

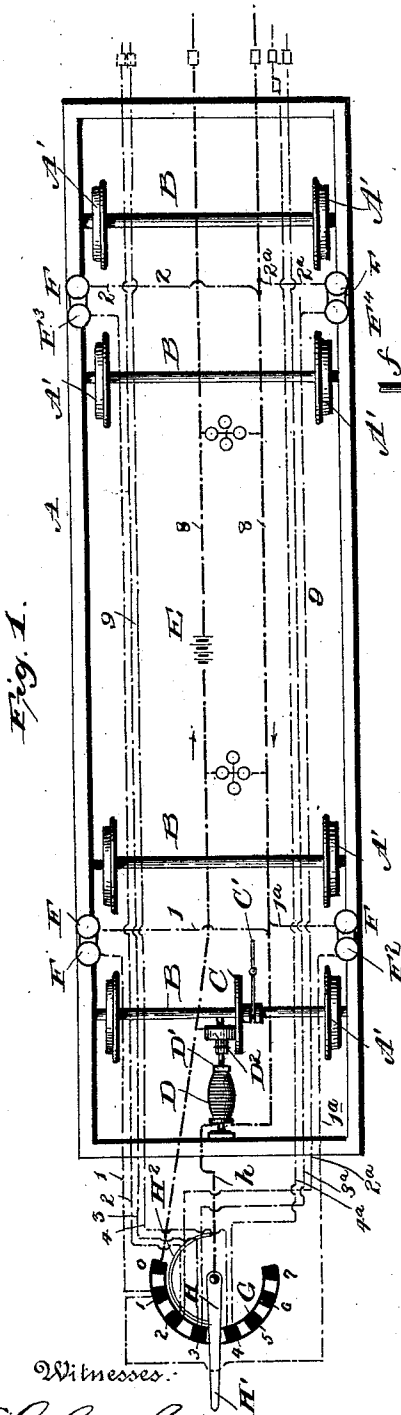
(No Model.)

G. W. SWARTZ.

ELECTRIC TRAIN LIGHTING AND BRAKING SYSTEM.

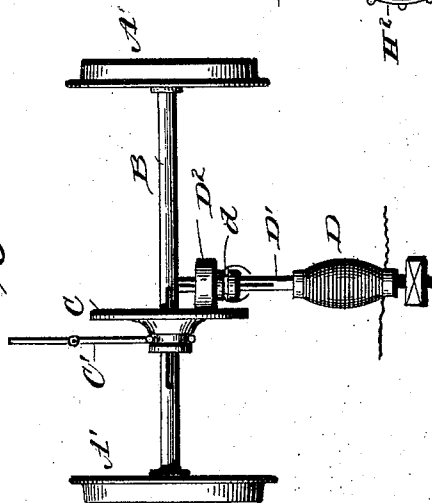
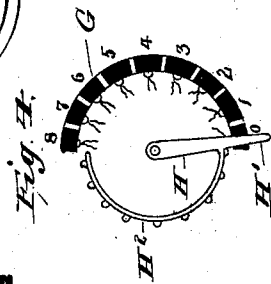
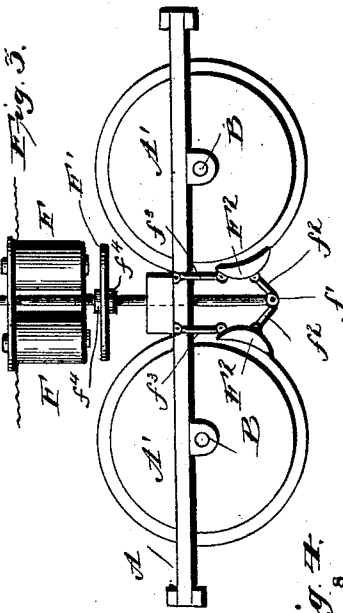
No. 517,498.

Patented Apr. 3, 1894.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE.

GEORGE W. SWARTZ, OF FLORENCE, ALABAMA.

ELECTRIC TRAIN LIGHTING AND BRAKING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 517,498, dated April 3, 1894.

Application filed September 1, 1893. Serial No. 484,585. (No model.)

To all whom it may concern:

Be it known that I, GEORGE W. SWARTZ, a citizen of the United States, residing at Florence, in the county of Lauderdale, State of Alabama, have invented certain new and useful Improvements in Electric Train Lighting and Braking Systems, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in devices for lighting and stopping trains by electricity, and it has for its objects among others to provide simple and efficient means, applicable to any and
15 all styles of cars, whereby electricity is collected and stored, and the current maintained at a standard so that as the speed of the train is decreased or the train comes to a standstill, the lights will remain as bright as when
20 the train is traveling at its greatest rate of speed.

I place a generator in the front part of the train, as for instance, in the baggage car, where it is arranged to be driven from the
25 axle of the car on which there is an adjustable disk which is engaged by a friction pulley (preferably of rubber) on the armature shaft and is rendered adjustable for a purpose which will soon appear. The speed of
30 the armature of the generator is automatically regulated by means of a magnet connected with a lever that clutches the rubber friction pulley on the armature shaft so that when the current becomes above standard a
35 part of the current shunts through the magnet and attracts the armature of the magnet up and causes the rubber friction pulley or disk to be moved toward the smaller part of the driving disk on the axle and the speed
40 of the armature shaft is lessened by reason of its position on the disk; when the train slows up and the current gets below standard the armature of the magnet will drop and cause the disk to move back toward the outer
45 edge of the driving disk and thereby increase the speed of the armature. Under the car I place storage batteries connected with the generator by suitable wires, said batteries being connected in series and wired back to
50 the engine and arranged so that when the engineer turns a switch on a certain contact point the current will flow from the main cir-

cuit of the generator around suitable magnets located on the trucks of the cars and to the armatures of which are connected rods 55 which are connected with brake shoes by means of pivotal connections so that the attraction of the armatures of the said magnets will cause the brakes to be applied.

Other objects and advantages of the invention will hereinafter appear and the novel features thereof will be specifically defined by the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters and figures of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a diagrammatic view showing my invention and the various circuits. Fig. 70 2 is a top plan of the generator and its friction pulley or disk and the driving disk on the axle. Fig. 3 is an enlarged side elevation showing the brake mechanism. Fig. 4 is a detail of the switch.

Like letters and figures of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates the frame of the truck, B the axles, and A' the wheels, all of 80 known or approved construction. On the front axle is a friction driving disk or wheel C which is mounted thereon to rotate therewith and yet capable of longitudinal adjustment when desired; this movement length- 85 wise of the axle is accomplished by means of a pivoted lever C' carrying a clutch engaging the hub of the disk as seen in Figs. 1 and 2 and the lever being extended upward to within convenient reach from the interior of 90 the car.

D is a generator of any approved construction suitably supported preferably within the baggage car and D' is the armature shaft upon which is mounted to rotate therewith a 95 friction pulley, disk or wheel D² (preferably of rubber) which is also capable of movement lengthwise of the shaft the hub thereof being provided with an annular groove *d* as seen best in Fig. 2 to receive a clutch con- 100 nected with a lever for moving it along the shaft for a purpose which will hereinafter be made apparent.

At any convenient point or points along

the under side of the car I arrange storage batteries E of any known form and which are connected with the generator wires, said batteries being connected in series and wired back to the engine as shown in Fig. 1 and so connected and arranged that by the movement of a switch on the engine the current will flow from the main circuit of the generator around suitable magnets located on the truck and adapted to operate the brakes. These magnets F are suitably supported and their armature F' each has connected therewith a vertical rod *f* which is mounted to slide freely through a suitable guide on the frame of the truck and has pivotally connected to its lower end as at *f'* the rods *f*² which in turn are pivoted to the brake shoes F² as seen best in Fig. 3, the shoes being loosely suspended from the frame of the truck by the links *f*³ as is also best shown in said Fig. 3. These shoes are arranged between the wheels so that when the current is switched around the brake magnets the armatures thereof will be attracted and the shoes brought into engagement with the wheels; as soon as the switch is moved so as to stop the flow of the current around the magnets demagnetism sets in and the armature falls away from the magnets and the brakes are released.

The storage batteries are employed for the purpose of supplying current to furnish lights for the train when at a standstill, and to maintain the current as the train slows up coming into stations and at such times as the speed of the train becomes so slow that the generator will not generate a sufficient current to actuate the brake magnets and continue the lights, then the stored energy from the storage batteries comes into play and furnishes the necessary current for the purpose. The rod *f* is screw-threaded as seen in Fig. 3 and nuts *f*⁴ are provided for the purpose of adjusting the armature to cause it to act more or less readily as may be desired.

G is the switch; it is located on the locomotive in close proximity to the hand of the engineer, and on said switch there should be as many contact points as there are trucks on the trains, there being preferably one over each pair of trucks; these contact points are numbered, and the movable contact H carries the metallic quadrant H², and has a handle H' by which it is moved as desired; to one end of this pivoted contact plate is connected the positive wire *h* from the generator which circuit is connected with the O contact plate, and leads back to the storage battery or batteries and is connected to the positive terminal thereof, the battery cells being connected in series and the main circuit connected to the negative terminal of the cells where it comes from said cells; the number of cells employed will be determined by the voltage of the generator, which will be preferably one hundred and ten volts and then fifty-five cells will be used which will main-

tain the electro motive force of one hundred and ten volts at such times as the train is stopped or the generator is not furnishing current. The contact points of the switch are insulated from each other in any suitable way and the brake circuit 9 is wired to these contact points, there being two wires to each contact point. From the contact point No. 1 of the switch there is a brake circuit 1 which runs to the brake magnet F' and from thence and connects with the negative terminal of the lamp circuit 8; there is also a wire 1^a connected with the contact point 1 of the switch and running to brake magnet F² and around the coils of the solenoid and connects to the negative terminal of the lamp circuit. The contact point or plate 2 of the switch is wired by wires 2 and 2^a in a similar manner to the brake magnets F³ and F⁴ all as shown in Fig. 1, said magnets being located on the next pair of trucks as shown. Each contact point is connected in a similar manner with the other brake magnets; if there are more trucks there should be more contact points. I have shown two more with their wires 3 and 3^a and 4 and 4^a, this being deemed sufficient for the proper understanding of the invention.

With the parts constructed and arranged substantially as above set forth the operation will be as follows;—the revolution of the axle will generate the electricity as will be readily understood; it will also be readily comprehended how the disks are moved back and forth on their shafts for the purpose hereinbefore set forth. As the train is required to slow up the engineer moves the contact plate H on the contact point 1; the brake magnets F' and F² are thus energized and the brakes applied, said magnets being brought into circuit, and when the movable contact is moved onto the contact point 2 the magnets F³ and F⁴ are energized and their brakes applied. Soon throughout the whole train if necessary. Now should the movable contact plate be moved on the O contact point which is connected only with the lamp circuit 8 as seen in Fig. 1, the brake circuit will be cut out and the armatures of the brake magnets, being no longer attracted, fall and the brakes are released. The lamp circuit 8 is arranged so that there is a main positive wire from the contact plate H which is connected to the positive pole of the generator and thence through the cars or whole train, and from the negative terminal a circuit runs back through the cars, as seen in Fig. 1; the current for the lamps is taken from the positive circuit, carried through the lamps and to the negative or return circuit.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as new is—

1. The combination with a generator and co-operating means including an adjustable rubber friction disk or pulley on the car axle, of brake magnets and their brakes, a switch, an electric light circuit, a storage battery in the

light circuit and connections between the generator, switch and light circuit and brake magnets, as set forth.

2. The combination with the axle and the
5 driving disk adjustably mounted thereon, of the generator having a shaft provided with an adjustable rubber friction disk or pulley, and storage batteries in circuit to be charged
10 from said generator to maintain the light current while the train is not in motion, as set forth.

3. In a system of electrical distribution, the combination with one or more brake circuits connected in multiple with a lamp circuit and storage battery of a sufficient number of cells to bring the voltage to the same
15 potential as the generator, shunt circuits between the brake and lamp circuits a lamp circuit and a brake circuit and both circuits

in multiple series for the purpose of lighting 20 a train and actuating electro magnetic brakes for stopping the same, and a switch connected with the generator and with each of the circuits, as set forth.

4. The combination with the brake magnets 25 and their armature, of a rod connected with the armature, and screw threaded, nuts on the threaded portion above and below the armature, brake shoes pivotally connected with said rod, and links suspending the brake
30 shoes from the frame of the truck, as set forth.

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

GEORGE W. SWARTZ.

Witnesses:

WM. S. HULL,

A. G. NEGLEY.