C. H. TOMLINSON.

ELECTRIC MULTIPLE CONNECTION PLUG.

APPLICATION FILED APR. 17, 1912.

1,422,241. **Patented July 11, 1922.**

2 SHEETS—SHEET 1.

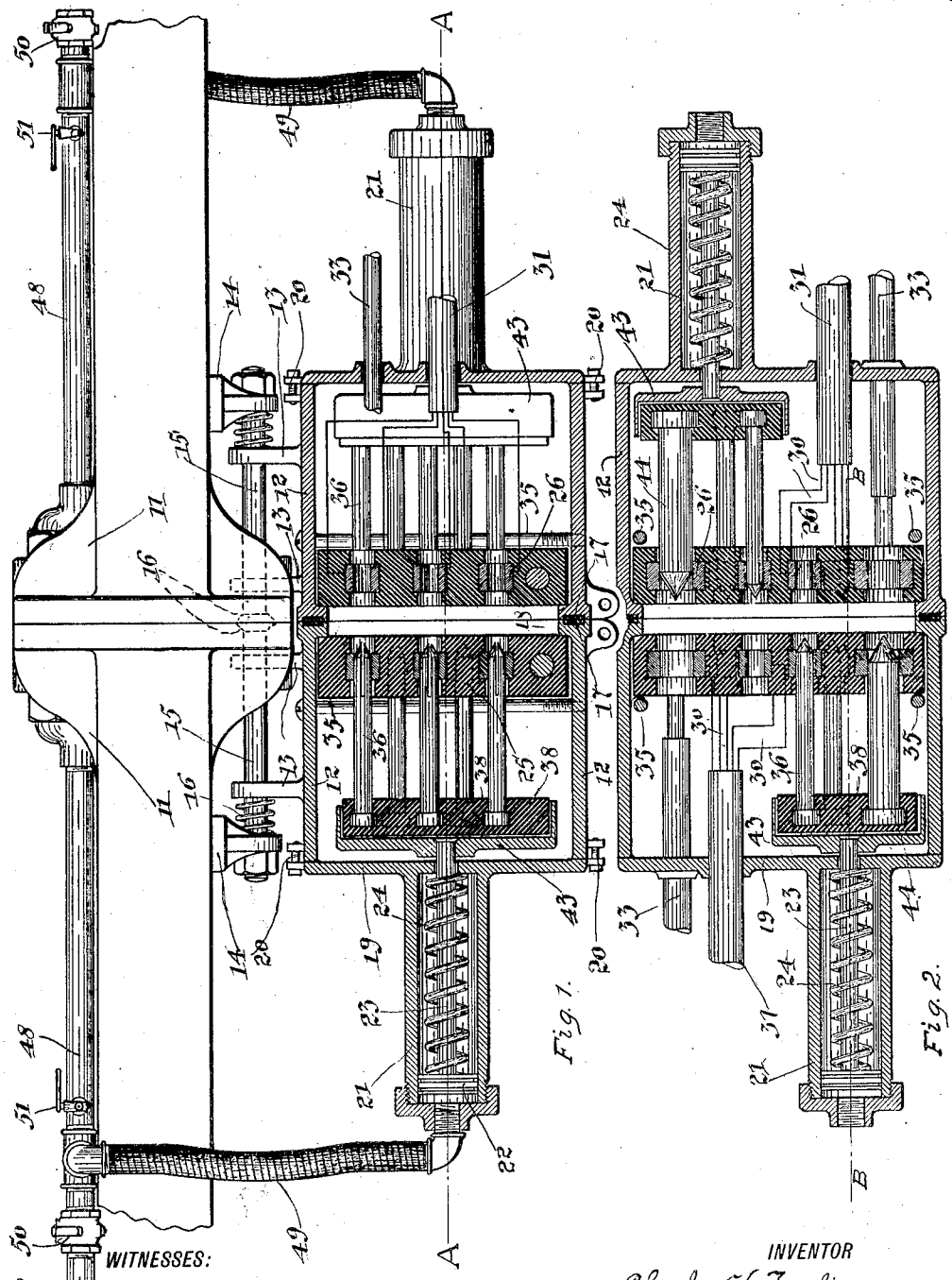


Fig. 1.

Fig. 2.

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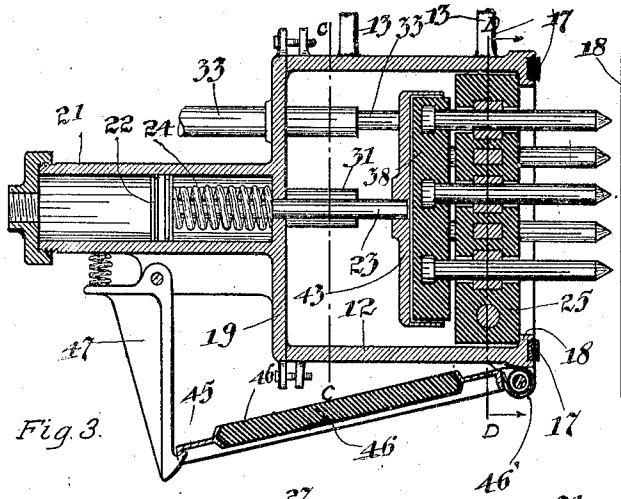


Fig. 3.

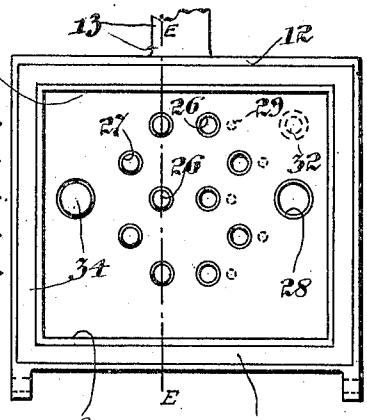


Fig. 4.

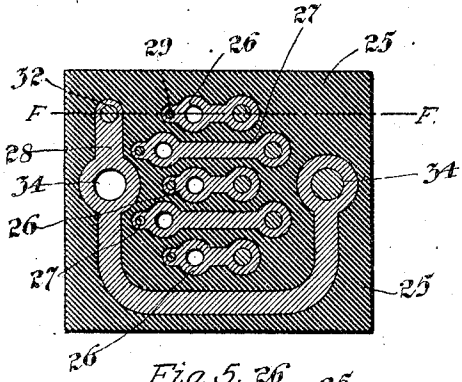


Fig. 5.

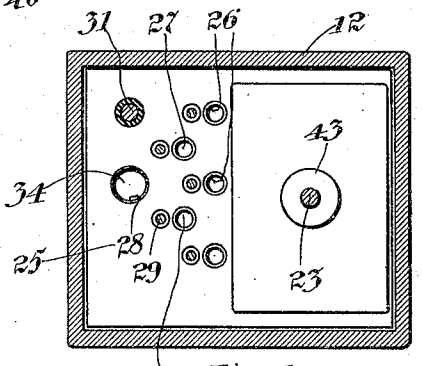


Fig. 6.

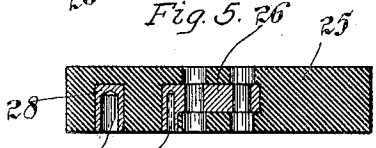


Fig. 7.

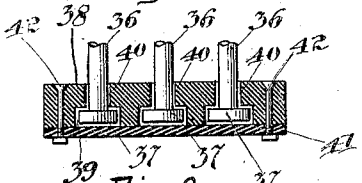


Fig. 9.

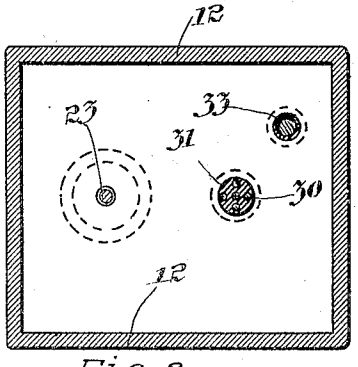


Fig. 8.

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ELECTRIC MULTIPLE-CONNECTION PLUG.

1,422,241. Specification of Letters Patent. Patented July 11, 1922.

Application filed April 17, 1912. Serial No. 691,511.

To all whom it may concern:

Be it known that I, CHARLES H. TOMLINSON, 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 Multiple-Connection Plugs, of which the following is a specification.

This invention relates to an electrical connection plug, and is more particularly designated and described as a multiple circuit connector, which is adapted to be used in connecting a plurality of separate and distinct circuits, such, for example, as the several circuits of a multiple control system for electric cars and trains. The principal object of the invention is to provide an improved, simple and reliable device of the class described, which is effective and efficient in operation.

Another object of the invention is to provide means to protect the contact points and to prevent short circuits in a plug of this class.

A further object of the invention is to provide means whereby the device may be operated by fluid pressure such as from the air brake line.

For 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 generally shown in the accompanying drawings and described in the specification, but more particularly pointed out in the appended claims.

In the drawings Fig. 1 is a sectional elevation of a device of this class, as applied to a car, and as supported by the coupler of a car, the device being shown in section as taken on a line B—B of Fig. 2; Fig. 2 is a plan view in section taken on a line A—A of Fig. 1; Fig. 3 is a detail sectional view with the connectors thrust forward and with the cover or lid engaged by the latch; Fig. 4 is a view in elevation looking at the face of one of the plugs; Fig. 5 is a cross sectional view of the insulation block taken on the line D—D of Fig. 3; Fig. 6 is a sectional view taken on the line C—C of Fig. 3, looking towards the front of the block; Fig. 7 is a sectional view taken on the line F—F of Fig. 5; Fig. 8 is a sectional view taken on the line C—C of Fig. 3 looking towards the rear of the member; Fig. 9 is a detail sectional view showing the preferred construction of the holding block for the connectors.

In connection plugs of this class it is customary to employ a construction in which the adjacent plugs are snapped in position by the engagement of one member with another, usually requiring that the plugs are of different construction. The present invention contemplates the use of a single type of plug in which the connections may be made from one to the other without necessitating different forms of plugs or without requiring that any special or particular locking mechanism be necessary to hold adjacent plugs in position. It is also desirable to provide a plug which is automatically aligned with the plug of an adjacent car, and which may be accurately and positively positioned and connected in the least possible time. In the present invention the pressure of the air supply line or other fluid pressure may be employed to place the plugs in operative or connected position, and when the air brake supply line is thus employed it is contemplated that the opening of the common supply line throughout the train will effect the connection between the plugs. These plugs may be applied to any type of cars or in any place where they can be easily placed in alignment, and in the present exemplification of the invention it is contemplated that they will be employed in connection with self-aligning couplers of any approved construction or type which will materially assist in the alignment of the opposite plugs, whereby they may be automatically connected without manual attention thereto and so that the operation of connecting the air supply line between two cars will automatically effect the connection between the adjacent plugs.

Referring now more particularly to the drawings, and in the present exemplification of this invention, the numeral 11 designates generally a coupler to which the connection plug may be secured although it should be understood that the plug may be connected in any suitable way so that when two plugs are brought in proximity to each other they will be substantially in align-

ment. The connection plugs may be supported in any desired or suitable manner, such, for example, as that illustrated in Fig. 1, in which each plug is provided with a casing 12 having projecting perforated ears 13 which extend upwardly from the casing of the plug. A perforated lug 14 depends from the coupler 11 or from the support for the plug and a bolt 15 is placed through the perforation in the lugs or ears 13 and 14, and through a suitable opening 16' in the face of the coupler, so that each plug is freely supported upon the bolt 15. Interposed between one of the ears 13 and the depending lug 14 is a spring 16 which tends to press the entire plug forwardly upon the bolt, the ears 13 being so spaced that a longitudinal movement of the plug upon the bolt is permitted, the object of the spring being to press the plug forwardly so that the face of the plug will be slightly in advance of the face of the coupler. The object of this construction is so that when two adjacent plugs are brought in position with respect to each other they will be pressed firmly together, and packing material 17 is preferably disposed about the face of the casing so that a substantially tight joint is made between the plugs when they are in position, the springs 16 tending normally to press and to retain the plugs in position.

The casing 12 is preferably hollow and open at the ends, one end of which may be designated as the front of the plug, being formed with an inwardly extending ridge or projection 18, the other end of the casing being inclosed by means of a removable end member 19, which is secured to the casing in any suitable manner, such, for example, as by means of locking devices 20, which are disposed at the edge of the member 19 and which engage suitable grooves or lugs in the casing 12. This end member 19 is formed with a tubular portion 21 with a smaller opening therefrom communicating with the interior of casing 12 and constituting a cylinder which is adapted to receive a piston 22, the piston being provided with a piston rod 23, which extends through the opening into the casing 12 and a coil spring 24 is positioned about the piston rod and bears against the piston at one end and against the member 19 at the other, thereby tending to press the piston outwardly in the tubular portion 21.

Disposed within the casing and abutting the flange or shoulder 18 is a perforated insulating partition 25. This partition is composed of any desired or suitable insulating material and a number of lugs 26, 27, 28 are disposed within the material by being cast in the partition or otherwise secured thereto in any desired or suitable manner and suitably spaced from each other. In the preferred construction the lugs are suitably spaced with respect to each other, and the insulation is poured or molded about them. The lugs 26 and 27 are provided with perforations one of which is smaller than the other and is adapted to receive the end of a conductor, as at 29, and to form an electrical connection with conductors 30, which are brought through the end member 19 by means of a cable 31. These lugs 26 and 27 are preferably arranged so that the larger perforations are disposed in pairs and symmetrically with respect to a vertical center line through the face of the partition, so that an equal number of openings are on both sides of the center line and equally spaced with respect thereto. The lug 28 is preferably larger than the others and in the present exemplification of the invention is preferably designated and described as the busbar lug, having connection at 32 with the bus-bar conductor 33. This teminal lug 28 preferably extends as shown in Fig. 5, from one side of the partition, and under the other lugs to the other side of the partition, and having openings 34 also symmetrically disposed with respect to a vertical center line drawn through the face of the partition. The insulating block or partition 25 is preferably greater in width than the lugs so that it is necessary to provide openings in the insulating material (see Fig. 7) itself, which communicate or register with the perforations in the lugs. These openings are slightly larger in diameter than the openings or perforations in the lugs, so that there will be no danger of a conductor being engaged by the insulation before it strikes the lug, the face of the partition with such conductor withdrawn presenting an appearance similar to that shown by Fig. 4.

To hold the partition 25 in position, the casing 12 may be perforated on one side and provided on the opposite side with a threaded opening to receive the end of threaded bolts 35 which are disposed immediately behind the partition 25 (see Figs. 1 and 2). To place the partition 25 in place, it is necessary to remove the end member 19 and to insert the partition 25 against the shoulders 18, and then to place the bolts 35 in position, whereupon the partition will be held firmly in place against the flange or shoulders 18.

In order to connect the lugs in the partition of one plug with corresponding lugs in another plug, it is necessary to provide longitudinally movable connectors 36, which will engage the lugs in both of the plugs. These connectors 36 are preferably inserted at one end in a block, the other end being tapered and slit, if desired, and adapted to be inserted through the perforations in the lugs 26—27. It is necessary that the connectors register with the perforations in the lugs, and for this reason it is best to employ

a construction as illustrated by Fig. 9 to permit a slight movement of a connector in a lateral direction. These lugs are preferably formed with heads 37 and they are inserted through a block 38 having recesses 39 in one face of the block slightly larger than the head and having openings 40 through the block for said recesses slightly larger in diameter than the diameter of the connectors 36, so that they move loosely in the recesses and openings 39 and 40. A plate 41 is placed over the block and secured in position by suitable fastening devices 42, so that the connectors may be moved simultaneously by moving the block. Both block 38 and the plate 41 are composed of suitable insulating material, so that the connectors 36 are suitably insulated from each other. The block 38 is positioned and held in a holder 43 which is connected to the inner end of the piston rod 23, so that a movement of the piston 22 in the tubular portion 21 effects a corresponding movement of the block 38 and the connectors 36 in the casing 12, causing the connectors to be moved longitudinally through the lugs 26 and 27 in the partition 25 and into the corresponding lugs of the adjacent plug, thereby causing an electrical connection to be made between the corresponding lugs of the two connection plugs. A larger connector 44 is provided for the bus-bar lug 28, which is preferably secured in the block 38 in the manner already described, and which is adapted to form connection between the bus-bar lugs of the two connection plugs in a manner similar to that already described for the other connectors.

It will be understood that although only a comparatively small number of lugs are shown in the present exemplification of the invention, any desired number of connectors and lugs may be employed, the size and number of the lugs and connectors depending upon the character and nature of the control to be effected and the amount of current which it is necessary for them to carry.

It is evident from this construction that the spring 24 tends to press the connectors 36, 44 inwardly, that is, away from the face of the plug, or in other words to draw them in from the face of the plug. In this position they would be free from contact with any outside material, and there would be no danger of a short circuit being formed with any of the connectors. To prevent foreign material entering the openings in the partition 25 and to protect the connectors from contact, a lid or cover 45 is provided for the face or end of the plug. This cover is provided with a spring 46′ which tends to close the cover over the face of the plug, and the cover is preferably formed as shown in Fig. 3. In its preferred form the cover consists merely of a frame having a central opening in which there is inserted a block or plate of insulating material 46, which is exposed on both sides of the cover. This insulating material is exposed on both sides, so that if the lid is in position over the face of the plug it will be impossible to form a short circuit between the connectors of the same plug in case they are pressed outwardly against the cover, and it will also be impossible for the connectors of another plug to be short circuited by reason of their contact with the cover of the adjacent plug, for it will be seen that if the outside of the cover were not of insulating material the adjacent plug might be short-circuited, just as well as the plug to which the cover belongs. In order to hold the cover out of its position over the face of the plug, a spring pressed latch 47 is provided which engages the lid or cover 45 and holds it in its open position.

This type of connection plug is designed to be used in connection with cars which employ air brakes or other fluid actuated devices in their control, and in the present exemplification of the invention, particularly as shown in Fig. 1, the numeral 48 designates the pressure supply line of such a fluid pressure system. In order to effect the longitudinal movement of the connectors 36 and 38, it is necessary only to move the piston 22 in the cylinder or tubular portion 21 against the action of the spring 24. This may be accomplished by connecting the tubular portion 21 with any suitable source of pressure supply. A flexible hose connection 49 is therefore made between the fluid pressure supply line 48 and the tubular portion 21, a stop cock being inserted between the open end of the fluid pressure supply line and the pressure reservoir, and the flexible hose connection being disposed between the stop cock 50 and the open end of the said supply line. It is understood that when two adjacent cars are connected, that the air or pressure supply lines are also connected, and since it is necessary to have an open pressure supply line, or what is commonly known as a train line, for the fluid pressure, it is necessary to open the stop cock 50. As soon as this stop cock is opened the piston 22 will be subjected to the train line pressure, and by suitably restricting the opening into the tubular portion 21, the movement of the piston 22 in the lower tubular portion may be made as slow as desired, and the connectors 36 and 38 may be moved slowly or rapidly into connecting position. If it is desired at any time to sever the electrical connection between any two cars, the stop cocks 50 may be closed and the release cock 51 opened, which will permit the escape of pressure from within the tubular portion 21 and will permit the spring 24 to retract the connectors.

It is believed that the construction and operation of this device will be clearly mani-

fest from this description, and that no further details need be given of the mode of operation of the device. It will be understood that the plugs are all similar, and that only one form of plug is necessary. The reversal of one plug with respect to the other caused by the reversal in position, in order to make the faces of the plug abut, is sufficient to position them symmetrically with respect to each other. The blocks which move the connectors are disposed upon one side only of the plugs, so that for each plug there are two connectors extending between the two adjacent plugs, and that from each plug there extends a conductor 30, which may be guided in any direction or to any connection by means of the cable 31.

While I have thus described the preferred construction of the several parts which constitute my invention, it is evident that those skilled in the arts to which this appertains may make various changes in the construction, combination and arrangement without departing from the spirit and scope of the invention.

What I claim as new is:—

1. In a device of the class described, the combination with a casing open at one end of a fixed perforated partition in the open end, a block movable toward and from the partition, and a plurality of electrical connectors each having one end loosely held in the block and the other end guided by a perforation of the partition, the loose mounting of the connectors in the block permitting a universal registering movement of each individual connector as the block is moved toward and from the partition.

2. In a device of the class described, the combination with a casing open at one end, of a perforated partition fixed within the said open end of the casing, a block movable in the casing, a plurality of electrical connectors each loosely held at one end in the block and movable through the partition, the loosely held connectors being individually self-registering in the perforations of the partition, and a single spring to retract the block for drawing the connectors through from the outer side of the partition.

3. In a device of the class described, the combination with a perforated guiding partition, of a plurality of connectors movable in the perforations, and a block in which the ends of the connectors are mounted, the mounted ends of the connectors being formed with enlarged heads, and the block being provided with openings larger than the heads to permit a lateral movement thereof and at the same time to hold them in spaced position.

4. In a device of the class described, adapted to cooperate with a counterpart device, the combination of a perforated insulating partition, connector lugs secured in the partition spaced apart and each provided with a plurality of perforations, and electrical connectors movable only through one perforation of each lug and adapted to make contact with a counterpart perforation of the cooperating device whereby a double connection will be made between corresponding lugs of cooperating devices.

5. In a device of this class adapted to cooperate with counterpart devices, the combination with a perforated insulating partition, the perforations of which are symmetrically located with respect to each other and to a center line of the partition, connector lugs mounted in the partition each formed with a pair of perforations, and electrical connectors movable in only one perforation of each lug whereby it will connect with the corresponding lug of a cooperating device and with said device will make a double connection.

6. In a device of the class described, the combination of a perforated insulating partition, connector lugs each with a pair of perforations, each of the perforations being symmetrically located with respect to a center line of the device, and a plurality of connectors movable through the perforated lugs on one side of the center line.

7. In a device of the class described, the combination with an open casing, of connectors movable out of one end thereof, a hinged cover movable into and out of position over the open end of the casing and when in such position to protect the connectors and prevent their movement out from the casing, and a spring-pressed latch to positively hold the cover out of said position.

8. In a device of the class described, the combination with a casing open at one end, connectors movable outwardly at the open end, a cover or lid movable into position over the end, and an insulating plate secured to the lid with which the connectors contact when the lid is in said position and the connectors are moved outwardly.

9. In a device of the class described, the combination with a casing open at one end, connectors movable outwardly at the open end, a cover or lid movable into position over the end, and an insulating plate secured in the lid and exposed on both sides thereof.

10. In a device of the class described, the combination with a casing open at one end, connectors movable outwardly at the open end, a hinged cover provided with a central opening, and an insulating plate inserted in the opening.

11. In a multiple electrical connector adapted to cooperate with a counterpart connector, the combination with a hollow casing open at both ends, of a member secured to one end of the casing having a tubular portion, electric circuit connectors movable from the other end of the casing to make

and break circuits, a rod extending into the tubular portion adapted to move the connectors, a piston secured to the rod in the tubular portion, and a spring disposed in the portion bearing against the piston and tending to press the connectors inwardly in the casing, the said piston being operative, under fluid pressure, to overcome spring tension and to move the connectors outwardly into circuit connecting position.

12. The combination with a car, of a connection plug adapted to cooperate with counterpart plugs on other cars, means supported by each car to which each plug is connected for aligning the plugs when the cars abut, fluid pressure supply means in connection with the car, and means actuated by fluid pressure from the supply means to cause the movement of the connectors in one plug whereby they will make connection with a cooperating plug.

13. The combination with a car having a self-aligning mechanical coupler, of an electric connection plug supported by the coupler, a fluid pressure device for each plug, movable connectors in connection with each plug, and means actuated by the fluid pressure device for effecting the operative movement of the connectors of one plug with respect to a cooperating plug.

14. The combination with cars each having a self-aligning coupler, of a connection plug therefor, means to yieldingly support the plug from the coupler permitting a yieldable longitudinal movement of the plug, counterpart movable connectors for each plug, and fluid pressure means to move the connectors from one plug into a cooperating one whereby a double connection is formed when the connector of the cooperating plug is operated.

15. The combination with a car, of a multiple connection plug adapted to cooperate with counterpart plugs, means to freely support the plug from the car, a spring tending to press the plug forwardly in the support whereby cooperating plugs will be pressed firmly together when adjacent cars abut, a fluid pressure supply line in connection with each car, connectors movable from each plug, a fluid pressure device in connection with each plug for operating the connectors, and a flexible fluid pressure conductor extending from the supply line to the said device to permit the free and longitudinal movement of the plug with respect to the supporting means.

16. The combination with a plug of the class described having a plurality of separate connectors, connector lugs having a plurality of perforations, connectors movable from within the plug through the perforations and into the perforation of a corresponding lug in an adjacent plug, the said perforations being symmetrically arranged so that the connectors of adjacent plugs will make a double connection between the corresponding lugs, and means to move the connectors into and out of engaging position.

17. The combination with a car, of a multiple connection plug adapted to cooperate with counterpart plugs, a fluid pressure supply line in connection with each car, connectors movable from each plug, a fluid pressure device to operate the connectors of the plug when the cars to be coupled are adjacent each other, means to connect said device with the supply line when adjacent cars are connected, and means to release the pressure from said device when the supply line connection between adjacent cars is shut off.

18. The combination with a connection plug of the class described, having connector lugs each with a plurality of perforations, means to connect an electrical conductor to each lug, the said lugs being insulated and spaced apart, the perforations being arranged in pairs and symmetrically disposed with respect to a vertical center line, connectors in each plug movable through one of the perforations of its own plug and movable into the corresponding perforation of an adjacent oppositely disposed lug, means tending to press the connectors out of such engagement, and means operable to contact the connectors with the adjacent lugs.

19. The combination with a connection plug of the class described having connector lugs each with a plurality of perforations, means to connect an electrical conductor to each lug, the said lugs being insulated and spaced apart, the perforations being arranged in pairs and symmetrically disposed with respect to a vertical center line, connectors in each plug movable through one of the perforations of its own plug and movable into the corresponding perforation of an adjacent oppositely disposed lug, the connectors of each plug all being disposed upon one side of the said center line whereby the corresponding connectors of adjacent plugs may both be inserted through the lugs of abutting plugs, and means to move the connectors into and out of connection positions.

20. The combination with a car, of a multiple connection plug having movable connectors adapted to be projected into and to cooperate with counterpart plugs, a fluid pressure supply line in connection with the car, a stop-cock in said line adjacent both ends of the car, a flexible hose connection with the said line at a point outside of the stop-cock, and a fluid pressure device for said plug with which the flexible hose connects to project the connectors from one plug into a counterpart one when the stop-cock is opened.

21. The combination with a car, of a connection plug having movable connectors

adapted to be projected into and to cooperate with counterpart plugs on adjacent cars, a fluid pressure supply line adapted to be connected between adjacent cars when they are coupled, a stop-cock adjacent each end of said line of each car, a flexible hose connection with said line at a point outside of the stop-cock at each end of the car, a fluid pressure device with which the flexible hose connects for operating the connectors when the stop-cock is opened, and a release cook nearer the end of the supply line than the hose connection to permit the release of fluid under pressure from said device when the stop-cock is closed and after the device has been energized.

22. The combination with a car having a self-aligning car coupler, of an electric multiple connection plug adapted to cooperate with a counterpart plug carried by each of the couplers and yieldingly movable into engagement with a counterpart plug carried by an adjacent car, the faces of the cooperating plugs abutting in a vertical plane when adjacent cars are brought together.

23. The combination with a car having a mechanical coupler, of an electric coupler depending therefrom and yieldingly supported thereby, and means for operating said electric coupler to close the circuit between adjacent cars after the mechanical car coupler has been coupled.

24. The combination with a car having a self-aligning car coupler, of an electric coupler supported thereby and partially aligned by the other coupler, and connectors in the electric coupler movable therein, relative thereto, for completing the alignment and for making connections between the electric coupler of the car and of an adjacent car.

25. The combination with a car having a mechanical coupler, of an electric coupler supported thereby partially aligned by the mechanical coupler and capable of an additional registering movement with a cooperating electric coupler of an adjacent car, and connectors in the electric coupler movable therefrom for closing circuit connections within a cooperating electric coupler subsequent to the connection of the car coupler and after the alignment of the electric couplers has been completed.

26. The combination with a car having a mechanical coupler, of electric couplers supported thereby adapted to cooperate with the counterpart coupler of a adjacent car, the mechanical coupler being provided with means to effect a partial alignment of the electric couplers of adjacent cars and each electric coupler being provided with counterpart means for completing its alignment with an adjacent electric coupler, and means for making electric connection between the said counterpart electric couplers, said means comprising a fluid pressure device and movable connectors projected by the device from within one electric coupler into a counterpart cooperating coupler.

27. In a device of this class adapted to cooperate with counterpart devices, the combination with an insulating member, of electrical contacts mounted in the insulating member each comprising a pair of lugs spaced apart, and a movable insulating member having an electrical connector affixed thereto and adapted to electrically connect one of the lugs of its device to the corresponding lug of a counterpart device by projecting it from within its device into the counterpart device.

28. The combination with a car provided with wires or electrical conductors, of electrical coupling terminals carried by and located at the opposite ends of said car, each of said coupling terminals having a plurality of pairs of contact members, with the contact members of each pair connected electrically together and to a single electrical conductor, a plurality of said pairs being located in the same plane with the members of each pair on opposite sides of a plane at right angles to the said plane and with both members of each pair equi-distant from said latter plane, whereby the car can be coupled directly at either end with another car, equipped exactly the same, and connect like electrical conductors in one car with the same electrical conductors in the other car or cars irrespective of which ends of the cars are coupled together.

29. The combination with a car provided with wires or electrical conductors, of electrical coupling terminals carried by and located at the opposite ends of said car, each of said coupling terminals having a plurality of pairs of contact members, with the contact members of each pair connected electrically together and to a single electrical conductor, the contact members of some of the pairs being separated by different distances, with the members of each pair on opposite sides of a plane common to all the pairs and at right angles to the planes in which the contact members of each pair are located, and with both members of each pair equi-distant from said latter plane, whereby when two cars equipped identically are coupled together, each electrical conductor in the coupling terminal will be automatically connected to exactly the corresponding electrical conductor in the coupling terminal of the adjacent car irrespective of which ends of the cars come together.

30. In an electric train line coupling, the combination with a coupling head containing a plurality of fixed contacts adapted to be connected to train line circuits, and a movable carrier provided with contacts, of fluid pressure means for projecting said carrier to electrically connect the corre-

sponding fixed contacts of counterpart coupling heads through the contacts of the movable carrier.

31. In an electric train line coupling, the combination with a coupling head containing a plurality of fixed contacts adapted to be connected to train line circuits, and a movable carrier provided with corresponding contact bars, of a piston and cylinder for projecting said carrier to electrically connect the corresponding fixed contacts of counterpart coupling heads through the contact bars of the movable carrier.

32. In an electric train line coupling, the combination with a coupling head containing a plurality of fixed contacts adapted to be connected to train line circuits, and a movable carrier provided with corresponding contact bars, of a fluid cylinder and piston for projecting said carrier to electrically connect the fixed contacts of counterpart coupling heads through the contact bars of the movable carrier, and means for returning the carrier to normal position.

33. In an electric train line coupling, the combination with a coupling head containing a plurality of fixed contacts adapted to be connected to train line circuits, and a movable carrier provided with corresponding contact bars, of a fluid cylinder and piston for projecting said carrier to electrically connect the fixed contacts of counterpart coupling heads through the contact bars of the movable carrier, and a spring for returning the carrier to normal position.

34. In an electric train line coupling, the combination with a casing containing a plurality of fixed contacts, and a movable carrier having corresponding contact bars, of fluid pressure means for projecting said carrier to electrically connect the corresponding fixed contacts of counterpart couplers, and a spring for opposing said movement and for yieldingly holding said carrier in normal released position.

35. In an electric train line coupling, the combination with a plurality of fixed contacts connected to train line circuits, a movable carrier having corresponding contacts, and means transmitting a reciprocating movement to the carrier in a horizontal direction for projecting said carrier to connect the corresponding fixed contacts of counterpart coupling heads.

36. In an electric train line coupling, the combination with a plurality of fixed contacts connected to train line circuits, a movable carrier having corresponding contacts, means transmitting a reciprocating movement to the carrier in a horizontal direction for projecting said carrier to connect the corresponding fixed contacts of counterpart coupling heads, and a spring to oppose the movement of the carrier.

37. In an electric train line coupling, the combination with a casing containing a plurality of fixed contacts and a movable carrier having corresponding contact bars, of fluid pressure means for projecting the carrier to electrically connect the fixed contacts of counterpart couplers, means for establishing fluid pressure connections between counterpart couplers upon impact and means for actuating said fluid pressure means.

38. A coupling device for vehicles comprising a mechanical coupler for mechanically connecting the vehicles together, an electrical coupler attached to said mechanical coupler and supported thereby for electrically connecting the vehicles, and a pneumatic actuating device for operating said electrical coupler.

39. A coupling device for vehicles comprising a mechanical coupler having a coupler head on each vehicle, an electrical coupler associated therewith having an electrical coupler element on each vehicle and means deriving its power from a source independent of the relative movement of said vehicles for moving said electrical coupler elements relative to the vehicles to electrically connect them, said mechanical coupler holding said electrical coupler elements from separating.

40. A coupling device for vehicles comprising a mechanical coupler having a coupler head associated with each vehicle, an electrical coupler connected therewith having an electrical element associated with each vehicle and a pneumatic actuating apparatus for moving said electrical coupler elements into contact, said mechanical coupler holding said electrical coupler elements from separating.

41. A coupling device for vehicles comprising a mechanical coupler having a coupler head associated with each vehicle, an electrical coupler having an electrical coupler element associated with each vehicle, pneumatic devices for actuating said electrical coupler elements, said pneumatic devices holding said elements in proper connection, and means associated with said electrical coupler elements for automatically preventing movement in the electrical coupler corresponding to the back and forth movement in the mechanical coupler.

42. A coupling device for vehicles comprising an electrical coupler element carried thereby, a cylinder, a piston therein connected with said electrical coupler element, and means for admitting air into said cylinder to move the coupler element.

43. In an electric train line coupling, the combination with a casing containing a plurality of fixed contacts adapted to be connected to train line circuits, and a movable contact carrier having corresponding contacts, of hand controlled means for projecting said carrier to electrically connect the

fixed contacts of counterpart couplings after engagement of said couplings.

44. In an electric train line coupling, the combination with a casing containing a plurality of fixed contacts adapted to be connected to train line circuits and a longitudinally movable contact slide having corresponding contacts, of fluid pressure operated means for projecting said slide to electrically connect the fixed contacts of counterpart couplings, and a manually operated element for controlling the supply of fluid to said means.

45. In a car coupling, the combination with a casing containing a plurality of fixed contacts connected to train line circuits, and a movable carrier having corresponding contact bars, of fluid pressure means for projecting said carrier to electrically connect the corresponding contacts of counterpart couplers, and a valve device for controlling the return movement of said carrier.

46. In a car coupling, the combination with a casing containing a plurality of fixed contacts connected to train line circuits, and a movable carrier having corresponding contact bars, of fluid pressure means for projecting said carrier to electrically connect the corresponding contacts of counterpart couplers, and a manually controlled valve device for releasing fluid from said fluid pressure means to effect a return movement of said carrier.

47. In a car coupling, the combination with a casing containing a plurality of fixed contacts connected to train line circuits, and a movable carrier having corresponding contact bars, of fluid pressure means for projecting said carrier to electrically connect the corresponding contacts of counterpart couplers, a valve device for controlling the release movement of said carrier and a conduit establishing communication between said valve devices of the counterpart couplers.

48. In a car coupling, the combination of a casing having an opening and containing electrical contacts connected to train line circuits, a movable carrier having corresponding contact bars, mechanism for projecting said carrier through said opening to electrically connect corresponding contacts of counterpart couplers, and a movable shutter for protecting said opening when said carrier is withdrawn.

49. An electric train line coupling comprising a pair of cooperating counterpart coupler heads each having a plurality of contact terminals in the form of open-ended bushings connected to the respective car line circuits and each having a carrier provided with a plunger contact extending through the inner end of one of said bushings, and means for projecting said plunger contacts through said bushing and into a corresponding bushing of the cooperating counterpart coupler.

50. 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 some 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 tubular contacts of the other coupler, and means for projecting the plunger contacts of either coupler into the corresponding tubular contacts of the other coupler.

51. 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 some 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 tubular 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 coupler.

52. An electric train line coupler comprising a pair of cooperating counterpart coupler heads each having a plurality of train line circuits terminating therein, each coupler head having a carrier mounted therein and provided with a plurality of contact members, and means for projecting both carriers simultaneously to electrically connect the corresponding train line circuits of the counterpart coupler heads when the two cars are coupled together.

53. An electric train line coupler for connecting a train line circuit comprising a pair of cooperating counterpart coupler heads each having a movable contact carrier mounted within the head and provided with a contact electrically connected to a train line circuit terminating therein, and means for projecting said carrier to electrically connect the contact of the counterpart head and the train line circuit.

54. In an electric train line coupler, the combination with a pair of cooperating coupler heads each containing a plurality of fixed contacts adapted to be connected to train line circuits and a movable carrier provided with contacts and mounted within the head, of means for projecting said carrier to electrically connect the corresponding fixed contacts of counterpart coupler heads through the contacts of the movable carrier, and means for disconnecting the fixed contacts prior to disengaging the coupler heads.

55. In an electric train line coupler, the combination with a pair of cooperating

coupler heads each containing a movable carrier provided with contacts electrically connected to train line circuits, means for projecting said carrier to electrically connect the corresponding train line circuits of counterpart coupler heads through the contacts of the movable carrier, and means for disconnecting the train line circuits of the counterpart heads prior to disengaging the coupler heads.

56. An electric train line coupling comprising a pair of cooperating counterpart heads each having means for guiding them into operating relation, a movable carrier within each head and provided with a plurality of contact members arranged to engage contact members in the counterpart couplers for connecting the corresponding train line circuits, and means to advance and retract the movable carrier relatively to each coupler head in a direction parallel to the line of movement of the coupler head when moved into coupled relation.

57. A coupling for electrically connecting corresponding train line circuits comprising a pair of cooperating counterpart coupler heads, each head having a movable carrier mounted therein and provided with a plurality of contact members electrically connected to train line circuits terminating within the heads, the movable carrier adapted to advance and retract in a horizontal plane, and means for projecting said carriers to electrically connect the contacts of the counterpart heads and like train line circuits.

58. In an electric coupling mechanism, the combination of a casing provided with an opening and adapted to be supported at the end of a car, fixed contacts mounted in said casing and connected to the respective train line circuits, a movable contact member also maintained in said casing and normally held out of operative position, and means for advancing said contact member in a horizontal direction through said opening to the operative position to establish electrical connection between said fixed contacts and the corresponding fixed contacts of a counterpart coupling on the adjacent car.

59. A coupling for electrically connecting corresponding train line circuits comprising a pair of cooperating counterpart heads each having a movable carrier mounted therein and provided with a plurality of contact members electrically connected to train line circuits terminating within the heads, means for projecting said carriers to electrically connect the contacts of the counterpart heads and like train line circuits and means for retracting said carriers to disconnect said contacts and circuits.

60. In an electric coupling mechanism, the combination of a casing adapted to be supported at the end of a car, fixed contacts mounted in said casing and connected to the respective train line circuits, a movable contact carrier also mounted in the casing and normally held out of operating position, and means for transmitting to the contact member a reciprocating movement to advance the contact member to the operative position to establish electrical connection between said fixed contacts and the corresponding fixed contacts of a counterpart coupler on the adjacent car.

61. In an electric coupling mechanism, the combination of a casing having an opening at its end, a movable contact carrier mounted in the casing and normally held out of operative position, a contact member mounted on the contact carrier and electrically connected to a train line circuit, and means for advancing the carrier and contact with a horizontal reciprocating movement through the opening to establish electrical connection with the contact of a counterpart coupling and electrically connect like train line circuits.

62. An electric coupler for connecting like train line circuits comprising a pair of cooperating counterpart coupler heads, each head comprising a casing with an opening, a pair of contacts mounted in the casing arranged in a horizontal plane and electrically connected together and to a single train line circuit and having the contacts of said pair spaced an equal distance on either side of a vertical center line of the coupler head, and means mounted in each casing to be projected from the casing to connect the corresponding pairs of contacts in the cooperating heads whereby the train line circuits connected to the corresponding pair of contacts are connected and means for projecting said prior means.

63. In a pair of cooperating counterpart coupler heads for connecting train line circuits, each head provided with a movable contact carrier mounted within a casing, each carrier provided with contacts having electrical connection with the train line circuit, and means in each head to give to the carrier of each head a reciprocating movement whereby each carrier is advanced and the contacts of one head are electrically connected with the contacts of the counterpart head and the like train line circuit connected thereby.

64. In an electric train line coupling, the combination with a plurality of fixed contacts connected to train line circuits, of a carrier movable relatively to the fixed contacts and having corresponding contacts, and means transmitting a horizontal reciprocating movement to the movable carrier to connect the corresponding fixed contacts of counterpart coupler head.

65. In an electric train line coupling, the combination with a plurality of fixed con-

tacts connected to train line circuits, of a carrier movable relatively to the fixed contacts and having corresponding contacts, means transmitting a horizontal reciprocating movement to the movable carrier to connect the corresponding fixed contacts of counterpart coupler head, and a spring to oppose the movement of the carrier.

66. A coupler for electrically connecting corresponding train line circuits comprising a pair of cooperating counterpart coupler heads, each head having train line circuits terminating therein and provided with contact members arranged to advance and retract in a horizontal direction for connecting the train line circuits of one head with the train line circuits of the other head, and means for projecting said contact members of each head.

67. An electric train line coupler for connecting a train line circuit comprising a pair of cooperating counterpart coupler heads, each having a movable contact carrier mounted within the head and provided with a contact electrically connected to a train line circuit terminating in said head, and means for projecting the carrier of one of said heads in a substantially straight line horizontal direction to electrically connect the contact of said head with the corresponding train line circuit of the counterpart head.

68. An electric train line coupler for connecting a train line circuit comprising a pair of cooperating counterpart coupler heads each having a movable contact carrier mounted within the head and provided with a contact electrically connected to a train line circuit terminating in said head, and means for projecting the movable carriers on both heads to simultaneously electrically connect the contacts thereon with corresponding train line circuits of the counterpart heads.

69. In an electric train line coupling, the combination with a coupler head containing a plurality of train line circuits, of a movable carrier provided with contact bars corresponding to the train line circuits, and pneumatic means for projecting said carrier to electrically connect the corresponding train line circuits of counterpart coupler heads through the contact bars of the movable carrier.

70. A coupling mechanism for electrically connecting corresponding train line circuits comprising a pair of cooperating counterpart coupler heads, each head having train line circuits terminating therein and each head provided with corresponding contact members electrically connected to the train line circuits and arranged to advance and retract in a horizontal direction relative to the coupler head and arranged to connect the corresponding train line circuits of the counterpart heads, and means for simultaneously projecting and retracting the contact members of both heads.

71. An electric train line coupler for connecting train line circuits comprising a pair of cooperating coupler heads each having a movable contact carrier mounted within the head and provided with a contact member electrically connected to a train line circuit at all positions on said head, and means connected with each of said heads for projecting the carrier therein to electrically connect the contact member of said carrier to a corresponding train line circuit in the cooperating head.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 13th day of April, A. D. 1912.

CHARLES H. TOMLINSON.

Witnesses:
L. J. MYERS,
M. A. DRAKE.