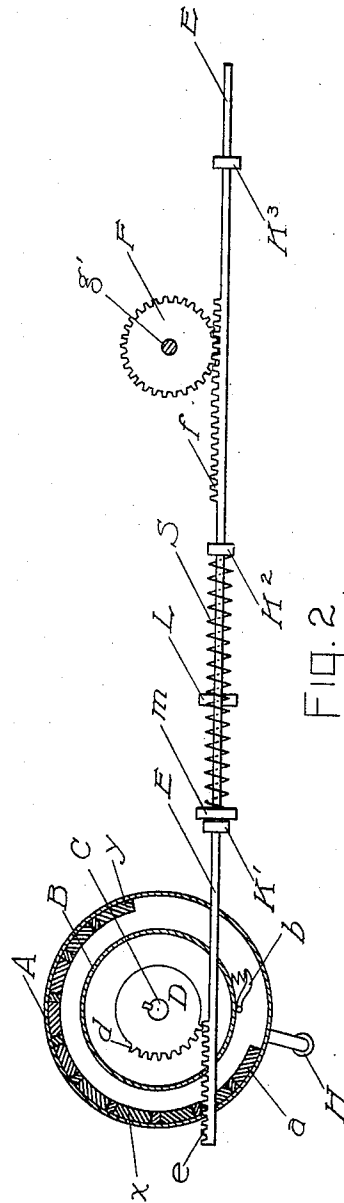
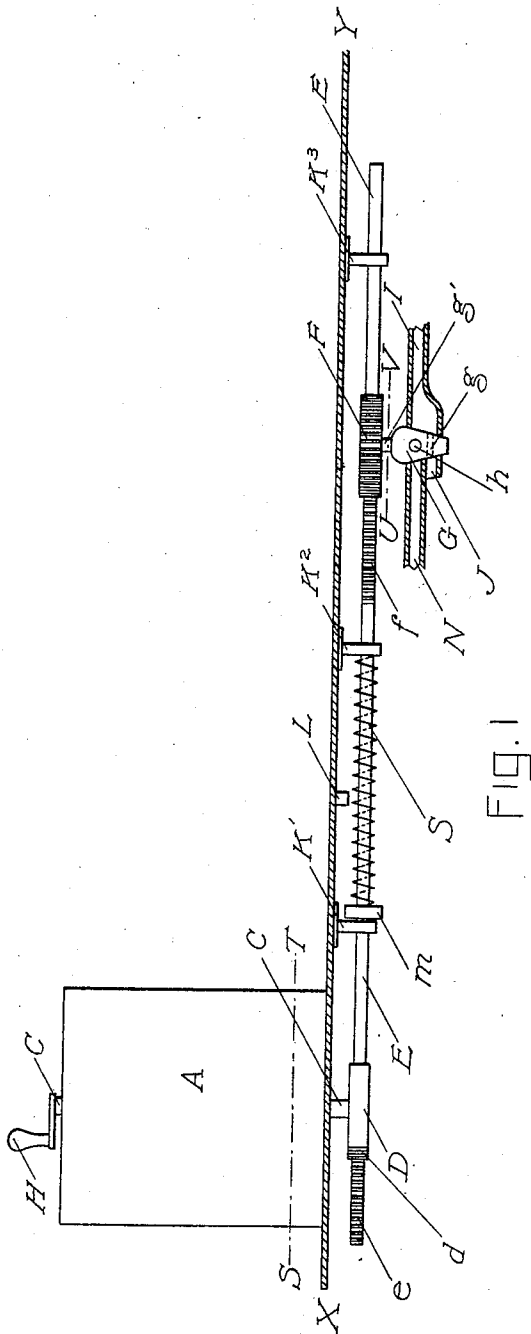


(No Model.)

G. B. DAMON & G. W. PEARSON.
CAR BRAKE.

No. 581,415.

Patented Apr. 27, 1897.



WITNESSES

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CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 581,415, dated April 27, 1897.

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To all whom it may concern:

Be it known that we, GEORGE B. DAMON, a citizen of Germany, and GARDNER W. PEARSON, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Car-Brakes, of which the following, taken in connection with the accompanying drawings, is a specification.

This invention relates to a system of air-brakes for electric cars, the object being to provide a controlling-stand which will govern the application of the electric current to the car-motors by one movement of its crank-handle and the valve admitting air to and allowing it to escape from the brake-cylinders by another movement in such a way that current cannot be turned on and brakes applied at the same time, the means for controlling the brakes being mechanical and entirely independent of the electric current. This arrangement permits the motorman to control the motion of the car by one controlling-stand handle operated by one hand. We attain these results by the mechanism illustrated by the accompanying drawings, in which—

Figure I shows an elevation of the apparatus as applied under the floor X Y of a car, the valve-seat being cut away to show construction. Fig. II is a view of the valve-controlling mechanism above the line U V, looking up toward the car-bottom, that portion of the controlling-stand cylinders below line S T and the car-floor being cut away to show construction.

Similar letters refer to similar parts throughout the views.

The controlling-stand consists of an outer stationary cylinder A, in which revolves an inner movable cylinder B, carried by a suitable shaft C, at the end of which is fitted the crank-handle H for turning said shaft and cylinder. The inner cylinder B carries on its outer surface contact-fingers *b*, engaging at suitable points with the contacts *a x y* on the inner surface of cylinder A, said contact-fingers and contacts being arranged according to any suitable system for controlling the

car-propelling motors and being properly insulated and connected by suitable conductors, respectively, with the car-propelling motors and the source of electric power. The shaft C extends through the floor X Y of the car and carries a sectional pinion D.

The pipe N I connects the brake cylinder or cylinders of the system with the source of pneumatic pressure, and the valve-plug G, having ports *h* and *g*, is inserted in said pipe and is adapted to form, with the port J, a two-way valve, whereby by turning said valve-plug connection between the brake-cylinders and the source of pneumatic pressure may be made through pipe I N and port *h*, or between the brake-cylinders and the outside air by means of ports *g* and J, ports *h* and *g* being so made that both connections cannot be established at the same time. The stem *g'* of the valve-plug G carries the pinion F, which engages with teeth *f* on the rod E E. This rod E E moves back and forth through the supporting-guides K' K² K³, attached to the car-body, and carries, besides the teeth *f*, engaging at all times with those of pinion F, teeth *e*, with which teeth *d* engage when pinion D is turned to the previously-determined position.

The rod E E carries a collar *m*, which limits the motion of the rod to the distance between support K' and the lug L, attached to the bottom of the car. A spiral spring S, wound around rod E E and between support K² and collar *m*, keeps the rod E E and so the pinion F, valve-plug G, and also the teeth *e* with relation to pinion D, normally in the position shown.

The parts should be adjusted as follows: The contacts *a x y* are arranged on less than the whole inner surface of cylinder A, thus leaving the space from *a* to *y*, through which contact-fingers *b* may pass without closing any circuits connecting with the car-motors, and also so that the speed of the car is gradually accelerated by suitable arrangement of contacts, as contact-fingers *b* sweep from the point *a* to point *x* and thence to point *y*. The teeth *d* are cut on a somewhat smaller proportional part of the circumference of pinion D than the portion of the inner sur-

face *a y* of cylinder A bears to the whole inner surface of said cylinder, and pinion D is so adjusted on shaft C that teeth *d* engage teeth *e* on rod E E when the inner cylinder B is turned by handle H so as to carry contact-fingers *b* from *a* to *y* and back from *y* to *a* and at no other part of its revolution.

The valve-plug G is ordinarily held by the spring S acting on collar *m* and soon rod E E, teeth *f*, and pinion F in the position shown, making no connection through port *h* and pipe H I between the brake-cylinders and the source of pneumatic pressure, but permitting free escape of air from the brake-cylinders through ports *g* and J.

It will be readily seen that when handle H is in the position shown no contacts are made and the brake-valve is in its normal position. If handle H is turned toward *x*, the car-motors are started and full power is applied when it reaches the point *y*. If the handle is turned from *y* to *x* and *x* to *a*, the current for the motors is cut off until it reaches zero at *a*. When handle H is turned beyond *a* toward *y*, teeth *d* engage teeth *e*, rod E E and spring S are forced back, pinion F and valve-plug G are revolved, the connection between the brake-cylinders and outside air is broken, and connection is established between the source of pneumatic pressure and the brake-cylinders, and the brakes are set. When the handle H is turned back again to the position shown, the connection between the brake-cylinders and the source of pneumatic pressure is broken and that between the cylinders and the outside air is established, the air from the cylinders is exhausted, and the brakes are released. It will be seen that by this arrangement the car-motors cannot be started until the brakes are thrown off and the brakes cannot be set until the current supplying the motors is shut off, and, further, that the failure of the current does not affect the operation of the brakes.

No particular form of valve is essential, (that shown being an ordinary two-way valve,) as any valve adapted to control the supply of air from a reservoir-tank or other source of pneumatic pressure to the brake-cylinders and the escape therefrom to the outside air by the turning of its seat can be readily used by suitable adjustment of the various parts, as by making pinion F larger or smaller.

No particular construction of controlling-stand or system of contacts to operate the motors is necessary, but it must be so arranged that the brake mechanism is put in operation by the movement of the handle from the zero-point in an opposite direction to that taken by the handle in establishing contacts for the supply of power to the motors.

It will also be seen that other devices for operating the valve mechanism can be substituted for the rack-and-pinion device, such as sprocket-wheels and chain, system of levers, or other equivalents for transmitting the

motion of the controlling-stand handle, when not operating the car-motors, to the brake-valves.

What we claim for our invention, and desire to cover by Letters Patent, is—

1. In a system of pneumatic brakes for electric cars, a controlling-stand wherein the electrical contacts are so arranged that a turn of its handle of less than a complete revolution, on one side of a given point, makes suitable electrical connections for governing the car-propelling motors, and a valve adjusted to control the supply of air to and its escape from the brake-actuating cylinders, combined with mechanical devices connecting the valve with the rotating shaft and handle of the controlling-stand in such a way that when said handle is so turned that the electrical contacts of the controlling-stand do not make electrical connections for actuating the car-propelling motors the valve is turned and admits air through one of its ports from the source of pneumatic pressure to the brake-cylinders, and that when said handle is so turned that the said electrical contacts do make electrical connections for the car-propelling motors, the valve is left at rest in its normal position of permitting the escape of air from the brake-cylinders to the outside air.

2. In a system of pneumatic car-brakes, a controlling-stand adapted to govern the operation of the car-propelling devices by the movement of its handle to one side of a given point and to govern by its movement to the other side of said point, through suitable mechanical devices, the operation of the valve or valves regulating the supply of air for operating the brakes.

3. In a system of pneumatic brakes for electric cars, a controlling-stand adapted to govern the operation of the car-propelling motors by the movement of its handle on one side of a given point and to govern by its movement on the other side of said point, through suitable mechanical devices, the operation of a valve or valves regulating the supply of air for operating the car-brakes.

4. In a system of pneumatic brakes for electric cars, a controlling-stand wherein the electrical contacts are so arranged that a turn of the handle in one direction from a given point makes suitable electrical connections for actuating the car-propelling motors and a turn in the other direction from said point throws into operation mechanical devices for controlling the valve or valves regulating the supply of air to and its escape from the brake-cylinders.

5. In a system of pneumatic brakes for electric cars, a controlling-stand wherein the electrical contacts are so arranged that a turn of the handle in one direction from a given point makes suitable electrical connections for actuating the car-propelling motors and a turn in the other direction from said point throws into gear a sectional pinion, with rack device connecting with another pinion carried by the

