

S. G. FREUND.
BRAKE APPARATUS.
APPLICATION FILED MAR. 27, 1908.

912,459.

Patented Feb. 16, 1909.

Fig. 1.

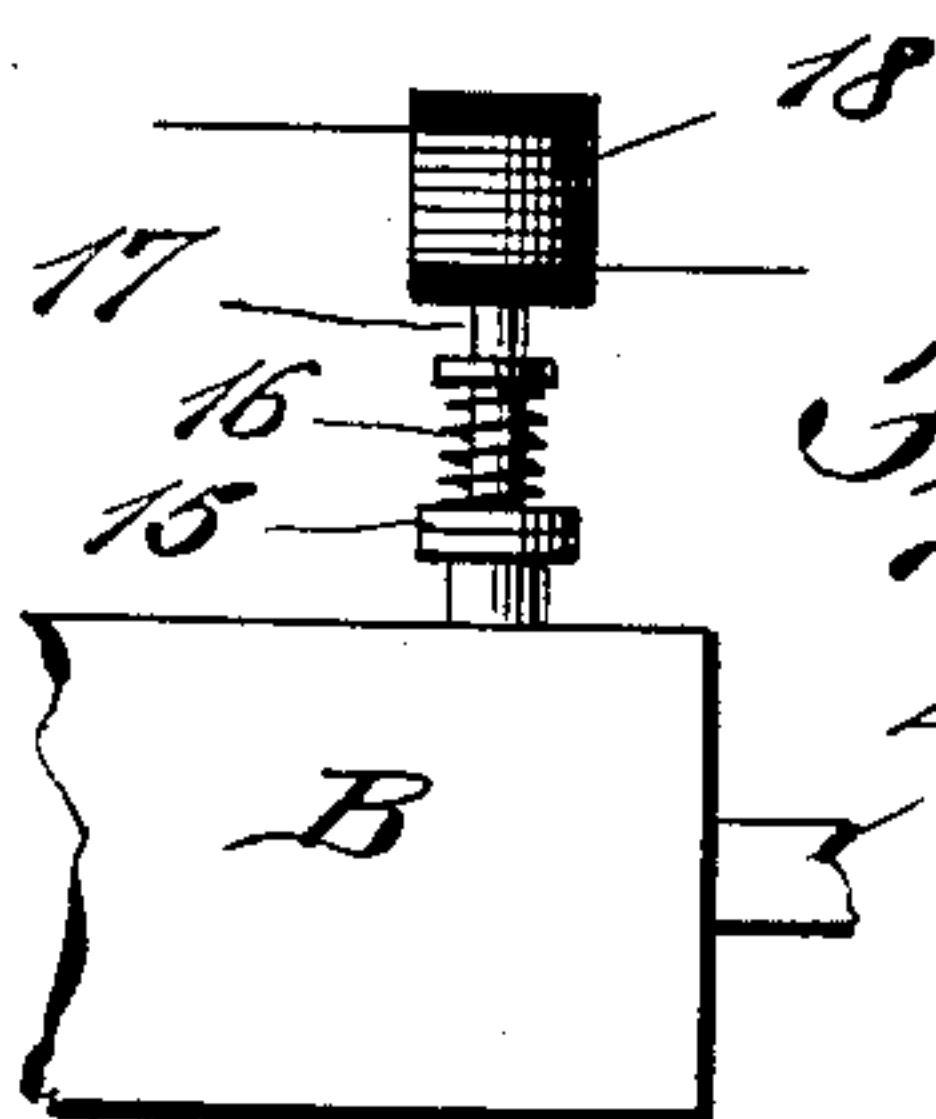
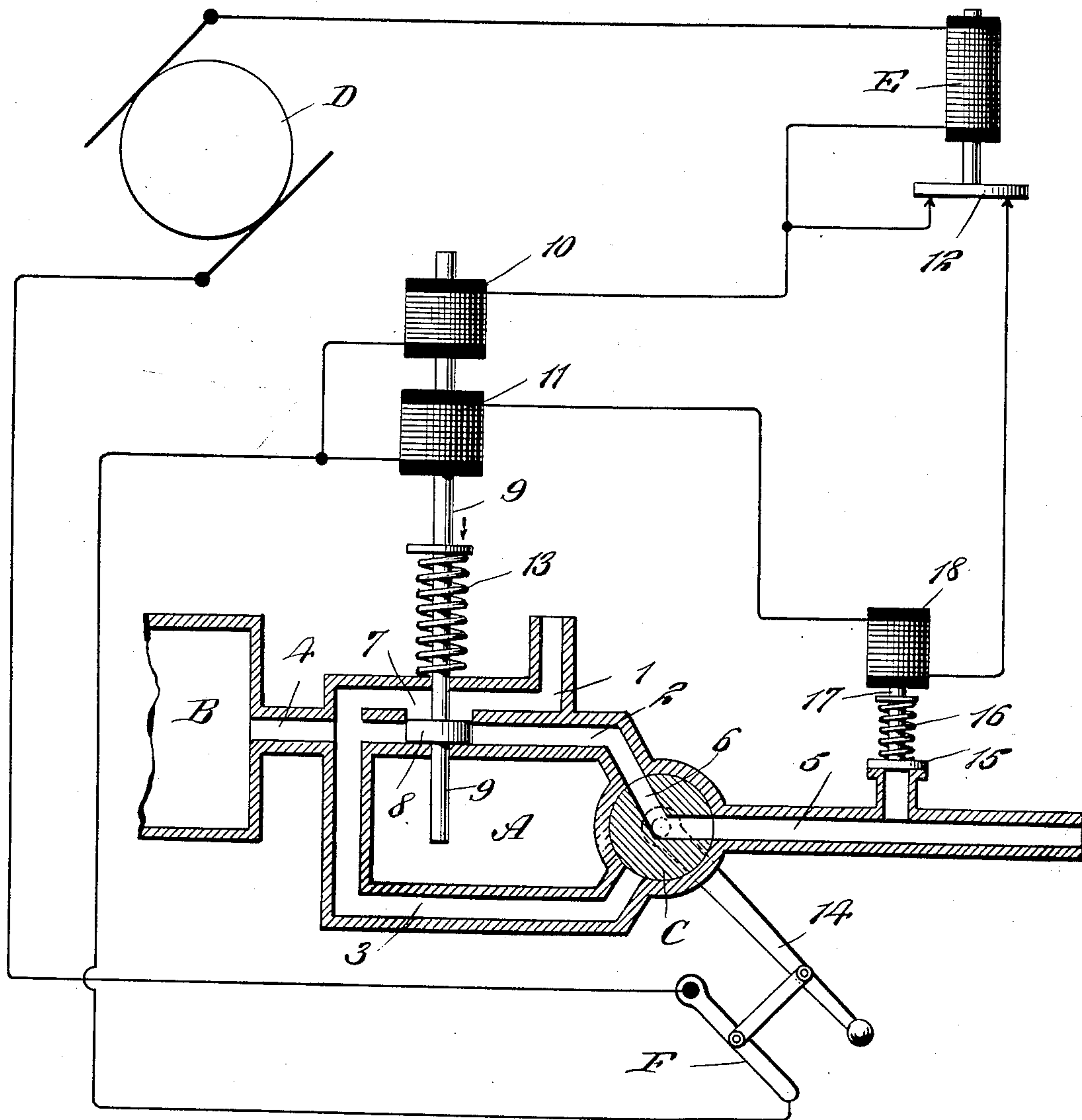


Fig. 2.

WITNESSES
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SIEGFRIED G. FREUND, OF NEW YORK, N. Y.

BRAKE APPARATUS.

No. 912,459.

Specification of Letters Patent.

Patented Feb. 16, 1909.

Application filed March 27, 1908. Serial No. 423,710.

To all whom it may concern:

Be it known that I, SIEGFRIED G. FREUND, a citizen of Germany, having applied for the second United States naturalization paper on March 18, 1908, and a resident of the city of New York, county of New York, and State of New York, have invented a certain new and useful Braking Apparatus, of which the following is a specification.

My invention relates to the automatic application and release of air brakes and is adapted for use in connection with vehicles of transportation, such as railroad cars, the motive power for which is steam or electricity.

By the use of my new method successive automatic applications and release of brakes is obtained, whereby brakes are automatically applied, released when the speed of the train has been reduced to a predetermined degree, automatically applied a second time at a desired moment, again released upon further predetermined decrease of speed, and finally applied as desired or subjected to additional applications and release.

I do not desire to limit myself to any particular form or arrangement of apparatus for carrying my method into execution, a desired arrangement being shown in the drawing herewith and described hereafter, but I wish to cover broadly my new method of brake application and release and forms of mechanism designed to carry out such method, within the spirit of my invention as set forth and falling within the scope of the claims hereto appended.

Figure 1 represents a desired form of mechanism embodying my invention, the arrangement of circuits therein being shown diagrammatically. Fig. 2 represents a detail view of a modified arrangement of certain parts of the mechanism.

Like characters of reference denote like parts in both the figures.

Turning to a detail description of my invention in connection with the embodiment thereof shown, it is as follows:

Reference letter A denotes a valve member provided with release passage 1 and passages 2 and 3 connected by passage 4 with the brake cylinder B and by passage 5 with the compressed air supply; at the point of juncture of passages 2 and 3 and of 5 is located the brake valve C with passage 6 which

is adapted to connect either passages 2 and 5 or 3 and 5 as desired; as shown connecting 2 and 5 the valve is in service position. An aperture 7 in the wall between passages 1 and 2 is of a size and form to receive a valve member 8 mounted on stem 9 which is capable of vertical movement in its bearings in valve member A and at its upper end passes through solenoids 10 and 11. The valve member 8 is normally retained in a position closing passage 2 by spring member 13, and when raised the valve 8 will open passage 2 and close passage 1.

D represents the car motor, should the vehicle be an electric car, or a small generator as desired, adapted to operate in proportion to the speed of the vehicle and connected to solenoids 10 and 11. D is also connected to a relay E. The circuit to solenoid 11 is broken when the armature 12 of relay E is raised and completed when the armature is released. The circuit to the motor D is opened or closed by means of a switch member F connected to the valve lever 14 and adapted to complete the circuit when the valve C is brought into service position.

A relief valve 15 is inserted in the passage 5 and normally retained in a closed position by spring member 16 on the valve stem 17. The stem 17 passes through a solenoid 18, the valve being thereby adapted to be opened when the solenoid is energized to draw up its armature. Solenoid 18 is placed in the circuit of solenoid 11 between it and the relay E, the circuit to 18 being completed when the armature of relay E is released. The valve member 15 may be inserted in the brake cylinder B as desired (see Fig. 2), suitable connections being then provided to form the circuit for solenoid 18.

The operation of applying brakes takes place as follows: The brake valve C is thrown into service position (as shown) thereby also closing switch F and completing the circuit between the motor D and the solenoids. Solenoid 10 is thereupon energized, its armature is raised and the valve member 8 moved upwards to open passage 2 allowing passage of compressed air to the brake cylinder and closing release passage 1; solenoid E is also energized raising armature 12 and breaking the circuit to solenoids 11 and 18. The solenoids 10, E and 11 are wound for different voltages, that of 10 being the highest;

solenoid 18 is wound for the same voltage as solenoid 11. These different voltages are adapted to certain predetermined speeds of the vehicle to which the motor D is attached, in such a manner that after the speed of the vehicle has been reduced to such a predetermined degree that solenoid 10 because of its high voltage will no longer be energized, the voltage will still be high enough to energize solenoid E; when the speed and consequent voltage have been still further reduced to a predetermined degree, solenoid E will no longer be energized, its armature will be released, thereby completing circuit to solenoids 11 and 18 and these solenoids will be energized until a still further predetermined reduction of speed and voltage brings the latter below that for which 11 and 18 are wound and they are no longer energized. It will thus be seen that the brakes having been applied when solenoid 10 is energized as described, the speed of the train will be reduced, the voltage will fall below that of solenoid 10, valve 8 will be released shutting off the compressed air and opening the release passage 1; a further reduction of speed releases armature 12, completing the circuit to solenoids 11 and 18 and again raising valve member 8 and applying the brakes; upon the second application of brakes the speed of the train being less than at the first application, it is desirable that the air pressure be approximately reduced in proportion to the reduced train speed; this result is obtained by means of valve 15 which is opened, when solenoid 18 becomes energized, to a sufficient extent to reduce the air pressure in its passage to the brake cylinder. The speed of the train having been still further reduced upon the second application of brakes and the voltage falling below that of solenoids 11 and 18 the brakes are again released; the final application of brakes is effected by throwing the valve C into the emergency position opening passage 3 and the vehicle is brought to a stop. By means of any well known form of device the air release is adapted to be closed when the valve C is thrown into emergency position. As desired, the number of successive applications may be increased by the addition of other operating solenoids such as 10 and 11, circuit solenoids such as E, and pressure-reducing solenoids such as 18.

It will be readily seen that the construction and arrangement of parts embodying my method may be in any suitable form as desired, that shown being one desirable by reason of simplicity of design and operation. The method may be adapted for use not only on single cars, but also on trains with multiple control, in which latter case every motor car may be equipped with brake-setting mechanism; however, in operation it is desired that the mechanism on the front car only be used.

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

1. In a braking apparatus in combination, a motor and a plurality of solenoids of differing voltages in circuit with said motor.

2. In a braking apparatus in combination, a motor, a plurality of solenoids of differing voltages in circuit with said motor and a valve member adapted to be operated by each of said solenoids when energized.

3. In a braking apparatus in combination, a motor, a plurality of solenoids, of differing voltages, a switch member adapted to complete the circuit between said motor and said solenoids, and a valve member adapted to be operated by each of said solenoids.

4. In a braking apparatus in combination, a motor, a plurality of solenoids, a switch member adapted to complete the circuit between the motor and one solenoid of said series, and a solenoid adapted to operate to complete the circuit between the motor and the other solenoid of said series.

5. In a braking apparatus in combination, a motor, a plurality of solenoids of differing voltages, means for completing the circuit between the motor and said series of solenoids, a solenoid not in said series, and a valve member adapted to be operated by said separate solenoid.

6. In a braking apparatus in combination, a motor, a series of solenoids, means for completing the circuit between the motor and said series of solenoids, a valve member adapted to be operated by each solenoid of said series, a solenoid not in said series, means for completing the circuit between the motor and said separate solenoid and a second valve member adapted to be operated by said separate solenoid.

7. In a braking apparatus in combination, a vehicle, a motor on said vehicle, a series of solenoids of differing voltages, a valve member adapted to be operated by each solenoid of said series, and means for successively completing the circuit between the motor and successive solenoids of said series at differing rates of speed of said vehicle.

8. In a braking apparatus in combination, a motor, a series of solenoids of differing voltages, means for completing the circuit between said motor and each solenoid of said series, an air passage, an air release passage, and a valve member adapted to be operated by one solenoid of said series to open one of said passages and to close the other of said passages.

9. In a braking apparatus in combination, a motor, a series of electro-magnets, means for completing the circuit between the motor and each electro-magnet of the series, an air passage, an air release passage and a valve member adapted to be operated by each electro-magnet of the series successively to

open one of said passages and to close the other of said passages.

10. In a braking apparatus in combination, a series of electro-magnets, an air passage, an air release passage, and means adapted to be operated by each of the electro-magnets successively to open one of said passages and to close the other of said passages at differing rates of speed of a vehicle.

11. In a braking apparatus in combination a motor and a plurality of electro-magnets of differing voltages in circuit with said motor.

12. The combination with a braking apparatus of a series of electro-magnets adapted to operate to successively set and release the brakes of a vehicle.

13. The combination with a braking apparatus of a motor, a series of electro-magnets, and means for completing the circuit be-

tween the motor and successive electro-magnets of the series at differing rates of speed of a vehicle.

14. The combination with a braking apparatus of a motor, a series of electro-magnets, and means for successively completing the circuit between the motor and successive electro-magnets of the series.

15. The combination with a braking apparatus of a series of electro-magnets adapted to operate to successively set the brakes of a vehicle at differing rates of speed of the said vehicle.

In testimony whereof I have hereunto signed my name to this specification in the presence of two subscribing witnesses.

SIEGFRIED G. FREUND.

Witnesses:

FREDERICK R. SLATER,
ALBERT RUCKGABER.