No. 759,858. PATENTED MAY 17, 1904.

G. A. BROOKS.

AIR BRAKE MECHANISM.

APPLICATION FILED JUNE 15, 1903.

NO MODEL.

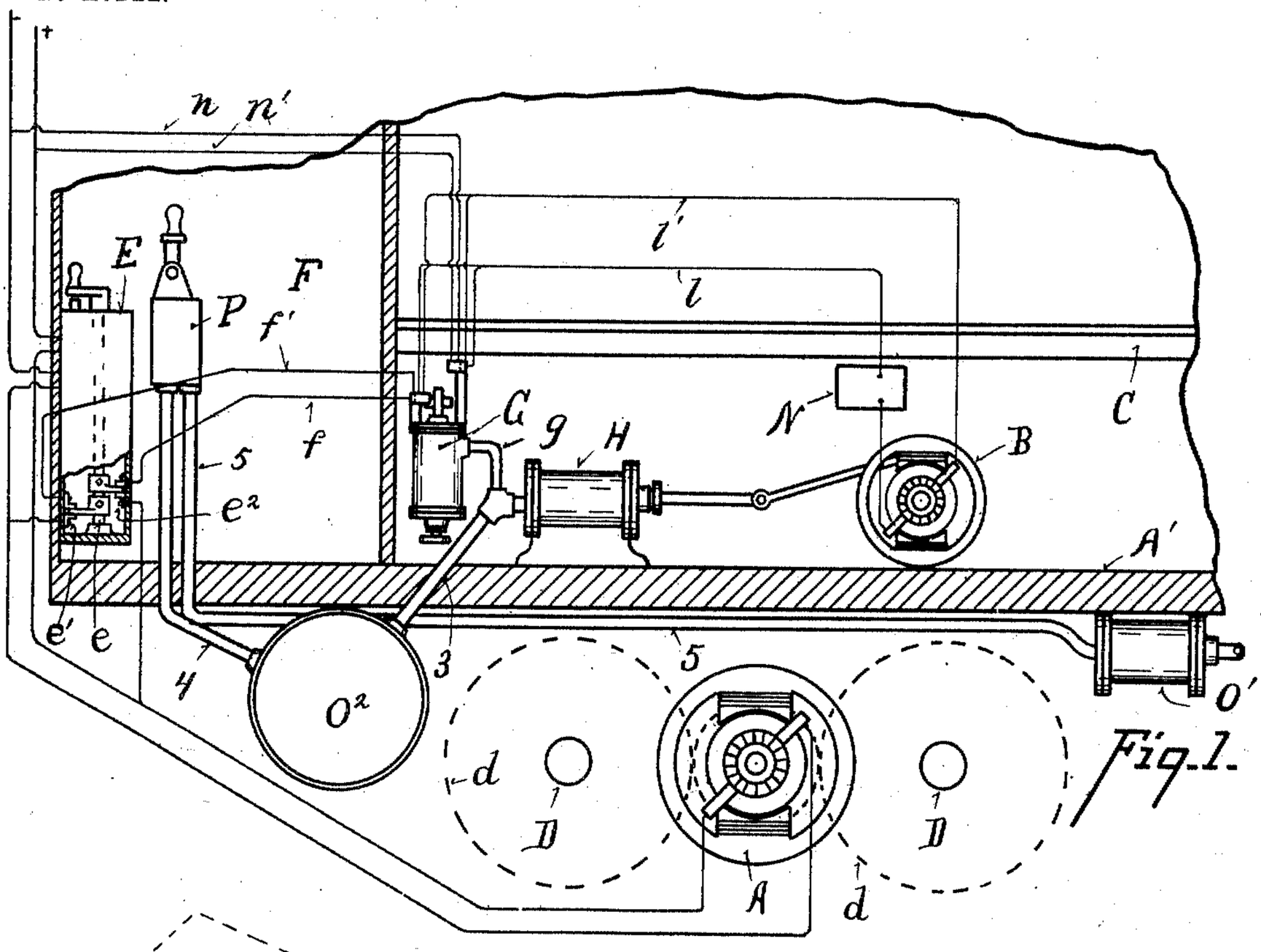

Fig. 1.

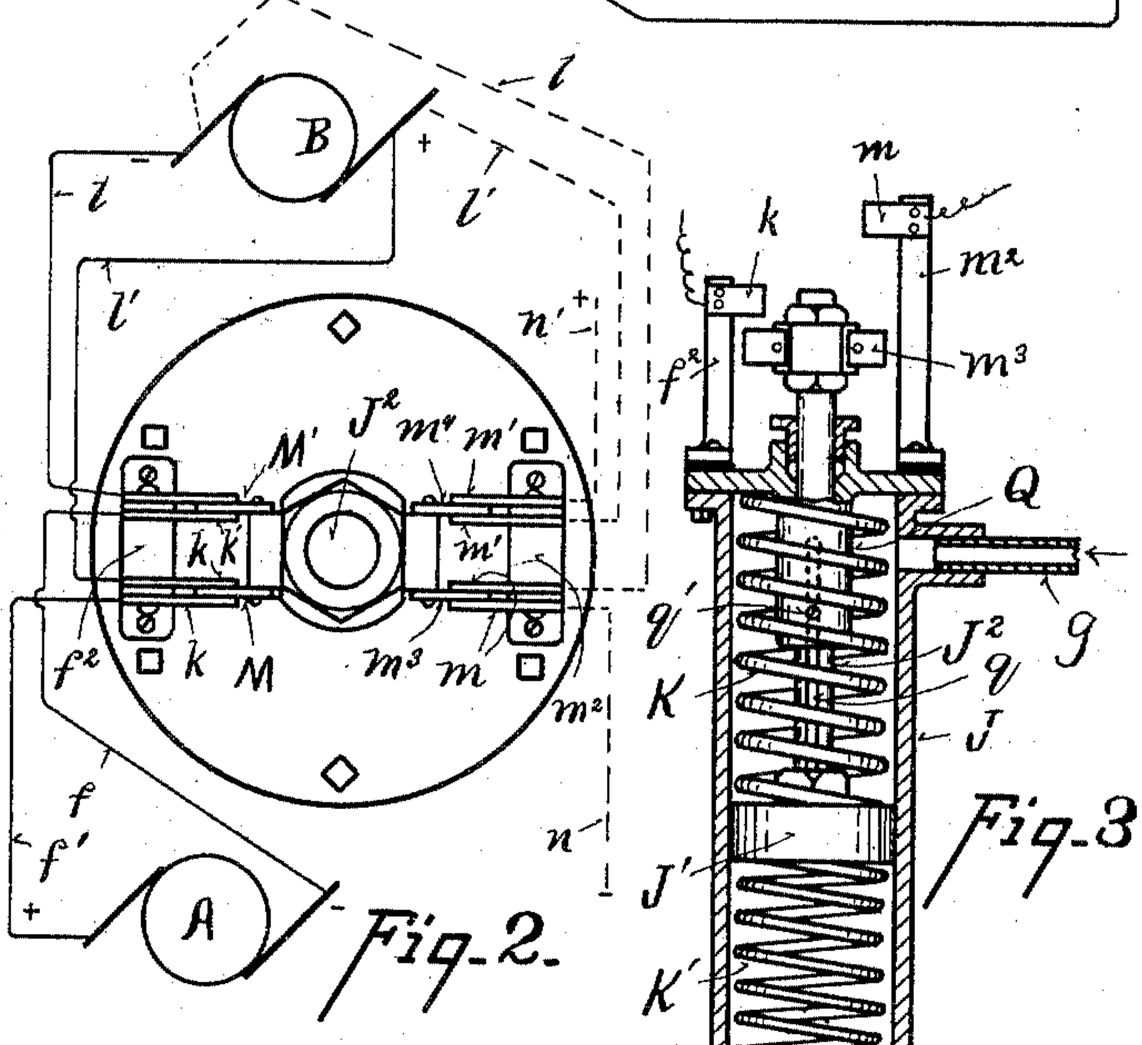

Fig. 2.

Fig. 3.

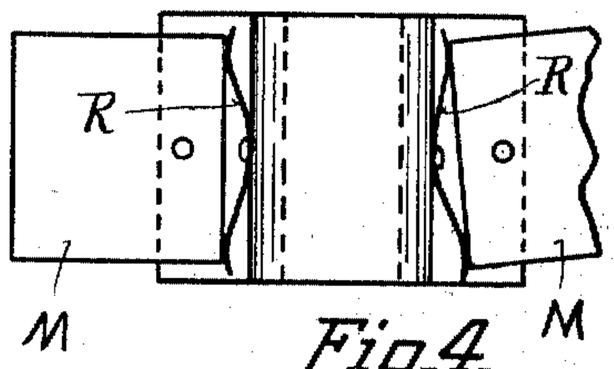

Fig. 4.

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No. 759,858. Patented May 17, 1904.

UNITED STATES PATENT OFFICE.

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AIR-BRAKE MECHANISM.

SPECIFICATION forming part of Letters Patent No. 759,858, dated May 17, 1904.

Application filed June 15, 1903. Serial No. 161,425. (No model.)

To all whom it may concern:

Be it known that I, GUSS A. BROOKS, a citizen of the United States, residing at Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in Air-Brake Mechanism; 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.

My invention relates to improved apparatus for operating street-car brakes. One of its objects is to provide means whereby the air for operating the brakes is compressed by the motors employed to drive the cars during the intervals when not being used for propelling the cars.

Another object is to employ the momentum of the cars to maintain the supply of compressed air.

Another object is to provide automatic regulating mechanism whereby the current from the motors when running idle is employed to maintain a maximum air-pressure and also whereby current from the main line is employed to maintain the air-pressure whenever the current from the car-motors is insufficient.

It also consists in certain details of form, combination, and arrangement, all of which will be more fully set forth in the description of the accompanying drawings, in which—

Figure 1 is a longitudinal sectional diagram through a car, showing my improved apparatus in position for use and the wiring thereto. Fig. 2 is an enlarged top plan view of the automatic regulator. Fig. 3 is a central vertical section through the same. Fig. 4 is an enlarged detail of the movable contact-blades.

A′ represents the car-body, F the motorman's cab, and C the car-seat.

D represents the axles of the car-wheels of one truck, and A the motor employed to drive said axles, preferably by means of spur-gears *d*.

E represents the usual controller-box, by means of which the current to the car-motors from the line-wires is controlled and cut out. At the lower end of the controller-shaft *e* I provide two contact-closing blades, which serve to close the contacts e' e^2 when the controller-shaft is turned to the position to cut off the current from the line-wires. The contacts e' e^2 serve to connect the motor B by means of the branch wires f f' with the automatic regulator G, the movements of which are controlled by means of the air-pressure from the storage-tank through the branch pipe *g*.

H represents an air-compressor driven by the electric motor B.

The automatic regulator consists of a cylinder J, in which is located a piston or plunger J′, having a rod J^2, projecting through the cylinder-head at the upper end.

K K′ represent springs which respectively tend to force the plunger in opposite directions and which therefore hold the plunger normally in position nearly equidistant from the respective ends of the cylinder.

The variable air-pressure from the storage-tank entering the upper end of the cylinder above the plunger assists the spring K to depress the plunger to a greater or less degree, depending upon the air-pressure.

k k' represent stationary electrical contacts mounted by an insulated bracket f^2 on the top of the cylinder and to which the wires f f' and also the wires l l', leading to the motor B, are attached.

M M′ represent blades mounted on the upper end of the piston-rod J^2, which enter between the stationary contacts to complete the circuit to the motor B.

m m' represent stationary contacts mounted by an insulated bracket m^2 upon the upper end of the cylinder, the bracket m^2 being longer than the bracket f^2.

m^3 m^4 represent blades adapted to complete the circuit through the contacts m m' to the motor B through the branch wires l l', leading from the branches n n' of the main-line wires.

N represents an automatically-operated rheostat of ordinary construction which serves to gradually apply the current to the motor B.

3 represents the pipe connection from the compressor to the storage-tank, 4 the pipe connection from the storage-tank to the brake-controller P, and 5 the pipe connection from the brake-controller to the brake-cylinder.

The mode of operation is as follows: Say it is desired to maintain a pressure of eighty pounds per square inch in the storage-tank for use in applying the brakes. The hand-wheel O is turned to adjust the pressure of the spring K′ against the under side of the plunger, so that the combined effect of the upper spring and the pressure of air from the storage-tank O^2 through pipe *g* will depress the plunger at eighty pounds to the position shown in Fig. 3 to break the circuit at the contacts *k k′*. Now as air is applied to the brake-cylinder O′ by means of the controller P the pressure of air in the storage-tank is reduced and the plunger rises in cylinder J, making electrical contact first at *k k′*, in which position the pump-motor will be started automatically whenever the motor A is cut off from the supply-wires and is driven by the momentum of the car, such as in making a stop or descending a grade. If sufficient current is thus obtained from motor A to drive motor B, so as to restore the maximum pressure in the storage-tank, the plunger is again depressed to break contact at *k k′* until the pressure of the storage-tank is again reduced. If, however, a frequent application of the brakes reduces the pressure in the storage-tank still further, then the plunger rises still farther and makes contact at *m m′*, whereupon current from the line-wires is automatically supplied through the branch wires *n n′* to motor B, which causes the pump to increase the air-pressure until the plunger is depressed sufficiently to contact at *k k′*. A sleeve Q on the inside of the upper head of cylinder J serves as a stop to prevent the plunger rising farther than necessary to make contact at *m m′*. A groove *q* in the plunger-rod J^2, engaged by a screw *q′*, serves to prevent the plunger and rod turning in the cylinder and insures the blades M M′ m^3 m^4 registering with the contacts *k k′ m m′*. In order to prevent the formation of an arc when the blades break contact, I pivot said blades and provide springs R, which as soon as the contact is broken quickly increase the distance between the contacts and breaks the arc. Other arc-breaking devices, such as a magnetic blow-out, may also be used, if desired.

Where the car motor or motors are series-wound, an increased number of contact-plates may be employed on the automatic controller-cylinder and in the controller E to properly connect up the field-coils of the car-motors to utilize them as current-generators, it being obvious that as many separate contacts as desired may be carried by said automatic regulator. I am thus enabled under all ordinary circumstances to secure sufficient current from the car-motors used as generators to run the compressor-motor and automatically maintain and regulate the air in the storage-tank, and only in exceptional instances will it be necessary to take current from the lines to maintain the air-supply. It will also be noted that the car-motors when employed as generators serve to a certain extent as a brake mechanism to stop the car, and I am thus enabled to secure the air-pressure to operate the brakes while descending grades and in making stops, where the generation thereof is not detrimental to the other operations of the car or car-motors. Where more than one motor is employed to drive the car, either one or more of said motors may be employed, as desired, as a generator. The usual electrical switches in the electrical line-wires and branch wires may be employed wherever desired, but have been omitted from the drawings.

Having described my invention, what I claim is—

1. In a brake mechanism for cars, an air-brake cylinder, an air-storage tank, a motor-driven compressor, an electric car-propelling motor, and means for converting the car-propelling motor into an electric generator when not employed for propelling the car, and using the current so generated in driving the compressor-motor.

2. In a brake mechanism for cars, an air-brake cylinder, and air-storage tank, a motor-driven air-compressor, an electric car-propelling motor, contacts adapted to connect up the car-propelling motor as an electric generator when not employed in propelling the car, and contacts for directing the current generated by the car-propelling motor to the compressor-motor to maintain the air-supply in the storage-tank.

3. In a brake mechanism for cars, an air-brake cylinder, an air-storage tank, a motor-driven air-compressor, an electric car-propelling motor, contacts adapted to connect up the car-propelling motor as an electric generator when not employed in propelling the car, contacts for automatically directing the current generated by the car-propelling motor to the compressor-motor to maintain the air-supply in the storage-tank, and an automatic rheostat interposed in the line to the compressor-motor.

4. In an air-brake mechanism for cars, an air-brake cylinder, an air-storage tank, a motor-driven compressor, an electric car-propelling motor, contacts adapted to connect up the car-propelling motor as an electric generator when not propelling the car, and contacts automatically operated by the pressure of air in the storage-tank for directing the current generated by the car-motor to the compressor-motor to maintain the air-supply in the storage-tank.

5. In an air-brake mechanism for cars, an air-brake cylinder, an air-storage tank, a motor-driven compressor, an electric car-propelling motor, contacts adapted to connect up the car-propelling motor as an electric generator when the line-current is cut off therefrom, contacts automatically operated by the pressure of air in the storage-tank for directing the current generated by the car-propelling

motor to the compressor-motor, and contacts also automatically operated to admit current from the line-wire to the compressor-motor whenever the current generated by the car-motor is insufficient to maintain the air-supply in the storage-tank.

6. In an air-brake mechanism for cars, an air-brake cylinder, an air-storage tank, a motor-driven compressor, an electric car-propelling motor, contacts adapted to connect up the car-propelling motor as an electric generator when not in use for propelling the car, contacts automatically operated by the pressure of air in the storage-tank for directing the current generated by the car-propelling motor to the compressor-motor, contacts also automatically operated to admit current from the line-wire to the compressor-motor whenever the current generated by the car-motor is insufficient to maintain the air-supply in the storage-tank, and an automatic rheostat interposed in the circuit of the compressor-motor.

7. In an air-brake mechanism for cars, an air-brake cylinder, an air-storage tank, a motor-driven compressor, an electric car-propelling motor, contacts adapted to connect up the car-propelling motor as an electric generator when not propelling the car, and automatically-operated contacts for directing the current generated by the car-motor to the compressor-motor to maintain the air-supply in the storage-tank.

8. In an air-brake mechanism for cars, a pneumatic-brake mechanism, an air-compressor, a motor adapted to drive said compressor, an electric car-propelling motor, mechanism for converting said car-propelling motor into an electric generator when not in use as a motor, and an automatically-operated regulator adapted to direct the current from said generator to the compressor-motor whenever required to maintain the air-supply.

9. In a brake mechanism for cars, in combination with a car-motor and a controller adapted to alternately connect the car-motor with the line-circuit and with an air-compressor motor-circuit, a regulator for automatically controlling the current to the compressor-motor for maintaining the air-supply, said regulator consisting of a cylinder, a plunger reciprocating therein, spring-pressure operating in one direction on said plunger, and the pressure of the compressed air operating on said plunger in the opposite direction, and a series of electric contacts adapted to be closed and opened by the movements of said plunger to automatically drive the compressor and thereby maintain the air-supply.

10. In a brake mechanism for cars, a regulator for automatically directing the current to the compressor-motor for maintaining the air-supply, said regulator consisting of a cylinder, a plunger reciprocating therein, spring-pressure operating in one direction on said plunger, and the pressure of the compressed air operating on said plunger in the opposite direction, and two series of electric contacts adapted to be successively brought into use by the movements of said plunger to automatically supply current from different sources to drive the compressor-motor and thereby maintain the air-supply.

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

GUSS A. BROOKS.

Witnesses;
C. W. MILES,
C. HOGAN.