

Feb. 5, 1924.

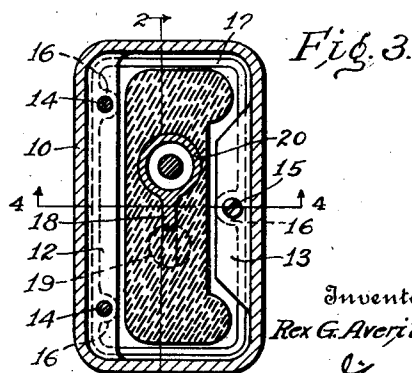
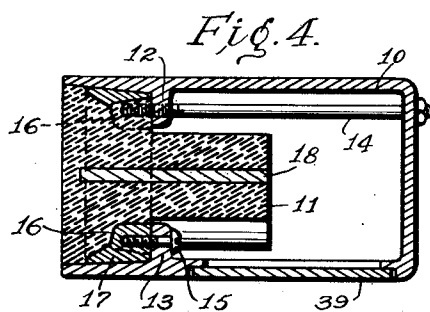
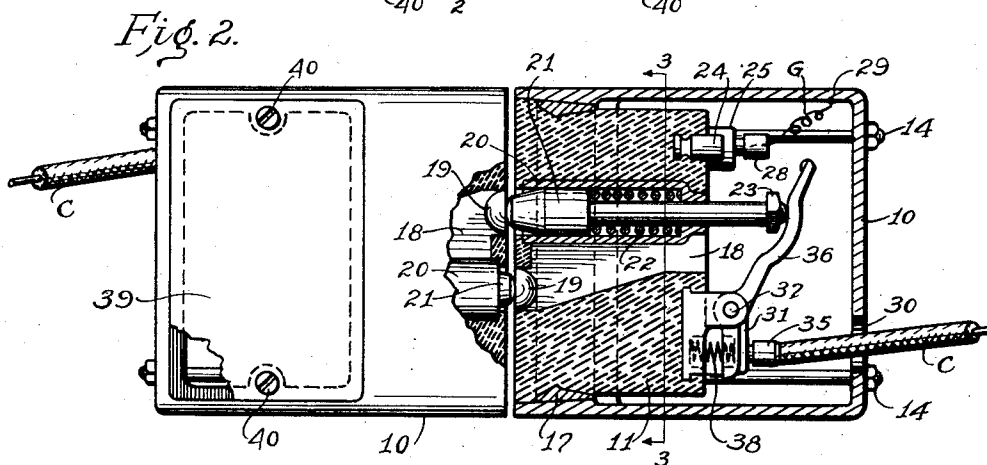
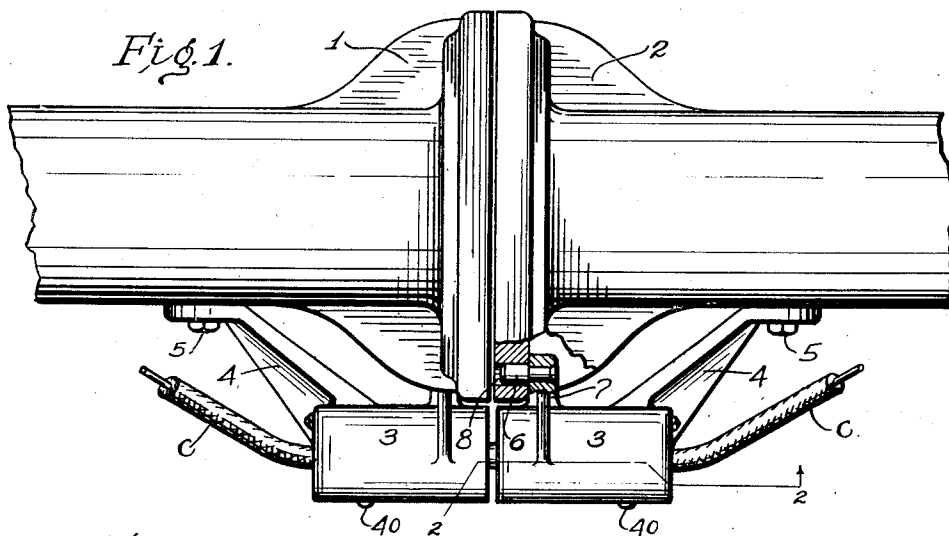
1,482,833

R. G. AVERILL

ELECTRIC COUPLER

Filed June 7, 1919

2 Sheets-Sheet 1



Witness

R. G. Averill

By

Inventor
Rex G. Averill

G. Averill
Attorney

Feb. 5 , 1924.

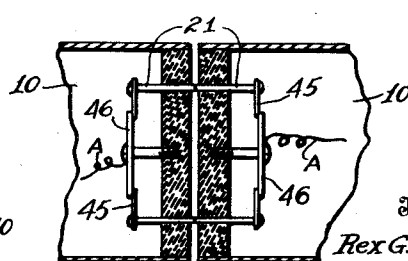
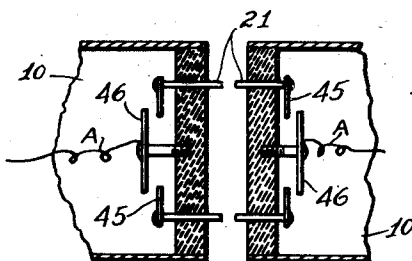
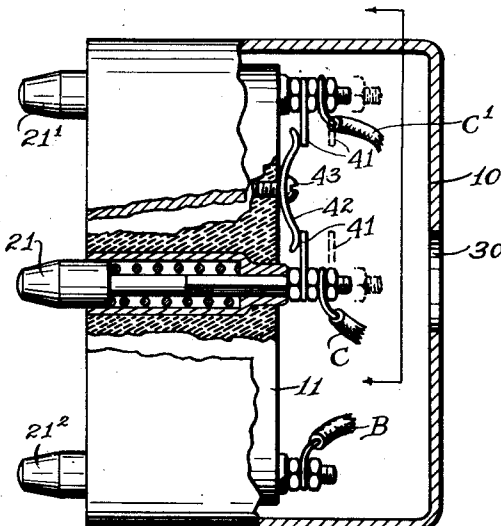
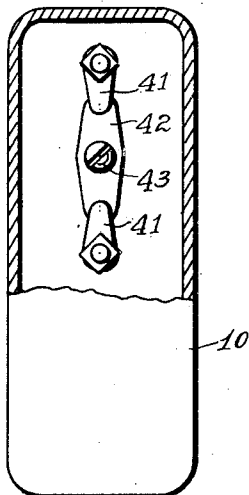
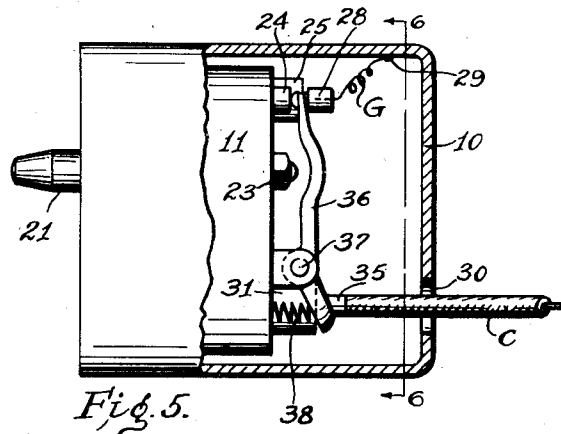
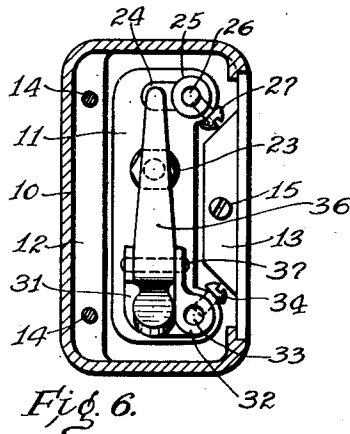
1,482,833

R. G. AVERILL

ELECTRIC COUPLER

Filed June 7, 1919

2 Sheets-Sheet 2



Witness

S. S. Mathis

Inventor
G. Averill

Rex G. Averill

Attorney

Big

UNITED STATES PATENT OFFICE.

REX G. AVERILL, OF MANSFIELD, OHIO, ASSIGNOR TO THE OHIO BRASS COMPANY, OF MANSFIELD, OHIO, A CORPORATION OF NEW JERSEY.

ELECTRIC COUPLER.

Application filed June 7, 1919. Serial No. 302,428.

To all whom it may concern:

Be it known that I, REX G. AVERILL, a citizen of the United States, residing at Mansfield, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Electric Couplers, of which the following is a specification.

This invention relates to improvements in electric couplers and more particularly to the type of electric couplers used for coupling together one or more electric circuits between two coupled cars so as to make the circuits continuous through the coupled cars.

One object of the invention is to provide an electric coupling device which shall be simple and economical to construct, capable of easy repair and which shall be effective and efficient in operation.

Another object of the invention is to provide an electric coupling device of a character that may be readily attached to automatic car coupling devices and which readily lends itself to automatic operation in coupling and uncoupling electric circuits during the coupling and uncoupling operation of said car coupling devices.

A further object of the invention is to provide in an electric coupling device mechanism operable upon impact of two electric coupling devices for controlling an electric circuit. To the attainment of these ends and the accomplishment of other new and useful objects, as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the several parts to be hereinafter more fully described and as more specifically pointed out in the appended claims.

The present invention is capable of embodiment in various forms several of which are illustrated in the accompanying drawings, and in which:

Fig. 1 is a side elevation of the adjacent end portions of two car coupling devices shown as coupled together and as having secured thereto electric coupling devices embodying my invention and which latter devices are also in coupling engagement.

Fig. 2 is a plan view of the electric coupling devices shown partially in section substantially along the lines 2—2 of Figs. 1 and 3 to illustrate the constructional arrangement of the several parts, the coupling devices being shown in coupled relation.

Fig. 3 is a transverse sectional view taken on the line 3—3 of Fig. 2.

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3 and illustrates the manner in which the insulation block is secured within the housing.

Fig. 5 is a plan view of a single electric coupling device, a portion of the housing being broken away to illustrate the relation of the parts when the device is out of coupling engagement with another coupler.

Fig. 6 is a sectional view taken on the line 6—6 of Fig. 5.

Fig. 7 is a plan view of an electric coupler shown partially in section and which illustrates another embodiment of the present invention.

Fig. 8 is an end view of Fig. 7 shown partially in section.

Figs. 9 and 10 are diagrammatic views illustrating still another form of the invention and in which two electric coupling devices are shown in uncoupled and coupled relation respectively.

The present invention consists primarily in providing an electric coupling device embodying mechanism operable to electrically connect train line circuits and to permit uninterrupted passage of current from car to car when in coupled position. It further consists in providing auxiliary cross-connecting means whereby one or more of the circuits are automatically closed when the coupler is out of coupled position.

In the drawings the same reference characters indicate the same parts throughout the several views.

Referring to Fig. 1 of the drawings the coupler heads 1 and 2 of the adjacent ends of two cars (not shown) are illustrated as coupled together by any well known or suitable connecting devices. The details of the connecting devices are not shown inasmuch as they do not form a part of the present invention. Secured to each of the coupler heads is an electric connecting device 3 embodying my invention and each of which as shown comprises an arm 4 which affords a convenient construction for the attachment of said devices to the coupler heads by suitable retaining bolts 5. The front end of the electric coupling devices may be rigidly secured to and maintained in proper position relative to the coupler heads by any well

known or suitable means such as alining pins 6 secured in bosses 7 and adapted to enter snugly into suitable perforations 8 provided in the coupler heads. Any number of these pins may be employed to insure the proper alinement and registration of the parts.

Since the details of the electric connecting devices are identical in construction, the description of one of these devices will be sufficient. Referring to Figs. 2 to 6 inclusive, my improved electric connecting device is shown as comprising a housing 10, having an insulation block 11 mounted therein upon suitable flanges 12 and 13 preferably formed integrally with the housing. The insulation block is removably secured within the housing by means of studs 14 and a screw 15 passing through suitable apertures formed in the flanges and having threaded engagement with lugs 16 formed on the inner surface of a metallic frame 17 embracing the insulation block as shown. Embedded within the insulation block 11 is a contact member 18 provided with an enlarged portion 19 having its end surface exposed in the face of the insulation block and adapted for engagement with the contactor of a co-operating device as clearly shown in Fig. 2. The contact member 18 comprises also a sleeve portion 20 wherein is mounted a movable contactor 21 which is normally maintained in the forward position, projecting through and beyond the face of the insulation block, when the device is in uncoupled position by means of a compression spring 22 interposed between a shoulder on the contactor and a shoulder in the sleeve. Fig. 5 shows the contactor in normal or forward position. The inner end of the contactor extends through the sleeve and has a nut 23 secured thereto which prevents removal of the contactor and limits the forward movement thereof by engagement with the end surface of the contact member 18. Arranged at one side of the member 18 and preferably molded in the end of the insulation block is a ground contact 24 provided with an enlarged portion 25 having an opening 26 and a set screw 27 for the attachment thereto of the terminal 28 secured to one end of the conductor G which is connected at its other end to ground, as to the housing at 29, or which may be insulated and carried through the opening 30 in the housing and connected to a common ground wire. Arranged at the opposite side of the member 18 and in substantial alinement with the ground contact 24 and the movable contactor 21 is a bracket 31 which may also be secured in position by being molded in the end of the insulation block, as shown, or otherwise. The bracket is formed with a boss 32 having an opening 33 and a set screw 34 for the attachment thereto of the terminal 35 secured to one end

of the car circuit wire C. This circuit wire passes through the car and may be used for lighting, heating, actuating signals, etc., and may be connected to and receive energy from any convenient source of supply, such for instance as a trolley wire, battery or the like. It will be apparent from the foregoing that the conductor C forms one side of the electric circuit passing through the car and that the track rails are utilized for the other side of the circuit. As the terminals of both sides of the circuit are spaced apart and insulated from each other it becomes necessary in order to complete the circuit under normal conditions to electrically connect these terminals, namely 28 and 35. This I accomplish by means of a contact lever 36 pivotally mounted in a suitable slot provided in the bracket 31 by means of a pin 37. A spring 38 is interposed between the bracket and one end of the lever 36 and tends to constantly urge the latter to rotate toward and into engagement with the ground contact 24 where it operates to electrically connect the terminals of both sides of the circuit as shown in Fig. 5. This spring preferably has one of its ends disposed in a cavity formed in the bracket and its opposite end arranged in a similar cavity formed in the lever thus providing against displacement thereof.

Each of the housings is shown as provided with a cover 39 which may be removably secured thereto by any suitable or approved means, such as screws 40. This cover may be easily and readily removed to afford opportunity for inspection, making repairs, etc.

In order that a clear understanding of the embodiment of the invention as shown in Figs. 1 to 6 inclusive and hereinbefore described may be had, a brief description of the operation is as follows:—In single car operation the electric coupling device is uncoupled and the parts are in the position as shown in Fig. 5. The movable contactor 21 is held in forward position by its spring 22 and the lever contact 36 is yieldably maintained in contact with the ground terminal 24, thus providing an uninterrupted circuit by connecting the terminals of both sides of the circuit. The circuit wire C may be used for various purposes as before stated, but for the purpose of explanation, let us assume that it is utilized for electrically actuating a motorman's proceed signal and that it receives energy from a trolley wire through the closing of a special switch operated by the motorman at his station in the car. The circuit leads through the signal lamps to the several series door switches of the car and finally to the electric coupler at the rear end of the car where it is grounded to the rail return side of the circuit through the lever contact 36. In this operation it will

be noted that the electric coupling device functions only to electrically connect the terminals of both sides of the circuit and that the contactor 21 being normally maintained out of contactual engagement with the lever 36, as shown, is rendered electrically "dead."

The above operation is for a single car; for train operation the device functions as follows: When two or more cars are connected together for train operation the electric coupling devices at the adjacent ends of the connected cars are coupled together as shown in Figs. 1 and 2. In the coupling operation the movable contactors 21 of each of the electric coupling devices is moved to a rearward or inward position by impact with the contact 19 of the co-operating device. By this positioning of the contactors the levers 36 are moved out of engagement with the ground terminals 24 in the coupled devices thus interrupting contact with the grounded or rail side of the circuit. In this relation of the electric coupling devices an uninterrupted passage of current from car to car is permitted through the electric couplers by means of their respective depressed contactors 21, contacts 19, and contact levers 36, as will be apparent in Fig. 2. In this manner the circuit is extended backward from car to car to the rear coupler on the last car and which coupler being in uncoupled position closes the circuit by connecting or short-circuiting the terminals of both sides of the circuit as described in connection with single car operation.

From the foregoing it will be obvious that the electric couplers function in two different ways, depending on whether they are in uncoupled or coupled position. In uncoupled position as in single car operation, they function to close the circuit by connecting or short-circuiting the terminals of both sides of the circuit, while in coupled position as in train operation they function to permit an uninterrupted passage of current from car to car, breaking their respective grounded connections. It will be noted also that these two positions of the electric coupler are assumed automatically in conformance to service requirements and consequently single car operation or train operation are both possible without manual alteration or adjustment of the system.

While I have illustrated and described the foregoing embodiment of my invention as comprising connections for a single circuit only, it will be understood that connections for any desired number of circuits may be provided without departing from the spirit of this invention.

Figs. 7 and 8 illustrate the embodiment of a slightly different form of the invention and which provides for the use of a two wire or full metallic circuit which is particularly desirable in cases where circuits

of battery potential are employed. In this form of the invention, the housing, insulation block, and the movable contactors are similar to those described and shown in Figs. 1 to 6 inclusive and are indicated by similar reference characters. The circuit wire C of one side of the circuit is shown as connected to the movable contactor 21 by suitable clamping nuts. Arranged in spaced relation with the contactor 21 and insulated therefrom is a similar movable contactor 21¹ to which is secured the circuit wire C¹ of the other side of the circuit. Secured adjacent to the inner ends of the contactors 21 and 21¹ and extending toward each other are contact fingers 41 which are adapted to cooperate with a leaf conductor 42 arranged therebetween to electrically connect and disconnect the circuit wires C and C¹. This leaf conductor may be secured to the insulation block by any well known or approved means, such as a screw 43, as shown. In practice when the device is uncoupled as in the case of single car operation the parts will be in the position as shown in Fig. 7. The contactors 21 and 21¹ will be in their forward position holding the contact fingers 41 in engagement with the leaf conductor 42 thus closing the circuit. When two devices are in coupled position as in the case of train operation the contactors of each device are depressed or moved rearwardly by impact with the contactors of the cooperating device. By this movement of the contactors the finger contacts 41 of each device are moved out of engagement with the leaf conductors 42 and to the position shown in dotted lines thus permitting an uninterrupted passage of current and extending the circuit from car to car through the electric coupling devices by means of their respective depressed contactors, the circuit being extended in this manner to the last coupler on the rear car where it is closed by means of the contact fingers 41 and the conductor 42 by reason of this last coupler being in uncoupled position.

In Fig. 7 I show another contactor 21² to which is connected a circuit wire B which may be used for any desired purpose. This circuit is independent from the signal circuit and may utilize the track rails for the return side of the circuit, a suitable ground connection being provided in each car. It will be understood that similar contactors may be provided for any desired number of separate and distinct circuits.

Referring to Figs. 9 and 10 which illustrate, diagrammatically, still another form of the invention and in which a pair of movable contactors 21, similar to the contactors illustrated in the other views, are shown as mounted in the insulation block 11. These contactors are adapted to be arranged at opposite sides of the horizontal center of the

coupling device and are provided with contact fingers 45 adapted to cooperate with a contact member 46 secured to the insulation block between the contactors 21 and having a circuit wire A connected thereto. As shown in Fig. 9, the finger contacts 45 are maintained out of engagement with the contact member 46 when the device is in uncoupled position thus rendering the exposed contactors electrically "dead." When two devices are coupled together as shown in Fig. 10, the contactors of each device are depressed or positioned inwardly by impact with the cooperating contactors of the other device. This positioning of the contactors brings the finger contacts 45 of each device into engagement with their respective contact member 46 thus permitting an uninterrupted passage of current through the coupled devices by means of their respective depressed contactors 21, finger contacts 45, and contact members 46. In this manner the circuit of one car is connected to the similar circuit of another car. This arrangement is particularly adapted for train operation in which it is desirable to connect the electric coupler of either end of a car to the electric coupler of either end of another car. While I have shown connections for one circuit only, it will be understood that similar connections may be provided for any desired number of circuits.

Having thus fully described my invention and illustrated several embodiments of the same, I do not wish to be limited to the details of the constructions shown since these can be obviously varied without departing from the spirit of this invention.

I claim as my invention:

1. An electric coupling device adapted to be coupled with a similar device for extending a train line circuit, each device comprising a terminal for each side of the train line circuit, means for cross-connecting the terminals when the coupling devices are uncoupled and reciprocating spring held means arranged to extend said train line circuits from one half of the device to the other half and to break said cross-connection between said terminals when the coupler halves are in coupled relation.

2. An electric coupling unit adapted to be connected to a like unit for extending a train line circuit, comprising a terminal in said unit for each side of a circuit, electrical cross connecting means engaging both the terminals and normally dead conducting means mounted on said unit for disengaging said electrical connecting means from one of the terminals and conducting current to the like member in the cooperating unit when connected thereto.

3. An electric coupling device adapted to be coupled with a similar device for extending a train line circuit from one car to another,

comprising normally dead means for permitting an uninterrupted passage of current through the device when in coupled position and connecting means within the device operating to electrically connect both sides of the circuit when the device is in uncoupled position.

4. An electric coupling device for connecting train line circuits comprising a housing having one end of a circuit wire terminating therein and insulated therefrom, an insulated and normally dead contact mounted in the housing, means for electrically connecting the contact with the circuit wire, and a contact in the housing engageable by said electrical connecting means and having a connection to another circuit contained therein.

5. An electric coupling unit adapted to be connected to a like unit for extending a train line circuit from one car to another, comprising a normally dead electrical contact adapted to cooperate with a like contact on the counterpart unit to electrically connect the circuit of both cars, and auxiliary connecting means mounted in the unit to automatically close the circuit when the device is in uncoupled or normal position.

6. An electrical connecting device comprising an insulating block, a bracket rigidly secured to said block and adapted to have a circuit wire connected thereto, a contact mounted in the insulating block, a make and break member connected to the bracket and engageable by said contact to electrically connect the circuit wire and the contact, and means for holding said contact normally out of engagement with said make and break member to render said contact dead.

7. An electrical connecting device comprising an insulating block, a bracket rigidly secured to said block and being provided with means adapted to receive the terminal of a circuit wire, a make and break member connected to the bracket, and a movable contact mounted in the block and yieldingly controlled in relation thereto and held normally out of engagement with said make and break member, said contact being adapted to movably engage the make and break member when cooperating with the contact of a counterpart device for electrically connecting the parts.

8. An electrical connecting device comprising an insulating block, a bracket rigidly secured thereto and having means for the attachment of a circuit wire, a make and break member pivotally secured to the bracket, a spring controlled contact mounted in said block and movable into engagement with the make and break member, and means tending to yieldably maintain the make and break member in engagement with the contact.

9. An electrical connecting device com-

prising an insulation block, a bracket rigidly secured to the block and having means for the attachment of a circuit wire, a terminal secured to the block in spaced relation with the bracket and having a connection to ground, a make and break member electrically connecting the bracket and the terminal, and a spring controlled contact mounted in the block and held normally out of engagement with said make and break member and being adapted when cooperating with the contact of a counterpart device to electrically engage the make and break member and to hold the latter out of engagement with the terminal thereby breaking said electrical connection to ground and permitting an uninterrupted passage of current from the circuit wire, to the contact by means of the movable make and break member and thence to the cooperating contact of the counterpart device.

10. An electric coupler comprising a pair of counterpart connecting devices each provided with an insulating block, a movable contact projecting from the face of each block, and a rigid contact exposed in the face of each insulating block and in spaced relation with the movable contact, the movable contact of each device being adapted to engage and cooperate with the rigid contact of the other device and normally dead when the counterpart connecting devices are in an uncoupled relation.

11. An electric coupler comprising a pair of counterpart connecting devices each provided with an insulating block, a movable contact projecting from the face of each block, a fixed contact in spaced relation with the movable contact and exposed in the face of the block, and means electrically connect-

ing the movable contact and fixed contact, the movable contact of each device being adapted to engage and cooperate with the fixed contact of the other device.

12. An electric coupler comprising a pair of counterpart connecting devices each comprising an insulation block, a spring controlled reciprocating contact member and a rigid contact member mounted in each block and spaced apart and exposed in the face thereof, and means electrically connecting the contacts, the movable contact of each device arranged to engage and co-operate with the fixed contact on the co-operating device.

13. An electric coupler comprising a contact adapted to cooperate with the contact of a similar device for connecting a train line circuit, a terminal to receive a train line circuit secured therein, means for automatically connecting said terminals with the contact when the devices are coupled and with another circuit when the devices are uncoupled.

14. An electric coupler comprising a contact adapted to cooperate with the contact of a similar device for connecting a train line circuit, a terminal to receive a train line circuit secured therein, a terminal in the device and insulated from the contact to receive the return wire of the said circuit and means in the device for automatically connecting the terminal of the train line circuit with the contact when the coupling devices are coupled and with the terminal of the return circuit when the coupling devices are uncoupled.

In testimony whereof I affix my signature.

REX G. AVERILL.