder having two oppositely-movable reciprocating cores each having its outer end pivotally connected with an arm of one of said equalizing-levers, the other arms of said equalizing-levers being connected with the truck or brake levers at opposite ends of the car.

7. A brake mechanism comprising a pair of levers pivotally supported intermediate their ends and connected together at one side of their pivots by a brake-cylinder having two cores or pistons working therein, each pivoted to one of said levers and adapted to move in opposite directions in applying the brakes, each of said levers being connected on the opposite side of their pivots with a truck or brake lever, the latter connections each having a branch extending therefrom with a flexible terminal, and a floating lever connected with one of said flexible terminals on each side of its center, the opposite arms of said floating lever being connected with brake-staffs at opposite ends of the car.

8. A brake mechanism comprising a pair of equalizing-levers each pivoted intermediate its ends to a strut and connected together at one side of the strut by a solenoid having two cores working therein, each core having its outer end pivoted to one of said levers and adapted to approach each other in applying the brakes, each of said levers being connected on the opposite side of said strut with a truck or brake lever by connections each having a branch with a flexible terminal portion, and a floating lever connected at each side of its center with one of said terminals and having its opposite arms connected with brake-staffs at opposite ends of the car.

9. In combination with the intermediately pivotally supported equalizing-levers, and the solenoid having two cores pivotally connecting said levers at one side of the pivots of the latter, a floating lever located between and in the same general plane of said equalizing-levers and having its opposite arms connected with brake-staffs at opposite ends of the car, bifurcated rods connecting a truck or brake lever at each end of the car with one of said equalizing-levers and with said floating lever on one side of its center, the latter connections having flexible portions therein to permit the floating and equalizing levers to operate either simultaneously or independently of each other in applying the brakes.

10. In combination with the equalizing-levers and means for automatically operating them, the hand-operated floating lever and bibranched connections extending from said levers in opposite directions to the truck or brake levers; each of said bibranched connections having one branch secured to an arm of one of said equalizing-levers and another branch secured to said floating lever at one side of its center, one of said branches being flexible, substantially as described.

11. A brake mechanism comprising a pair of equalizing-levers each pivotally supported intermediate its ends and connected at one side of its pivotal support with a truck or brake lever, a brake-cylinder with oppositely-movable cores or pistons connecting said equalizing-levers on the opposite side of said pivotal supports, and a floating lever having a flexible connection on each side of its center with one of the connections between one of said equalizing-levers and a brake or truck lever and connection at the same side with a brake-staff.

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

ERNEST H. MILLER.

Witnesses:
PAUL A. BLAIR,
HAZEL NORDEMAN.