T. R. BROWN.

COMBINED CAR AND ELECTRIC COUPLING.

APPLICATION FILED APR. 4, 1917.

1,412,384.

Patented Apr. 11, 1922.

2 SHEETS—SHEET 1.

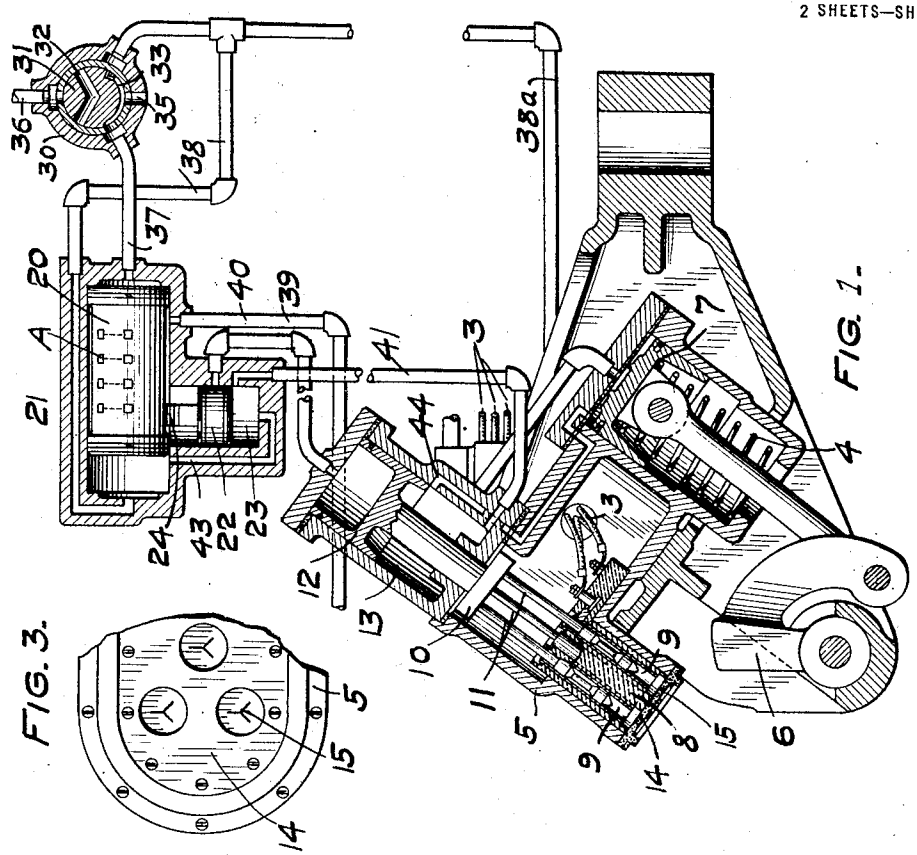


FIG. 1.

FIG. 3.

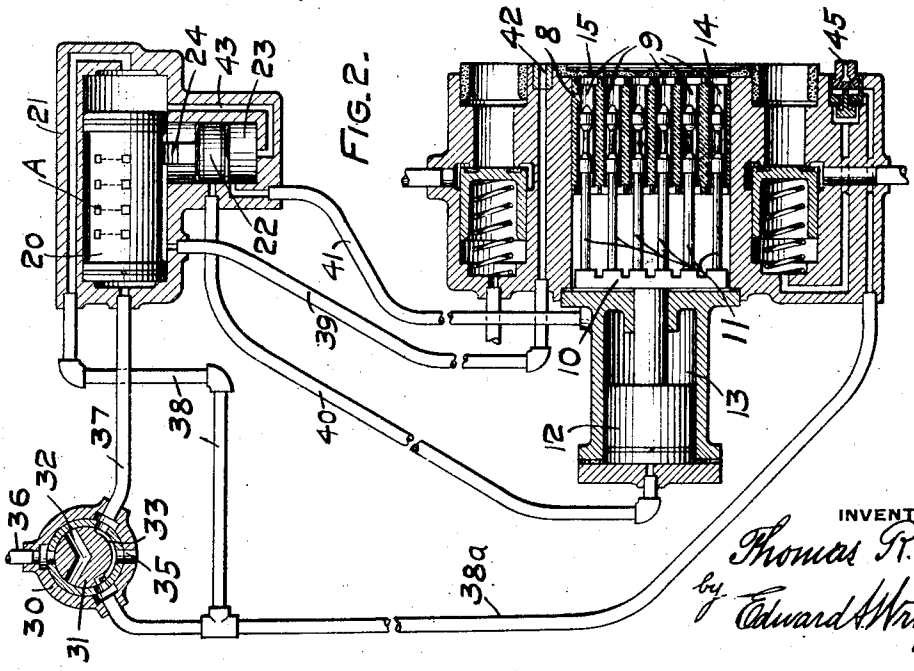


FIG. 2.

INVENTOR

Thomas R. Brown.

by Edward A. Wright.

Att'y.

T. R. BROWN.

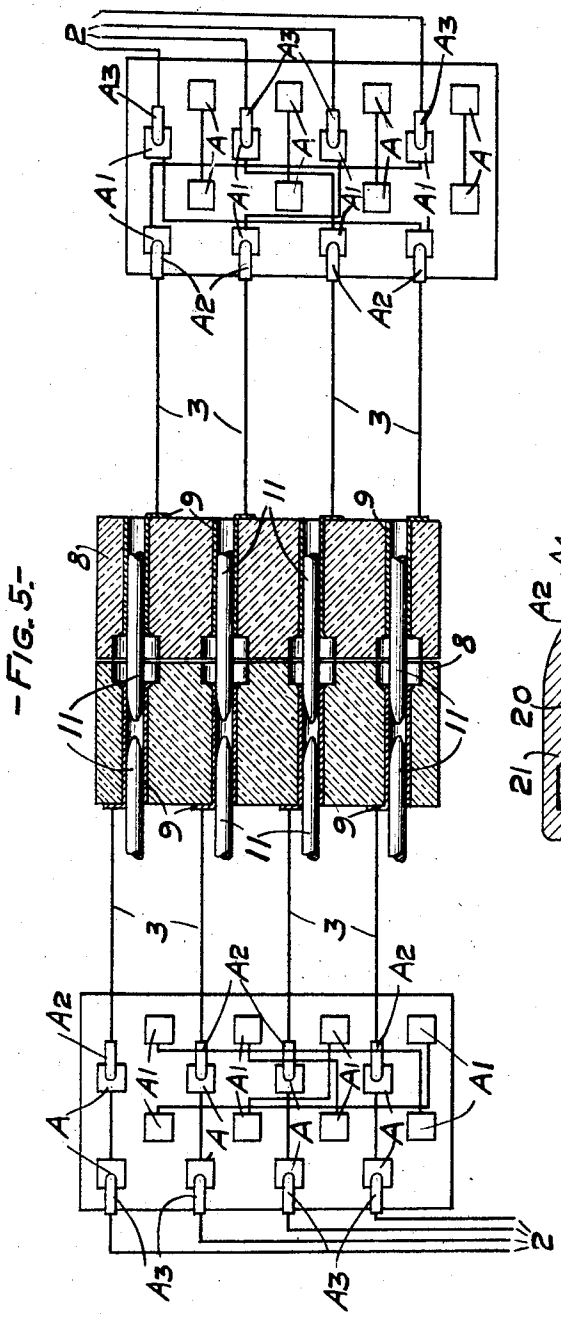
COMBINED CAR AND ELECTRIC COUPLING.

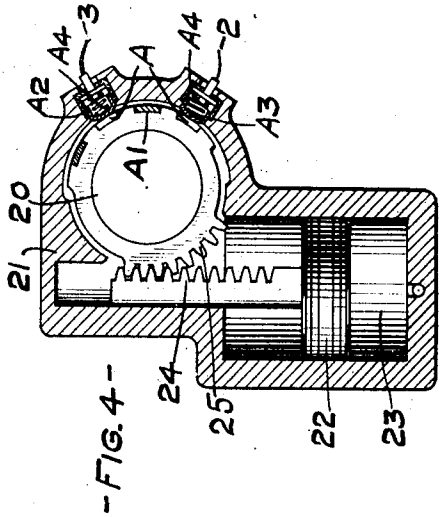
APPLICATION FILED APR. 4, 1917.

1,412,384.

Patented Apr. 11, 1922.

2 SHEETS—SHEET 2.





INVENTOR

Thomas R. Brown.

by Edward A. Wright. Att'y.

UNITED STATES PATENT OFFICE.

THOMAS R. BROWN, OF SPARKILL, NEW YORK, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF WILMERDING, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

COMBINED CAR AND ELECTRIC COUPLING.

1,412,384. Specification of Letters Patent. **Patented Apr. 11, 1922.**

Application filed April 4, 1917. Serial No. 159,801.

To all whom it may concern:

Be it known that I, THOMAS R. BROWN, of Sparkill, in the county of Rockland and State of New York, have invented a certain new and useful Improvement in Combined Car and Electric Couplings, of which improvement the following is a specification.

This invention relates to automatic coupling devices for electric circuits between the cars of a train, and applies more particularly to the type of coupling such as shown and described in my prior pending application Serial No. 135,916, filed December 8, 1916.

In electric coupling devices for cars where the counterpart couplers each have a plurality of contacts located on opposite sides of a vertical centre line, it is necessary that the car circuit wires at one side of the counterpart couplers be connected to those at the opposite side of the adjoining coupler in order to preserve the continuity of the corresponding circuits through the train, and in my prior application above referred to, there is provided for this purpose a switch located between the coupler terminals and the respective circuit wires at each end of each car. In the normal release condition these switches occupy an intermediate neutral or inoperative position, but when the cars are coupled together, one of the switches is reciprocated in one direction to a position for directly connecting said circuits in parallel, while the corresponding switch on the adjoining car is reciprocated in the opposite direction from its neutral position to a position in which the circuits on opposite sides of the centre line are cross-connected whereby the respective circuits are properly connected through the train. Latches are provided for holding said switches in their operative positions, and springs for returning the same to the neutral position when the latches are released.

One of the objects of my present invention is to provide an improved form of switch for this purpose, having both longitudinal and transverse movements, wherein one of said switches may be reciprocated longitudinally from its neutral position to one of its operative positions, while the adjoining switch may be shifted laterally or transversely, preferably by a partial rotary movement, from its neutral position to the other operative position for setting up the proper combination of circuits, and thereby eliminate the use of latches and springs for operating the switches.

Another object is to provide an improved form of contact carrier and contact terminals for the respective train line circuits, which may be located within the head of the coupler and operated by a piston.

These and other objects will now more fully appear from the following description of a preferred construction, embodying my invention, and the features of novelty will be set forth in the claims.

In the accompanying drawings: Figure 1 is a diagrammatic sectional view illustrating a coupler head and switch device embodying my improvement; Fig. 2, a diagrammatic section of the electric portion of the coupler with the switch and operating valve; Fig. 3, an enlarged face view of a portion of the electric coupler; Fig. 4, a transverse section of one of the electric switches; and, Fig. 5, a diagrammatic view of the electric switches and circuits through the couplers.

As shown in the drawings, the terminal contacts are mounted in the central portion of a coupler of the rigid lock type, in which each counterpart coupler is provided with a projecting head portion, 5, having laterally inclined surfaces, said parts being adapted to engage each other by a lateral movement, and each coupler having a pivoted lock or cam lever, 6, for clamping against the head of the counterpart coupler and rigidly locking the two couplers together in coupled position. The cam levers may be operated by springs, 4, and pistons, 7, or otherwise, as desired.

The contact terminals of the electric coupler are made in the form of tubular or open ended cylindrical bushings, 9, mounted in corresponding openings formed through the block of insulation, 8, in the coupler head and connected to the respective car circuit wires, 3. The outer ends of the bushings terminate near the face of the coupler and in line with the respective corresponding bushings of a counterpart coupler when the two are coupled together. For the purpose of bridging over the space and establishing electrical connection between the respective contact terminals of the counterpart couplers, I provide an im-

proved form of contact carrier comprising a body portion, 10, having a number of plunger rods, 11, corresponding to the number of contact bushings, and normally extending into the rear end portions of said bushings, either one of said contact carriers with its plunger contacts being adapted to be projected through said bushings and into the outer ends of the corresponding bushings of the other coupler and thereby electrically connect the same. For actuating said plunger contacts, the body, 10, may be connected to a piston, 12, mounted in cylinder, 13, on the coupler head, said piston being operated by fluid under pressure admitted at one end of the cylinder for projecting said carrier with its plunger contacts, and by fluid admitted upon the opposite side to retract said carrier. The direction of movement of the plunger contacts is preferably in line with the lateral inclined approach movement of the coupler heads.

For protecting the electric contacts from the weather, a gasket, 14, in the form of a sheet, preferably of rubber, is located over the ends of contact openings, the sheet being provided with slits, 15, at points in line with the respective openings, and through which the plungers, 11, pass when projected across into the counterpart coupler. This form of gasket offers practically no resistance to the passage of the plungers, and at the same time affords a means for prompt closing against weather when the cars are uncoupled. When the couplers are locked together, the surfaces of gaskets, 14, will meet and exclude the weather from the contacts.

According to another feature of my invention, I provide an improved switch device for connecting the contact terminals with the respective car line circuits either directly in parallel, or with a cross-connection, and have shown one form of such switch comprising a casing, 21, containing a piston, 20, on which are mounted, in suitable insulation, two sets of contact bars, A, A, etc., and A^1, A^1, etc., the first set being directly connected in parallel, and the other set being cross-connected, as clearly indicated in Fig. 5. In the cylindrical casing are mounted the set of contacts, A^2, connected by the respective leads, 3, with the corresponding contact terminals, 9, of the coupler, and another set of contacts, A^3, connected to the respective leads, 2, of the car line circuits. These contacts may be provided with springs, A^4, as indicated in Fig. 4, and are properly located so that in one of the operative positions of the switch piston, 20, the contacts, A, register with contacts, A^2 and A^3, and connect the circuits in parallel; but when shifted to the other operative position, the contacts, A^1, register with contacts, A^2 and A^3, and the circuits are cross-connected, as will be readily understood. In the present case, the movable switch member or piston, 20, is reciprocated longitudinally from its neutral position to one of its operative positions by fluid pressure admitted to said piston, and it is partially rotated to and from its other operative position by means of a gear, 25, and rack, 24, actuated by a piston, 22, in a cylindrical chamber, 23, of the casing. The movements of the pistons are controlled by a hand operated valve, 31, in casing, 30, having pipe connections, 37 and 38, to the opposite ends of the chamber of the piston, 20, a supply pipe, 36, and exhaust port, 35, the valve being provided with ports, 32 and 33, for cooperating with the ports in the casing communicating with said pipes and the exhaust. Pipe, 39, leads from a port in the piston chamber to passage, 42, of the coupler head and communicates with the corresponding passage and pipe of the other coupler when the coupler heads are brought together. Pipe, 40, connects a port in piston chamber, 23, with one end of cylinder, 13, while pipe, 41, connects another port in chamber, 23, with the other end of cylinder, 12. Pipe, 38^a, which is a branch of pipe, 38, communicates by a passage and hollow tappet connection, 45, in the coupler head with the corresponding passage and pipe of the counterpart coupler on the adjoining car. The piston, 20, controls communication from the pipe, 39, to the chamber on the upper side of the piston 22, and also the port, 43, leading to the bottom of piston chamber, 23. The port or passage, 44, connects the cylinder, 13, with the cylinder of the coupler, unlocking piston, 7, for the purpose of releasing the coupler locks after the plunger contacts have been withdrawn.

When the couplers are released and the cars separated, the plunger contacts are in the retracted position, and the electric switch piston, 20, is in its normal release or neutral position, as indicated in Figs. 1 and 2. As the cars are brought together, the coupler heads engage each other with a lateral inclined movement, and the coupler locks, 6, spring into place, thus locking the coupler heads rigidly together with the faces of the gaskets, 14, clamped against each other and the terminal contact bushings, 9, of the one coupler in line with the respective contact bushings of the other coupler. Then in order to project the carrier with its plunger contacts of one coupler head, and to shift the electric switches of both couplers to establish the proper circuit connections for the respective car line circuits, the hand operated valve, 31, upon either one of the cars is turned to coupling position, in which port, 32, connects the pipe, 36, to the pipe, 37, and air flows from supply, 36, to the pipe,

37, and to the chamber at one end of piston, 20, to shift the same to the opposite end of its chamber. During this movement, the movable contacts, A, are brought into register with the sets of fixed contacts, A^2 and A^3, and the circuit wires, 2 and 3, of this coupler are thereby connected directly in parallel, as indicated at the left in Fig. 5. This same movement of the piston, 20, uncovers the port leading to pipe, 39, and air flows by said pipe and passage, 42, to the corresponding pipe on the coupler of the adjoining car. The piston, 20, on this car being at the time in its neutral position, indicated in Fig. 1, air flows from pipe, 39, into the chamber, above the piston, 22, forcing the same downward, and through the rack and gear connection, 24, partially rotating said piston, 20, to its other operative position in which the contacts, A^1, register with the sets of contacts, A^2 and A^3, and the circuits, 2 and 3, on this car are thereby cross connected, as indicated at the right in Fig. 5. In this manner the proper circuit connections are effected at these switches for car line circuits through the train. At the time that the piston, 22, on the second coupler is forced downward, the port connected to pipe, 40, is uncovered, and air flows to the inner end of the cylinder, 13, where it acts on piston, 12, to project the carrier, 10, with its plunger contacts, 11, through the gaskets and into the corresponding bushings, 9, of the other coupler head, thereby establishing electrical connection between the bushing contact terminals of the respective circuits, as indicated in Fig. 5. The hand operated valve may then be returned to normal position, in which the cavity, 33, connects the pipes, 37 and 38, to the exhaust port, 35, but the parts remain in the coupled position to which they have been moved.

When it is desired to uncouple and separate the cars and couplers, the valve, 31, upon either one of said cars is turned to its uncoupling position, in which the port, 32, connects pipes, 36 and 38. Air then flows from the supply through pipe, 38, to the chamber at the opposite end of piston, 20. If this be the piston which has been shifted longitudinally, the air pressure will return said piston to its neutral position, and since it uncovers the port, 43, air will then flow into chamber, 23, beneath the piston, 23, but as this piston is already in its upper position, no movement thereof will result. The port connected to pipe, 41, however, is open, and air flows through this pipe to the outer end of cylinder, 13, where it acts to move the piston, 12, to withdraw the sliding plunger contacts, 11, or to hold them in the retracted position, if they are already withdrawn. If the piston, 20, to which the air is first supplied for releasing, is the one which has been partially rotated to its operative position by the piston, 22, then the air passes immediately through port, 43, and acts on the under side of piston, 22, to force the same upward and rotate said switch back to its neutral position, whereupon air flows through the port and pipe, 41, to the cylinder, 13, to withdraw the piston, 12, and plunger contacts, 11, as before described. At the same time, in either case, when releasing, air may flow through branch pipe, 38^a, and passage in the coupler head to the switch piston on the other car, and return the same from either one of its operative positions to its neutral position, as before described, and may then pass through pipe, 41, to cylinder, 13, to actuate the piston, 12. As this piston, 12, moves to its retracted position, port, 44, is uncovered and air flows through the same to the cylinder of the unlocking piston, 7, of the coupler, moving the same outward to release the coupler, 6. The uncoupling action is then complete, and the cars may be separated, and the valve, 31, returned to its normal position.

It will thus be seen that when either hand valve is operated for coupling, one only of the plunger contact carriers will be projected, while one switch piston will be reciprocated to its operative position, and the other switch piston will be partially rotated to the opposite operative position, whereby the car line circuits will be properly connected. Also that in operating either hand valve for uncoupling, the plunger contact carrier will be withdrawn, both electric switches will be returned to their neutral positions and the coupler locks of both couplers will be released.

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

1. In an electric train line coupling, the combination of a coupler head having a plurality of tubular contact terminals, corresponding plunger contacts extending into the inner ends of said tubular contacts, means for clamping counterpart coupler heads together with the respective tubular and plunger contacts of the one coupler in line with the corresponding contacts of the other coupler, and means for projecting the plunger contacts of either coupler into the corresponding tubular contacts of the other coupler.

2. In an electric train line coupling, the combination of a coupler head having a plurality of tubular contact terminals, corresponding plunger contacts extending into the inner ends of said tubular contacts, means for clamping counterpart coupler heads together with the respective tubular and plunger contacts of the one coupler in line with the corresponding contacts of the other coupler, a body portion joining the

plunger contacts, and a piston connected to said body portion for projecting the plunger contacts of one coupler into the corresponding tubular contacts of the other cupler.

3. In an electric train line coupling, the combination of a coupler head having a plurality of tubular contact terminals, corresponding plunger contacts extending into the inner ends of said tubular contacts, means for clamping counterpart coupler heads together with the respective tubular and plunger contacts of the one coupler in line with the corresponding contacts of the other coupler, a gasket sheet located at the meeting face of the coupler and having slits in line with the respective plungers, and means for projecting the plunger contacts of one coupler through said slits and into the corresponding tubular contacts of the other coupler.

4. In an electric train line coupling, the combination with a coupler having a plurality of contacts for the respective train line circuits, of a switch for said circuits, having a normal inoperative or open position, one operative position for connecting said circuits in parallel, and another operative position for cross-connecting said circuits, means for reciprocating the movable member of said switch to one of its operative positions, and means for rotating said switch member to its other operative position.

5. In an electric train line coupling, the combination with a coupler having a plurality of contacts for the respective train line circuits, of a switch for said circuits, having a normal inoperative or open position, one operative position for connecting said circuits in parallel, and another operative position for cross-connecting said circuits, a fluid pressure operated piston for reciprocating the switch member to one of its operative positions, and another piston for rotating said switch member to its other operative position.

6. In an electric train line coupling, the combination with a coupler having a plurality of contacts for the respective train line circuits, of a switch for said circuits, having a normal inoperative or open position, one operative position for connecting said circuits in parallel, and another operative position for cross-connecting said circuits, a fluid pressure operated piston for reciprocating the switch member to one of its operative positions, another piston for rotating said switch member to its other operative position, and a hand operated valve having connections for supplying fluid to the piston for reciprocating the switch on one car, and to the piston for rotating the switch on the adjoining car.

7. In an electric train line coupling, the combination of a plurality of contact terminals connected to the respective car line circuits, and adapted to be electrically connected with corresponding contacts of a counterpart coupler on the adjoining car, a switch for said circuits on each car, said switch having a normal open position, one operative position for connecting said circuits in parallel, and another operative position for cross-connecting said circuits, means for shifting said switch member longitudinally to one operative position, and means for moving the same transversely to its other operative position.

8. In an electric train line coupling, the combination of a plurality of contact terminals connected to the respective car line circuits, and adapted to be electrically connected with corresponding contacts of a counterpart coupler on the adjoining car, a switch for said circuits on each car, said switch having a normal open position, one operative position for connecting said circuits in parallel, and another operative position for cross-connecting said circuits, a piston for reciprocating the switch member longitudinally to one operative position, and another piston for shifting said switch member transversely to its other operative position.

9. In an electric train line coupling, the combination of a plurality of contact terminals connected to the respective car line circuits, and adapted to be electrically connected with corresponding contacts of a counterpart coupler on the adjoining car, a switch for said circuits on each car, said switch having a normal open position, one operative position for connecting said circuits in parallel, another operative position for cross-connecting said circuits, a piston for reciprocating the switch member longitudinally to one operative position, and another piston for shifting said switch member transversely to its other operative position, and a valve having connections for supplying fluid to the piston for reciprocating the switch on one car, and to the piston for effecting a transverse movement of the switch on the adjoining car.

10. In an electric train line coupling, the combination of a plurality of contact terminals connected to the respective car line circuits, and adapted to be electrically connected with corresponding contacts of a counterpart coupler on the adjoining car, a switch for said circuits on each car, said switch having a normal open position, one operative position for connecting said circuits in parallel, and another operative position for cross-connecting said circuits, a piston for reciprocating the switch member longitudinally to one operative position, another piston for shifting said switch member transversely to its other operative position, a valve for controlling a supply of fluid to one of said pistons, and a passage

controlled by the movement of said piston for supplying fluid to the other piston.

11. In an electric train line coupling, the combination of a plurality of contact terminals connected to the respective car line circuits, and adapted to be electrically connected with corresponding contacts of a counterpart coupler on the adjoining car, a switch for said circuits on each car, said switch having a normal open position, one operative position for connecting said circuits in parallel, and another operative position for cross-connecting said circuits, a piston for reciprocating the switch member longitudinally to one operative position, another piston for shifting said switch member transversely to its other operative position, and a valve having connections for controlling a supply of fluid to the opposite sides of both pistons for moving one switch to and from one operative position and the other switch on the adjoining car to and from the other operative position.

12. In an electric train line coupling, the combination of a plurality of contact terminals connected to the respective car line circuits and adapted to be electrically connected with corresponding contacts of a counterpart coupler on the adjoining car, a switch for said circuits on each car, said switch having a normal open position, one operative position for connecting said circuits in parallel, and another operative position for cross-connecting said circuits, a piston carrying the movable contacts of said switch and adapted to be reciprocated longitudinally to one of the operative positions, and another piston having a rack and gear connection with the first piston for rotating said switch to its other operative position.

13. In an electric train line coupling, the combination of a plurality of contact terminals connected to the respective car line circuits, a movable contact carrier, a piston for projecting said carrier to establish electrical connection between the corresponding contact terminals of counterpart couplers, a switch for controlling said circuits, a piston for actuating said switch, and means governed by the movement of the switch piston for supplying fluid to the piston for projecting the contact carrier.

14. In an electric train line coupling, the combination of a plurality of contact terminals connected to the respective car line circuits, a movable contact carrier, a piston for projecting and retracting said carrier, a switch for opening and closing said circuits, a piston for actuating said switch, and a passage governed by the movement of the switch to its open position for supplying fluid to the side of the piston for retracting said contact carrier.

In testimony whereof I have hereunto set my hand.

THOMAS R. BROWN.