

(No Model.)

3 Sheets—Sheet 1.

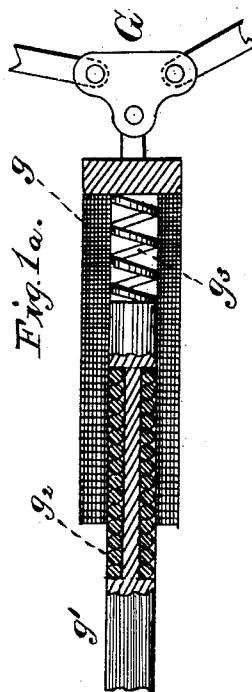
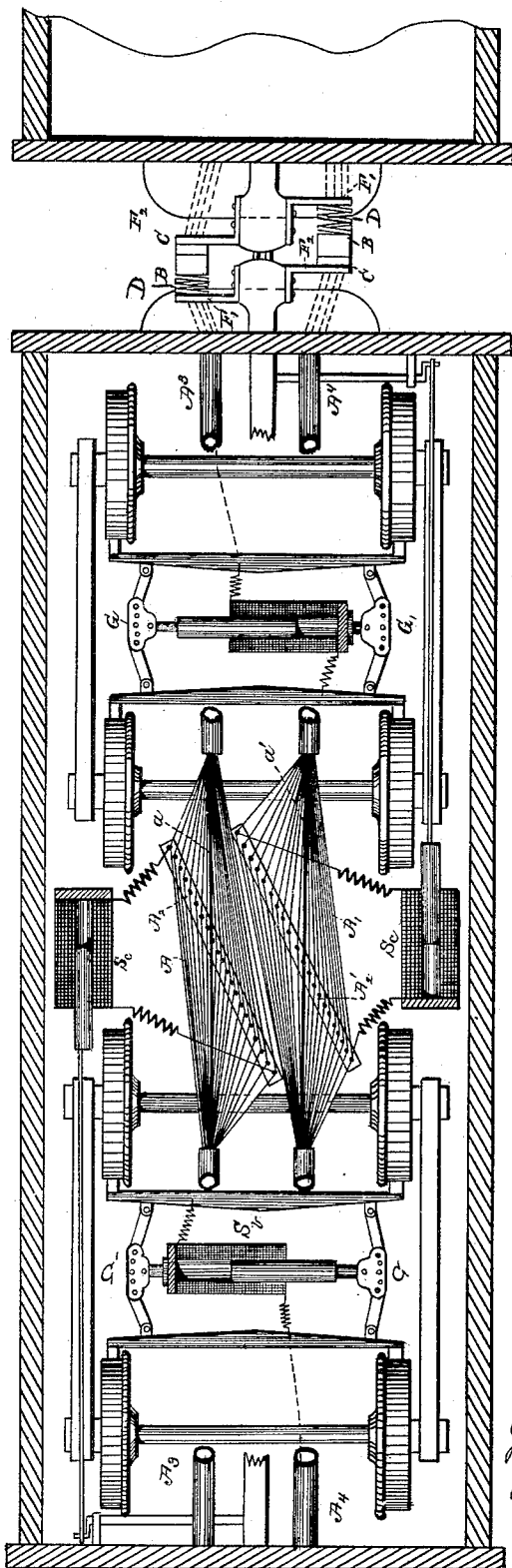
J. D. COLLIER & J. K. P. MILLER.

ELECTRIC CAR BRAKE.

No. 462,793.

Patented Nov. 10, 1891.

Fig. 1.



Witnesses
H. B. Harris
J. C. Wilson.

Inventors
James Dallas Collier
James K. P. Miller
by
Hittman & Wilkinson
Attorneys

J. D. COLLIER & J. K. P. MILLER.

ELECTRIC CAR BRAKE.

No. 462,793.

Patented Nov. 10, 1891.

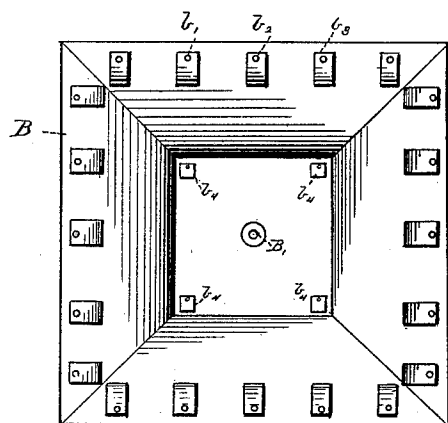


Fig. 2.

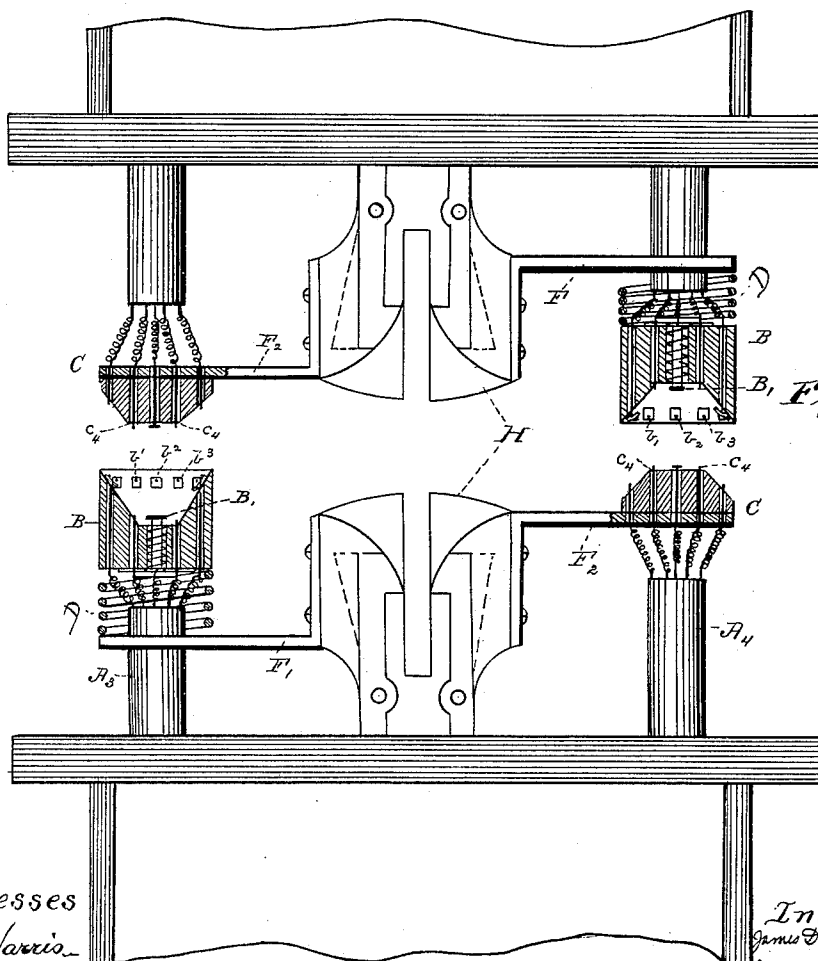


Fig. 3.

Witnesses
M. B. Harris
J. C. Wilson

Inventors
James D. Collier
James L. P. Miller
by
H. H. H. H. H.
Attorneys

J. D. COLLIER & J. K. P. MILLER.

ELECTRIC CAR BRAKE.

No. 462,793.

Patented Nov. 10, 1891.

Fig. 4.

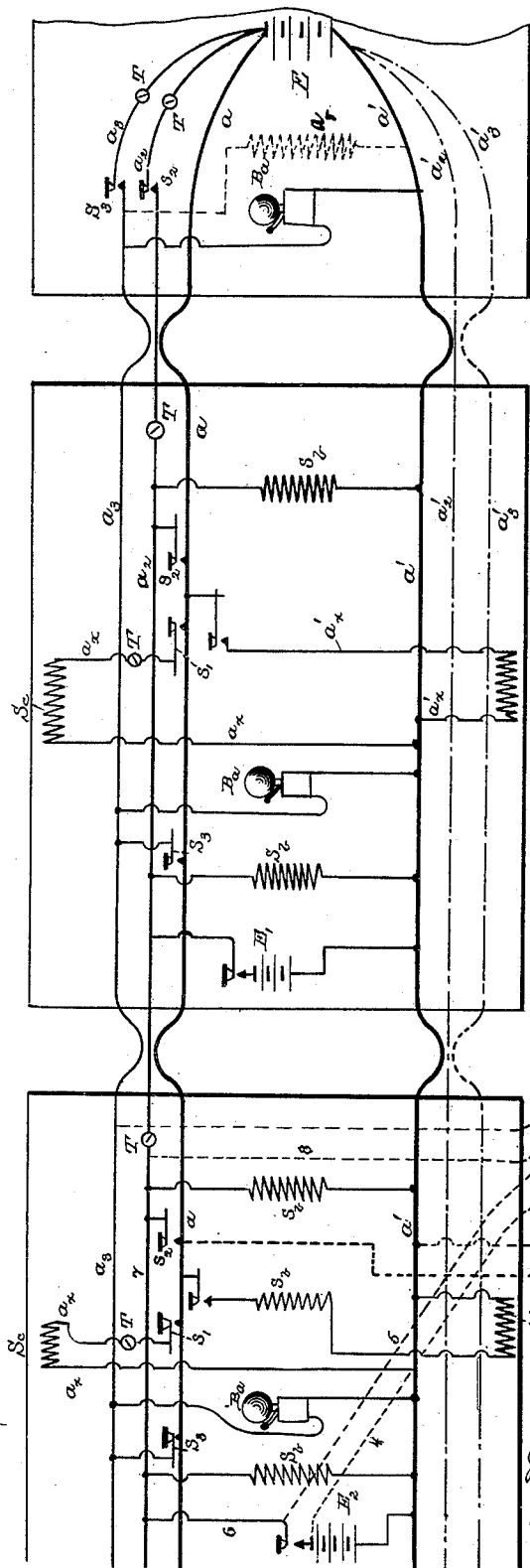
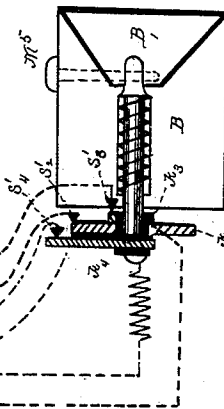


Fig. 5.



Witnesses
M. B. Harris
J. L. Wilson.

Inventors
James Dallas Collier
James K. Polk Miller
by
Hutman & Wilkinson
Attorneys

UNITED STATES PATENT OFFICE.

JAMES DALLAS COLLIER AND JAMES K. POLK MILLER, OF WOODVILLE,
TEXAS, ASSIGNORS OF ONE - THIRD TO JOHN H. KIRBY, OF SAME
PLACE.

ELECTRIC CAR-BRAKE.

SPECIFICATION forming part of Letters Patent No. 462,793, dated November 10, 1891.

Application filed February 4, 1891. Serial No. 380,150. (No model.)

To all whom it may concern:

Be it known that we, JAMES DALLAS COLLIER and JAMES K. POLK MILLER, citizens of the United States, residing at Woodville, in the county of Tyler and State of Texas, have invented certain new and useful Improvements in Electrically-Controlled Car-Brakes; and we 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.

Our invention relates to the application of electricity to various purposes of coupling and uncoupling, putting on and taking off brakes, signaling from car to car or from locomotive to cars, or vice versa, to lighting trains, and to such other purposes as it may be adapted.

The said invention consists in a suitably-controlled electric circuit extending throughout the train, and in such other devices as will be hereinafter described and claimed.

Reference is had to the accompanying drawings, wherein the same parts are indicated by the same letters.

Figure 1 represents a plan view of the lower portions of a car, (the car-body and frame-work being removed and parts being broken away,) showing various applications of our invention. Fig. 1^a is a sectional view of a modification of the brake solenoid and armature shown in Fig. 1. Fig. 2 represents an end view of one-half of our electric-circuit coupler. Fig. 3 represents a horizontal section through the car-coupler and the two sections of our electric-circuit coupler attached to the same end of the car. Fig. 4 is a diagram showing one method of making the various connections through the car-brakes, car-couplers, signal-bells, &c. Fig. 5 represents our method of applying brakes and sounding an alarm should any cars become uncoupled or break loose.

Although a number of broken circuits connected to one single return wire would ordinarily be sufficient, yet to make connections adapted to the condition that either end of the car may be shifted next to the locomotive or to the source of electricity we have found

it necessary to employ either one electric-wire coupler in the center of the car, in which case the mechanical difficulties as well as the danger from short-circuiting would be great, or two electric-wire couplers on either side of the car, with the current passing through one and returning *via* the other. In this case will be necessary either an automatic means of shifting the current or a double system of wires in each car. We prefer the double system of wires, as shown in the drawings.

A and A' represent two such systems of wires connected to key-boards A² and A'², arranged in each car. The central wire *a* or *a'* of each group is much larger than the others. All the wires are well insulated, and after leaving their respective key-boards the two groups of wires are gathered together in flexible tubes A³ and A'⁴, preferably of soft-rubber pipes, leading to the electric couplings B and C. Here each wire is connected to its own proper contact-piece, by which it is connected to a corresponding wire in the car next ahead or next behind.

In Fig. 1 we have shown twenty-one wires in each group; but the number of these wires may be less or greater, as may be desired. The electric circuits are completed from car to car by means of male and female couplers C and B, respectively. These circuit-couplers may be secured to the body of the car in any way; but we prefer to connect them to the draw-head H of the car-coupler by angle-irons or brackets F' and F², to which said brackets are secured. By this means the spring attached to the base of the car-coupler co-operates with the springs on the circuit-couplers to lessen the effect of vibrations in the cars. The body of these circuit-couplers is of insulating material, and the two faces in contact have a number of contact-strips *b'* *b*² *b*³ *b*⁴, &c., made of elastic metal, each connected to its proper wire. These contact-strips are pressed together by bending the metal sufficiently in either one of each pair to make a spring of it, or by placing a small spring under one of each pair. Moreover, the two parts of the coupler are kept in close contact by means of a spiral spring D, attached to the base of either half of the circuit-cou-

ler. We have shown it as attached to the base of the female portion of the circuit-coupler; but it might be applied to the male portion or to both equally well. We preferably make the male circuit-coupler in the form of the frustum of a truncated quadrangular pyramid. Owing to the wedge shape of C it will slide into and be centered by B. At each corner of the top of C we have four metallic contact-strips c^4 , which press against the contact-strips b^4 , similar in other respects to $b^1 b^2 b^3$, &c. Both c^4 and b^4 being connected each to a corresponding wire, add four circuits to our system.

In the center of all the female couplers we have a metallic plunger B', pressed out by a spiral spring at its base and making contact with a plate we have connected to the large central wire of each group, and this connection forms the return circuit for all the wires of the opposite group. Attached to the base of this plunger we have three contact-makers k^2, k^3 , and k^4 , (see Fig. 5,) which complete the circuit, sounding an alarm and applying the brakes when any of the cars become uncoupled or break loose. It will be seen that with our arrangement of electrical couplings it is immaterial which end of the car is next the locomotive or the supply of electricity. Both couplers may have a cap (not shown) to keep out rain, grease, particles of dust, &c.

E, Fig. 4, represents the main source of electricity, which may be either a dynamo or storage-battery carried on the locomotive or tender. We also provide small auxiliary storage-batteries $E^1 E^2$, &c., in each car for use should that car become disconnected from the main supply of electricity; or the supply of electricity may be obtained from a number of storage-batteries, one or more in each car, connected throughout the train.

G and G' represent the brakes, consisting of two toggle-joints connected at each end to the brake-beams and at their centers to the solenoid and to its armature. By passing a current through the solenoid they are powerfully attracted, and the two parts tend to straighten their respective toggle-joints and so press the brakes against the wheels; but any other equivalent mechanical device would operate equally well. Both sections of the solenoid should preferably be wound, and in opposite directions. When it is desired to remove the brakes, a switch may be arranged to throw the current through the two sections of the solenoid in the same direction, or a withdrawing-spring may be secured to the two parts of the solenoid. When the current is cut off, the spring will force the two portions apart, thus removing the brakes. These mechanical features, which may easily be arranged by any one skilled in the art, are shown in one form in Fig. 1^a, where G represents the toggle-joint, g the coil of the solenoid proper, and g' an armature, also having a coil g^2 wound thereon.

g^3 represents a spring tending to release the brakes.

Three sets of connections are shown in Fig. 4. There a and a' represent the two large central wires of each group, connected to the positive and negative poles, respectively, of the source of electricity. a^2 and a'^2 represent the two wires connected to the brake-circuit. a^3 and a'^3 represent the wires connected to one of a system of signal bells or alarms, and a^x and a'^x represent the wires connected to the various coupling-solenoids. The number of the various circuits may be increased or diminished as may be required, and also various combinations of the different wires may be made.

Since the wires on one side of the car are symmetrical with those on the other side, we shall only describe the connections on one side of the car. The use of the duplicate system of wires may be avoided by having one central electrical coupling with all the wires passing therethrough; but in this case the danger of short-circuiting would be greater. Having two systems of wires, a double series of contact-makers will be necessary; but we will describe those on one side of the car only. The two large wires a and a' are connected to each pole of the battery and are each in unbroken electrical connection throughout the train. The brake-solenoids S^b have one end of the wire of each connected to the wire a' , and the other end connected to the wire a^2 , which should be of small resistance. A contact-maker s^3 in each car is arranged to connect the wire a^2 with the wire a , and so complete the circuit through all the brake-solenoids whenever it is desired to put on the brakes. Now if connection be made through any one of the said contact-makers in any car, the current coming from the positive pole of E will follow along a to the point of contact, whence it will travel to the wire a^2 , and dividing a portion of said current will pass through each one of the brake-solenoids, returning to the source of electricity by the wire a' .

A galvanometer T or other indicator is added to inform the engineer that the circuit is completed and that the brakes are on. I may also place a galvanometer or other indicator on each wire in each car, should that be deemed advisable. In the same way by making the contact s' any one of the car-coupling solenoids S^c may be put into action. These electrically-controlled car-couplings are fully described in our application, Serial No. 381,858, filed February 18, 1891. Or by making the connection s^3 all the alarm-bells B^a may be sounded. For this bell-circuit a resistance-coil a^r should be introduced, as shown in dotted lines on Fig. 4. It will be evident that the number of circuits may be multiplied indefinitely. The wires on the opposite side of the car (shown in broken lines) have similar connections. (Not shown.)

In the device shown in Fig. 5, k^2 and k^3 rep-

resent two metallic cross-bars attached to but insulated from the metal plunger B' and electrically connected to the wire a . It will readily be seen that one cross-bar would do for both contacts. k^4 is another metallic contact-strip, insulated from the two cross-bars k^2 and k^3 , and also from the plunger B'. When the cars are coupled together, the plunger B' is pushed in, keeping the cross-bars k^2 and k^3 clear of the contact-points s'^2 and s'^3 , which are connected to the wires a^2 and a^3 , respectively. Should a part of the train break loose, the plunger B' on the last car remaining on the train and the first car of those broken loose will be released, and the cross-bar k^2 will strike s'^2 and k^3 will strike s'^3 . When k^2 strikes s'^2 , the circuit will be completed through the brake-solenoids, and when k^3 strikes s'^3 the circuit will be completed through the alarm-bells B^a. This is apparent for the part of the broken train next to the main source of electricity; but to apply the brakes and sound the alarm for the other portion of the train, connection is made with the storage battery or cell in each car. This connection may be readily made in a great variety of ways. For example, we may provide a contact-piece k^4 , secured to but insulated from B', said bar pressing against a contact-piece s'^4 , when the plunger B' is released. The current from the secondary battery E² then goes through the wires 4 5 6 7, and thence through the solenoid S^b to the wire a' , connected to the opposite pole of said secondary battery. It is evident that all the secondary batteries may be connected to the wire 4, and hence the combined effect of all the said batteries may be obtained and all the brakes be applied on the broken-off section of the train.

To prevent the last car of a train from keeping on brakes by this automatic device just described, it will be necessary to have some locking device M³ (see Fig. 5) to keep the plunger B' from springing forward. A switch to open the circuit would effect the same result. It will also be evident that the various secondary batteries may be so connected together and to the principal source of electricity that the combined effect of any number of said sources of electricity may be simultaneously obtained.

Since the variety of combinations and the arrangements possible with a limited number of wires connected from car to car, as described by us, is very great, we do not mean to limit ourselves to any particular means of performing a given function where numerous equivalent means would readily suggest themselves to one skilled in the art; but

What we do claim, and desire to secure by Letters Patent of the United States, is—

1. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material, the one

block adapted to fit snugly in a recess in the other block, both blocks being perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to different cars and being pressed together by a spring or springs, substantially as described.

2. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material, the one block being in the form of the frustum of a quadrangular pyramid and registering with a recess in the other block, both blocks being perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to different cars and being pressed together by a spring or springs, substantially as described.

3. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material, the one block being in the form of the frustum of a quadrangular pyramid and registering with a recess in the other block, both blocks being perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, and one block having a plunger pressed forward by a spring, one end of said plunger being normally against the contact-piece of the coupler attached to the next car, and the opposite end of said plunger having a device for making electrical connections through one or more circuits when the plunger is released, substantially as described.

4. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material, the one block being in the form of the frustum of a quadrangular pyramid and registering with a recess in the other block, both blocks being perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, and one block having a plunger pressed forward by a spring, one end of said plunger bearing normally against the contact-piece of the coupler attached to the next car, and the opposite end of said plunger carrying two metallic cross-bars, with a third metallic contact-piece insulated from the said two bars and the said plunger, with contact-pieces opposite each of the said cross-bars and the said contact-piece, whereby connection is made in three circuits when the plunger is released, substantially as described.

5. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material perforated with wires terminating in contact-pieces cor-

respondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to the draw-heads on the different cars and being pressed together by a spring or springs, substantially as described.

6. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material, the one block adapted to fit snugly in a recess in the other block, both blocks being perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to the draw-heads on different cars and being pressed together by a spring or springs, substantially as described.

7. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material, the one block being in the form of the frustum of a quadrangular pyramid and registering with a recess in the other block, both blocks being perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to the draw-heads on different cars and being pressed together by a spring or springs, substantially as described.

8. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to the draw-heads on the different cars and being pressed together by a spring or springs, one of each pair of said electric couplers having a metallic plunger, with a spring pressing said plunger against a contact-plate on the other electric coupler, said plunger and contact-plate being connected to a series of metallic cross-pieces, which, when the plunger is released, strike a number of contact-points, substantially as described.

9. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material, the one block adapted to fit snugly in a recess in the other block, both blocks being perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to the draw-heads on different cars and being pressed together by a spring or springs, one of each pair of said electric couplers having a metallic plunger, with a spring pressing said plunger against a contact-plate on the other electric coupler, said plunger and contact-plate being connected to wires in the circuit, and said plunger carry-

ing a series of metallic cross-pieces, which, when the plunger is released, strike a number of contact-points, substantially as described.

10. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material, the one block being in the form of the frustum of a quadrangular pyramid and registering with a recess in the other block, both blocks being perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to the draw-heads on different cars and being pressed together by a spring or springs, one of each pair of said electric couplers having a metallic plunger, with a spring pressing said plunger against a contact-plate on the other electric coupler, said plunger and contact-plate being connected to wires in the circuit, and said plunger carrying a series of metallic cross-pieces, which, when the plunger is released, strike a number of contact-points, substantially as described.

11. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to the draw-heads on the different cars and being pressed together by a spring or springs, one of each pair of said electric couplers having a metallic plunger, with a spring pressing said plunger against a contact-plate on the other electric coupler, said plunger and contact-plate being connected to a series of metallic cross-pieces k^2 and k^3 , attached to the plunger but insulated therefrom, said cross-pieces being arranged, when the plunger is released, to strike a number of contact-points and complete a number of circuits, substantially as described.

12. In an electrical system for use on continuous trains, a circuit-coupler for connecting the wires from car to car, consisting of two blocks of insulating material perforated with wires terminating in contact-pieces correspondingly arranged on the faces of said blocks in contact with each other, said blocks being attached to the draw-heads on the different cars and being pressed together by a spring or springs, one of each pair of said electric couplers having a metallic plunger, with a spring pressing said plunger against a contact-plate on the other electric coupler, said plunger and contact-plate being connected to a series of metallic cross-pieces k^2 , k^3 , and k^4 , attached to the plunger but insulated therefrom, said cross-pieces being arranged, when the plunger is released, to strike a number of contact-points and complete a number of circuits, substantially as described.

13. An electric brake for railway-cars, consisting of a pair of brake-beams with brake-shoes thereon, an electro-magnet connected to suitable mechanism for applying the brake-shoes at one end of said pair of brake-beams, and an armature adapted to be drawn to the said magnet, said armature being connected to suitable mechanism for applying the brake-shoes at the other end of the said pair of brake-beams, substantially as described.

14. An electric brake for railway-cars, consisting of an electro-magnet and armature placed between the wheels of a car-truck, the said magnet being connected to a toggle-joint connecting the brake-beams at one end, and the said armature being connected to a toggle-joint connecting the brake-beams at the other end, substantially as described.

15. In an electric brake for railway-cars, the combination, with an electro-magnet and armature placed between the wheels of a car-truck, the said magnet being connected to a toggle-joint connecting the brake-beams at one end, and the said armature being connected to a toggle-joint connecting the brake-beams at the other end, and the said magnet and armature being normally held apart, of a system of electrical connections by which the said magnet or the said magnet and armature may be electro-magnetized, substantially as described.

16. In an electrical system for use on continuous trains, a double series of wires carried in flexible insulated tubes to a double pair of electrical circuit-couplers, one on either side of the car, said double system of wires each having a main wire forming the return circuit for the system connected to the circuit-coupler on the opposite side of the car, substantially as described.

17. In a system of brakes to be applied by electricity, the combination, with the source or sources of electricity, of a conductor leading from one pole thereof, said conductor being connected to one end of each solenoid for actuating the brakes, a second conductor connected to the opposite pole of the source or sources of electricity, and a third conductor connected to the opposite ends of the said brake-solenoids, all of said conductors being connected from car to car, with a contact-maker in each car for connecting the last two conductors, and so applying the brakes, substantially as described.

18. In a system of brakes to be applied by electricity, the combination, with the source or sources of electricity, of a conductor leading from one pole thereof, said conductor being connected to one end of each solenoid for actuating the brakes, a second conductor connected to the opposite pole of the source or sources of electricity, and a third conductor connected to the opposite ends of the said brake-solenoids, all of said conductors being connected from car to car, with a contact-maker in each car for connecting the last two

conductors, and so applying the brakes, a circuit-coupler connecting the wires from car to car, a spring-plunger attached to said circuit-coupler, and a contact-maker attached to said spring-plunger, whereby the brake-circuit is automatically closed in each end of a parted train, substantially as described.

19. In a system of brakes to be applied by electricity, the combination, with a source or sources of electricity at each end of a train, of a conductor leading from one pole thereof, said conductor being connected to one end of each solenoid for actuating the brakes, a second conductor connected to the opposite pole of the source or sources of electricity, and a third conductor connected to the opposite ends of the said brake-solenoids, all of said conductors being connected from car to car, with a contact-maker in each car for connecting the last two conductors, and so applying the brakes, a circuit-coupler connecting the wires from car to car, a spring-plunger attached to said circuit-coupler, and a contact-maker attached to said spring-plunger, whereby the brake-circuit is automatically closed in each end of a parted train, and a contact-maker, attached to but insulated from the said plunger, adapted to close the brake-circuit connected to the auxiliary sources of electricity in the rear end of the parted train, substantially as described.

20. In a system of brakes to be applied by electricity, the combination, with a source or sources of electricity in each car of the train, of a conductor leading from one pole thereof, said conductor being connected to one end of each solenoid for actuating the brakes, a second conductor connected to the opposite pole of the source or sources of electricity, and a third conductor connected to the opposite ends of the said brake-solenoids, all of said conductors being connected from car to car, with a contact-maker in each car for connecting the last two conductors, and so applying the brakes, a circuit-coupler connecting the wires from car to car, a spring-plunger attached to said circuit-coupler, and a contact-maker attached to said spring-plunger, whereby the brake-circuit is automatically closed in each end of a parted train, and a contact-maker, attached to but insulated from the said plunger, adapted to close the brake-circuit connected to the auxiliary sources of electricity in the rear end of the parted train, and a contact-maker attached to the said plunger and making an alarm-circuit when the said plunger is released, whereby the alarm is given that the brakes are on because the train has parted, substantially as described.

21. In a system of brakes to be applied by electricity, the combination, with the source or sources of electricity, of the conductors a and a' , connected to the opposite poles thereof and to one end of the brake-solenoids, a conductor a'' , connected to the other ends of the

brake-solenoids, with contact-makers S² in
each car for completing the brake-circuit, and
a series of brakes composed of electro-mag-
nets and armatures adapted to be drawn
5 thereto, said magnets and armatures being
each connected to a toggle-joint actuating the
brake-shoes, substantially as described.

In testimony whereof we affix our signatures
in presence of two witnesses.

JAS. DALLAS COLLIER.

JAMES K. POLK MILLER.

Witnesses:

W. E. ADAMS,

JNO. H. KIRBY.