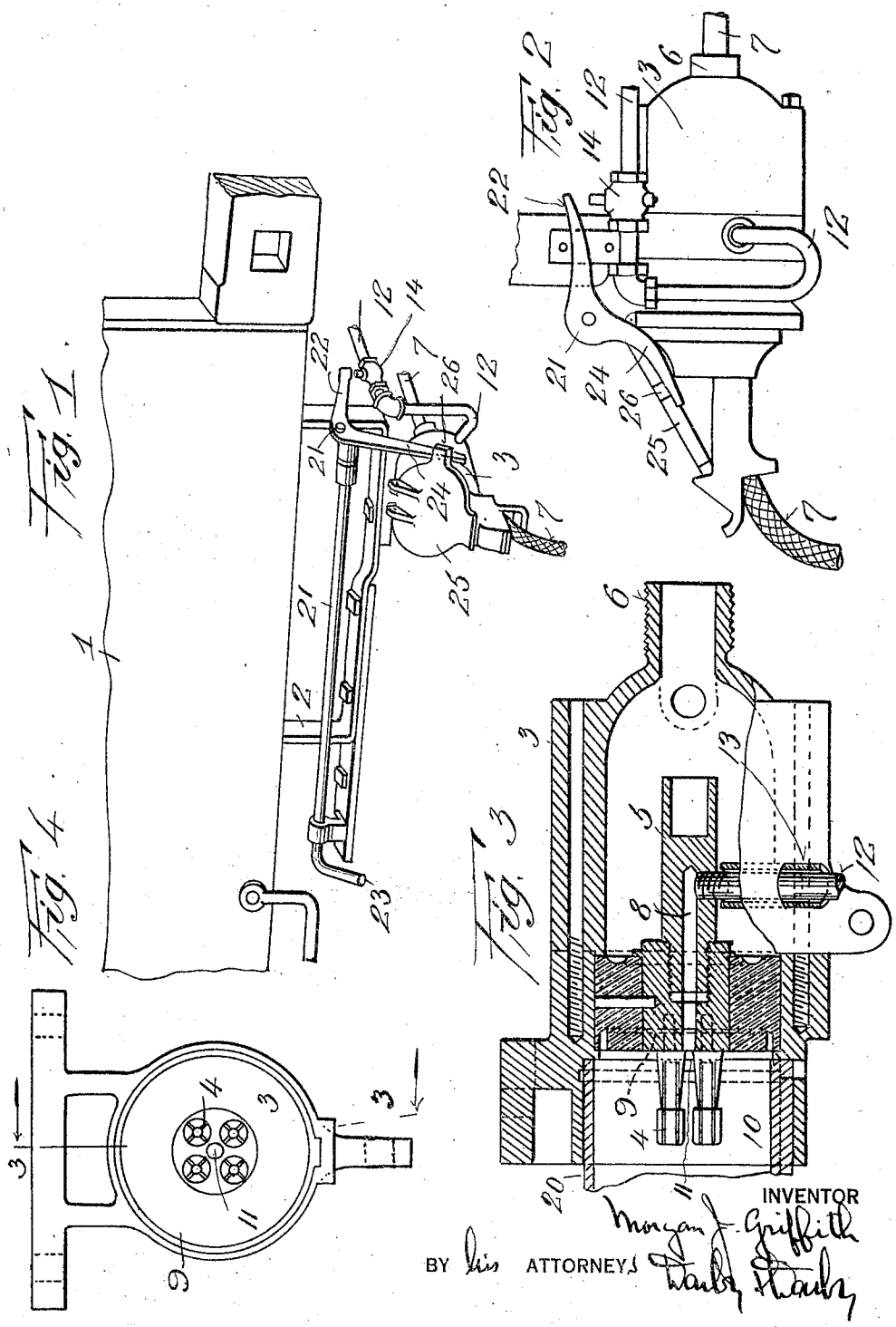
April 13, 1926. 1,580,825

M. J. GRIFFITH

HIGH POTENTIAL TERMINAL SEPARATOR

Filed July 2, 1921



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UNITED STATES PATENT OFFICE.

MORGAN J. GRIFFITH, OF JAMAICA, NEW YORK, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

HIGH-POTENTIAL TERMINAL SEPARATOR.

Application filed July 2, 1921. Serial No. 482,045.

To all whom it may concern:

Be it known that I, MORGAN J. GRIFFITH, a citizen of the United States, residing at Jamaica, in the county of Queens, State of New York, have made a certain new and useful Invention in High-Potential Terminal Separators, of which the following is a specification.

This invention relates to means for providing a simple, efficient, economical and safe method of separating separable high potential or other terminals, and the specific illustration of the invention elected for the purpose of enabling those skilled in the art to understand the principles thereof is that of a car bus line jumper head.

The object of the invention is to provide means for separating separable high potential and other terminals which may be controlled from a distance from the terminals in an easy, quick and most efficient manner, without danger to the one making the disconnection, and which secures such disconnection in a much quicker and efficient manner than has been possible heretofore, by suppressing the arc which generally jumps between the terminals during disconnection.

Further objects of the invention will appear more fully hereinafter.

The invention consists substantially in the construction, combination, location and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawing and finally pointed out in the appended claims.

Referring to the drawing—

Fig. 1 is a view in perspective of a high potential terminal separator embodying my invention, applied to a bus bar jumper head ejector, as is commonly employed on electric railway cars.

Fig. 2 is a side view of the same.

Fig. 3 is a sectional view of one terminal of the same.

Fig. 4 is a face view of the arrangement shown in Figure 3, the removable plug being omitted.

The same part is designated by the same reference character wherever it occurs throughout the several views.

It is among the special purposes of my invention to provide, as hereinbefore stated, an efficient, quick and safe means of separating separable high potential and other terminals, and while I have shown and will now describe the same as applied to a bus line jumper head commonly employed in electric railway systems, I wish it to be understood that I do not desire to be limited or restricted in this respect, as many other applications will readily occur to those skilled in the art without departing from the spirit and scope of my invention, as defined in the claims.

In the electric railway art, where a bus line of high potential extends from car to car throughout the train length, when it is desired to separate cars it is necessary that the bus line terminals be separated between the cars. The bus line terminals are contained in what is known as the jumper head, and it has heretofore been necessary to have a trainman step between cars, lift a jumper head cover and through physical effort separate the bus line terminals carried by the respective cars. Not only has this work been extremely laborious, but it has also been extremely dangerous due to the fact that when the terminals are separated an arc is most likely to occur and when occurring is liable to inflict exteremely dangerous and painful burns on the trainmen with the result that separating bus lines at the jumper head of the cars has been considered and still is considered as one of the most dangerous acts of routine work incident to electric railway systems.

In accordance with my invention, I render it possible to effect the disconnection at the jumper head of the terminals of the bus lines from a point remote to the jumper head, with but slight effort accomplishing the same pneumatically, i. e. utilizing the pneumatic pressure which forms part of a standard equipment of practically all of the electric railway systems in operation, either for brakes or for door operation or both, to eject either one terminal of the bus line from out of contact with the other terminal of the bus line. It will, therefore, be readily seen that all the manual effort required is to operate a pneumatic valve, which operation may obviously be effected from a point distant to the jumper head. In addition to this decided advantage over what is commonly employed in the art today, I utilize the fluid pressure employed for ejecting one terminal from the other to blow out any arc which may tend to jump between the terminals during their separation.

Referring to the drawing wherein I have illustrated one structure embodying the principles of my invention, reference numeral 1 designates generally the end of a car supporting in any suitable manner, for example, by means of angle iron 2, the jumper head generally indicated as 3. The jumper head contains contacts 4 which are set in a metal plug 9 in electrical communication with the terminal 5 on the interior of the casing 3, in which terminal 5 the bus line is secured and extends through the end 6 of the casing 3 through the train. The bus conductors indicated at 7 are ordinarily provided with terminal connections at the opposite end of the car, adapted to be connected with terminals on the end of the next adjacent car, to complete the circuit therethrough, and to retain their contact with each other until they are separated from each other.

The structure thus far described is substantially the standard construction employed in the railway art. In accordance with my invention, however, I provide a bore 8 through the terminal 5 which extends completely through the face 9 of the contact chamber 10 and terminates in the orifice 11 positioned preferably centrally relative of the contacts 4. I also provide the terminal 5 with a transverse opening into which extends a pipe 12 preferably insulated from the casing in any suitable manner, for example, by means of an insulation sleeve 13, which pipe 12 is connected with a source of fluid pressure supply and is controlled by a valve 14. When the bus line terminals of two cars are connected together, that is when the terminal connection at the free end of the bus line, indicated at 20, Fig. 3, is inserted into the socket or chamber 10 to complete the circuit through the contacts 4 and terminal 5, it will readily be apparent that if the valve 14, which is normally closed, is opened so as to permit fluid pressure to flow through the pipe and the bore 8 of terminal 5, this fluid pressure will, if strong enough, separate the contacts of the respective bus line terminals and at the same time act to blow out any arc that may tend to jump between said contacts. Inasmuch as the fluid pressure employed for both door operation and brake control on electric railway trains is considerably over twenty pounds, which would be more than sufficient to effect the ejection of the bus line terminal, it will readily be appreciated that the amount of pressure on any railway system in use today will be more than sufficient for this purpose.

By opening the valve 14 a jet of air under pressure is delivered through pipe 12, bore 8 and opening 11, and impinging against the terminal connection 20, serves to expel said connection 20, and at the same time extinguish any arc that may be formed at the time of separation of the live contacting portions of the coupling.

The admission of the air jet to accomplish the results stated may be effected in many different ways and controlled from any convenient point. In practice I prefer to effect the control of the air supply or jet from a point remote from the coupling or jumper head in order to avoid danger to the workman or other person effecting the separation of the circuit terminals, particularly in lines carrying high potential current. I have shown one simple and effective arrangement for accomplishing this result wherein I mount a rock shaft 21 in convenient position so that an arm 22 connected at or rocked with said shaft is positioned with reference to the stem of valve 14 so as to engage said stem, when the shaft 21 is rocked, and open said valve. The shaft 21 may be rocked in any suitable manner, as per example, by means of a handle member 23, located at a point remote from the jumper head.

Usually jumper heads are provided with covers to exclude dust, dirt, rain or the like from the contact portions of the device, and which cover must be raised or opened to permit a bus line terminal connection to be inserted in or removed from the socket chamber 10 of the jumper head. If desired, the same rock shaft employed to control the actuation of valve 14 may also be utilized to effect the opening of the jumper head cover. I have shown an arrangement for accomplishing this wherein the arm 24 is connected to rock with the shaft 21, and said arm is arranged to engage the cover 25 and raise or lift the same at the same time the arm 22 is moved to unseat the valve 14. In the illustrative arrangement shown the arm 24 engages beneath a lug or projection 26 of the cover 25, but this is a mechanical detail to which my invention in its broader scope is in no wise to be restricted. A convenient arrangement, also, is to form the arms 22, 24, as arms of a bell crank which is mounted on or connected to the operating shaft 21, but this, too, is a mere mechanical detail.

It will be understood that many changes in and modifications of details may readily occur to persons skilled in the art and still fall within the spirit and scope of my invention. I do not desire, therefore, to be limited or restricted to the exact details shown and described.

But having now set forth the objects and nature of my invention, and a structure embodying the principles thereof, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent is,—

1. A jumper head having a circuit terminal and a socket chamber, a cooperating circuit terminal adapted to be removably in-

serted in said socket chamber and means to deliver air under pressure into said chamber to effect the separation of said terminals.

2. A jumper head having a circuit terminal and a socket chamber, a cooperating circuit terminal adapted to be removably inserted in said socket chamber and means to deliver air under pressure into said chamber to effect the separation of said terminals, said means controllable from a distant point.

3. A jumper head having a circuit terminal mounted therein, said terminal having a passage therethrough, a cooperating circuit terminal adapted to be separately connected to the terminal in the jumper head, said cooperating terminal being positioned opposite the delivery end of said passage when connected to the jumper in the terminal head, and means to deliver air under pressure to said passage.

4. A jumper head having a circuit terminal mounted therein, said terminal having a passage therethrough, a cooperating circuit terminal adapted to be separably connected to the terminal in the jumper head, said cooperating terminal being positioned opposite the delivery end of said passage when connected to the jumper in the terminal head, and means to deliver air under pressure to said passage, said means being controllable from a point remote from the jumper head.

5. A jumper head having a circuit terminal, a cooperating circuit terminal adapted to be removably inserted in the head to complete circuit connection to the jumper head terminal, a pipe connected with the jumper head to deliver air under pressure against the contact face of the removable terminal, a valve in said pipe, and means to control said valve.

6. A jumper head having a circuit terminal, a cooperating circuit terminal adapted to be removably inserted in the head to complete circuit connection to the jumper head terminal, a pipe connected with the jumper head to deliver air under pressure against the contact face of the removable terminal, a valve in said pipe, and means to control said valve from a distant point.

7. A jumper head having a circuit terminal, a cooperating circuit terminal adapted to be removably inserted in the head to complete circuit connection to the jumper head terminal, a pipe connected with the jumper head to deliver air under pressure against the contact face of the removable terminal, a valve in said pipe, a shaft having an arm to control said valve, and means for rocking said shaft.

8. A jumper head having a circuit terminal, a cooperating circuit terminal adapted to be removably inserted in the head to complete circuit connection to the jumper head terminal, a pipe connected with the jumper head to deliver air under pressure against the removable terminal, a valve in said pipe, a cover for said head, means to control said valve, said means also operating said cover.

9. A jumper head having a circuit terminal, a cooperating circuit terminal adapted to be removably inserted in the head to complete circuit connection to the jumper head terminal, a pipe connected with the jumper head to deliver air under pressure against the removable terminal, a valve in said pipe, a cover for said head, a shaft, a bell crank connected therewith, one arm of said bell crank controlling said valve and the other controlling said cover, and means for rocking said shaft.

In testimony whereof I have hereunto set my hand on this 28th day of June A. D., 1921.

MORGAN J. GRIFFITH.