

July 15, 1924.

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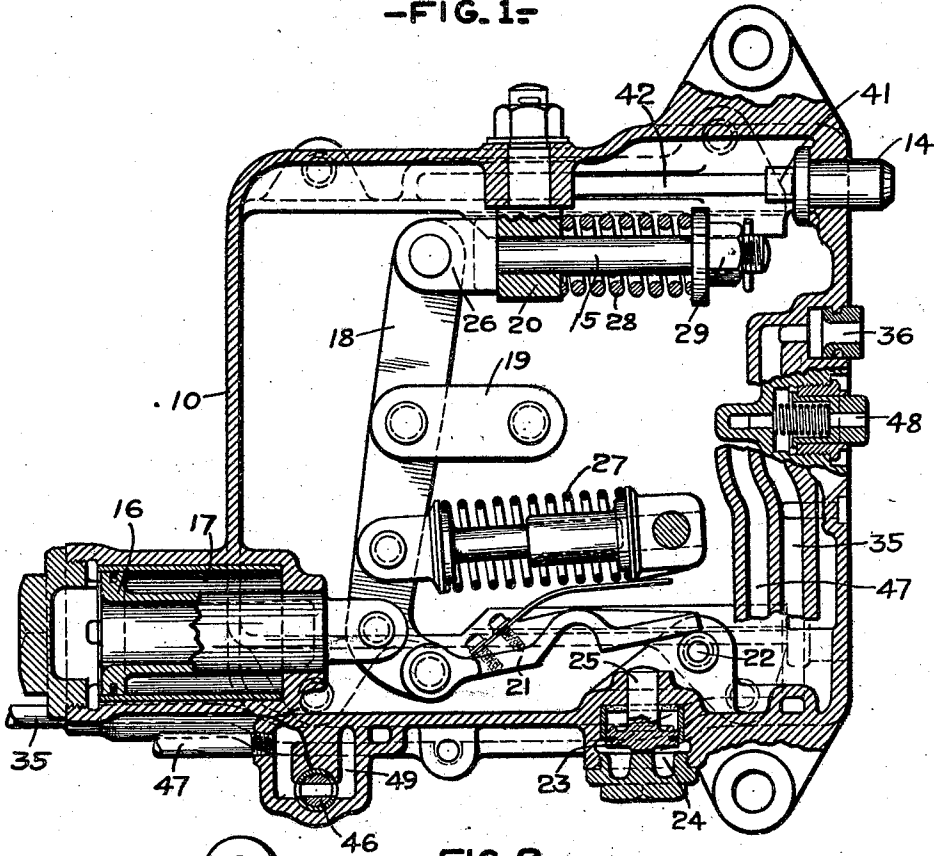
H. F. WOERNLEY

ELECTRIC COUPLING FOR CARS

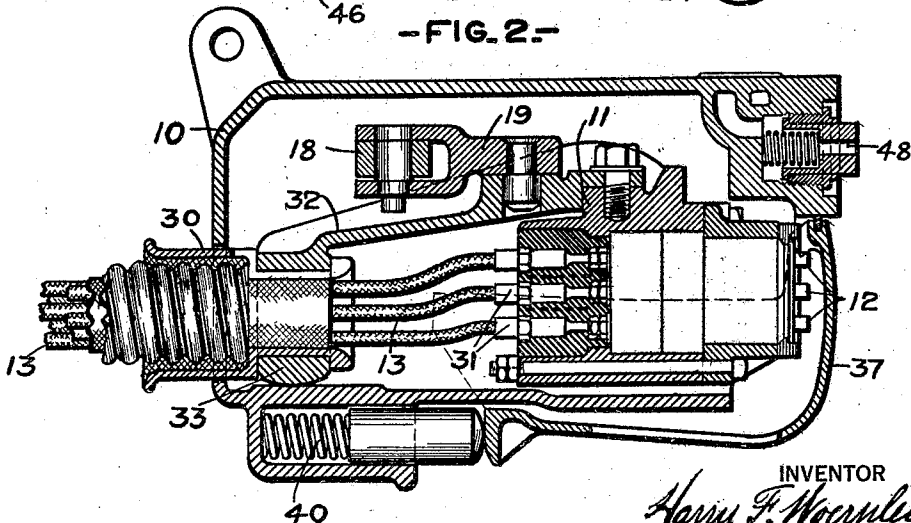
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-FIG. 1-



-FIG. 2-



INVENTOR

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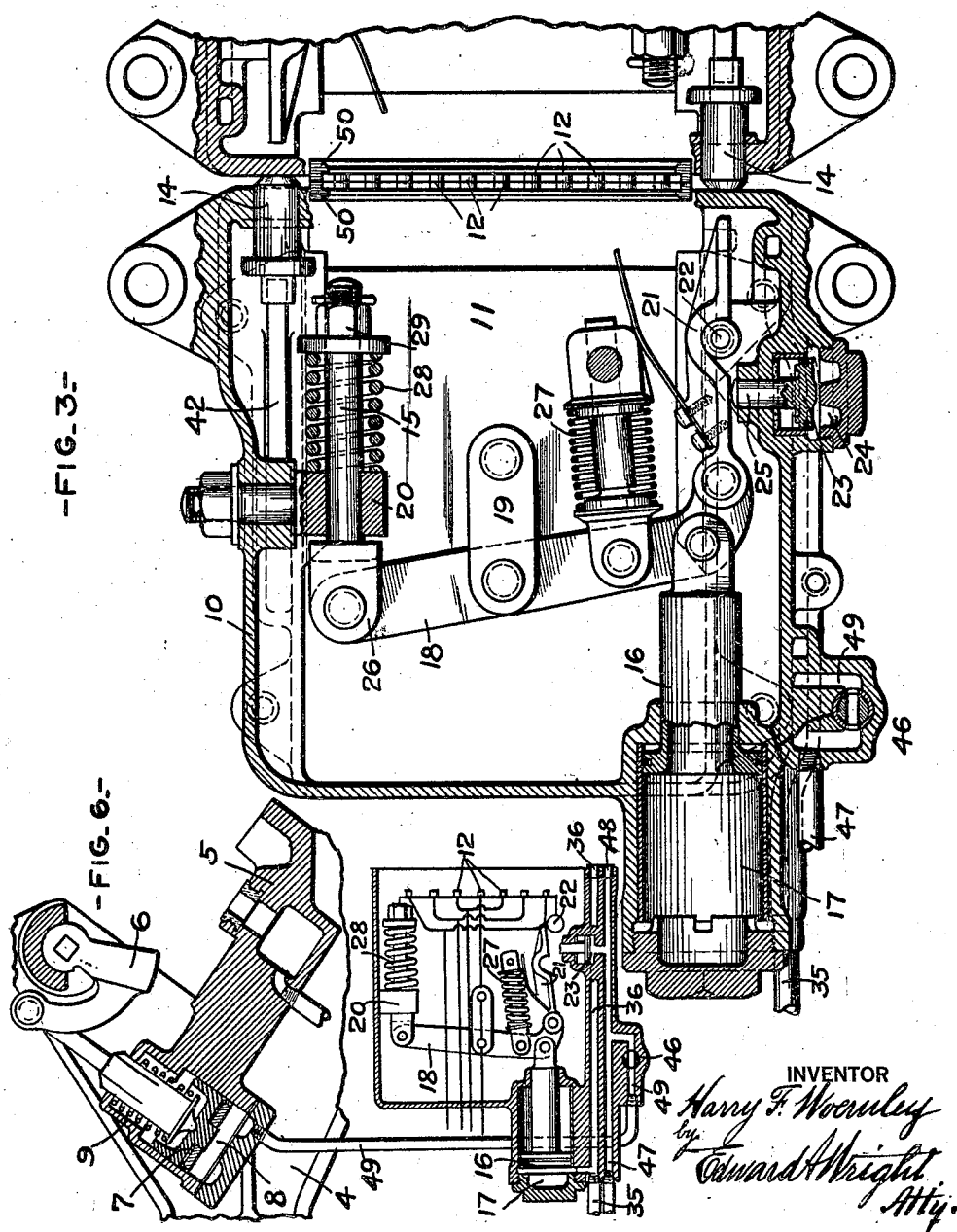
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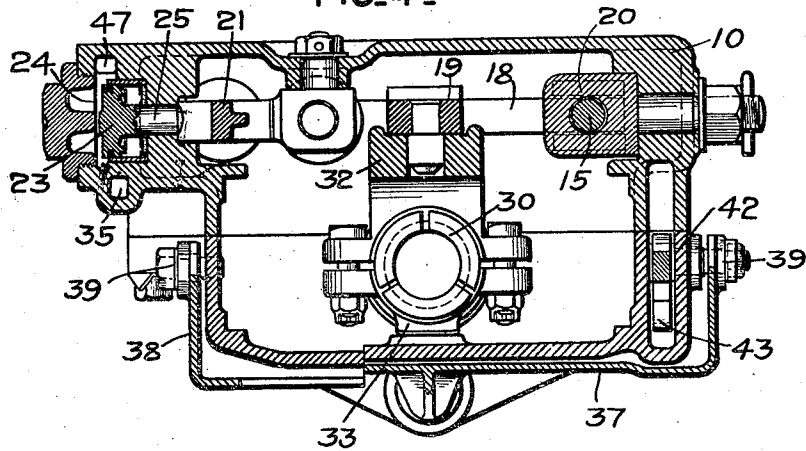
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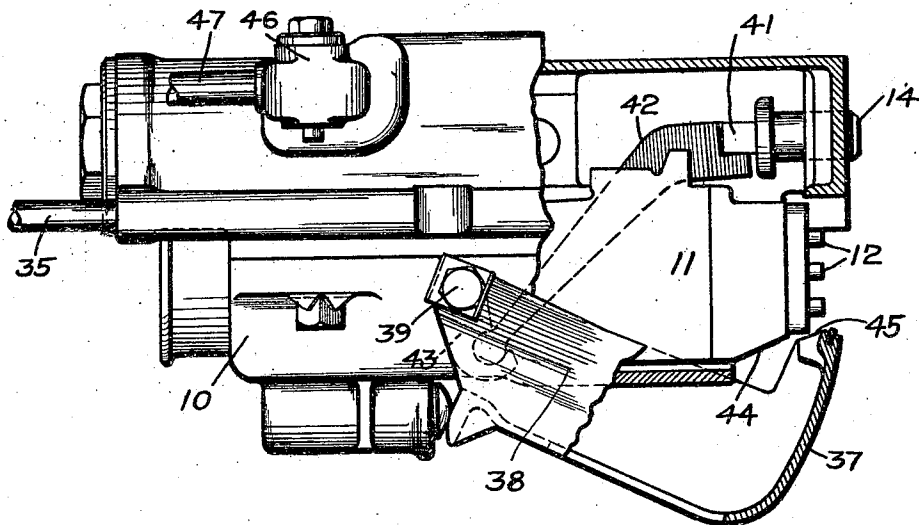
Filed July 5, 1919

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-FIG. 4-



-FIG. 5-



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UNITED STATES PATENT OFFICE.

HARRY F. WOERNLEY, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO THE WESTINGHOUSE AIR BRAKE COMPANY, OF WILMERDING, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

ELECTRIC COUPLING FOR CARS.

Application filed July 5, 1919. Serial No. 308,844.

To all whom it may concern:

Be it known that I, HARRY F. WOERNLEY, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Electric Couplings for Cars, of which improvement the following is a specification.

This invention relates to apparatus for coupling electric circuits between the cars of a train, and more particularly in couplings of this character having a movable member provided with a plurality of electric contacts connected to the respective circuits, and adapted to be projected forward to engage the contacts of a counterpart coupler on the adjoining car.

In order to compensate for slight variations in dimensions and other inaccuracies of manufacture in couplers of this type, it is desirable that the electric contacts of the counterpart couplers should be yieldingly held together with a certain pressure when in the coupled position, and one of the features of my present invention is to provide improved means for this purpose. Another feature comprises an improved form of connection between the contacts mounted on the carrier and the respective train line circuits, whereby any one may be independently disconnected, if desired. Another feature comprises improved means for automatically operating the shutter or cover for protecting the electric contacts.

This invention is also in the nature of an improvement on that of my prior application Serial No. 243,497, filed July 5, 1918.

In the accompanying drawings: Figure 1 is a horizontal section of the improved electric coupling taken substantially in the plane of the operating lever and piston the contact carrier being omitted for the sake of clearness; Fig. 2, a central longitudinal section; Fig. 3, a horizontal section showing the parts in coupled position; Fig. 4, a transverse section; Fig. 5, a side elevation, partly in section and showing the cover or shutter in the partially open position; and

Fig. 6, a diagrammatic sectional view illustrating the connections of the fluid passages.

As set forth in my prior application above referred to, the improved electric coupler is designed to be attached to the car coupler, which may be of the well known rigid lock type having a body, 4, with a hook-shaped projection, 5, adapted to interlock with the corresponding projection of a counterpart coupler and be rigidly clamped thereto by the pivoted locking lever, 6, actuated by spring, 9, and releasing piston, 7, in cylinder, 8, as indicated in Fig. 6. The electric coupling, which is preferably suspended beneath the car coupler, comprises a casing, 10, in which is slidably mounted the contact carrier, 11, having a plurality of butt contacts, 12, adapted to engage the contacts of a counterpart coupling on the adjoining car when the cars are coupled together and the carriers are projected forward to their coupled position.

The contact carrier 11, comprises a frame containing a block of insulating material, in which the electric contacts, 12, are mounted, these being arranged in pairs, with the contacts of each pair located upon opposite sides of the centre line, and connected together, and to the respective car line circuits. In this way each circuit is divided into two branches at the coupling, with the contacts at opposite sides of the centre, in order to make the proper electrical connections at either end of the car, it being understood, however, that those circuits having contacts located on the centre line require only a single contact. As shown in the drawings, there are three horizontal rows of contacts, 12, extending through the block of insulating material, the rear ends of each, or one of each pair, being connected to the respective train line wires, 13, which extend out through an opening in the rear of the casing.

According to one of the features of my improvement, the train line wires, 13, are enclosed in a sleeve or tube, 30, which is pref-

erably split at its forward end where it may be held in a jaw or clamp, 33, slidably mounted in the casing and rigidly connected by an arm, 32, with the frame of the contact carrier, 11. The train line wires are thus rigidly held by the clamp, so that all strain upon the said wires between the clamp and the carrier, due to the sliding movement of the latter, is removed, and at this point each wire comprises an independent flexible portion having a detachable plug connection, 31, with the respective contacts, 12, on the contact carrier. By this means any one of the circuits may be independently disconnected whenever desired. This construction is also shown in my prior application, above referred to, but is not claimed therein.

According to another feature of my present invention, there is provided an improved means for projecting the contact carrier forward to engage the contacts of a counterpart coupler with a direct abutting action, and to hold said contacts pressed together with a certain pressure when in the coupled position, and this comprises a lever, 18, connected by a link, 19, to the contact carrier, 11, and also connected to a piston, 16, mounted in the cylinder, 17. The actuating lever, 18, is pivoted at its end upon a fulcrum block, 26, carried by a rod, 15, slidably supported in an abutment, 20, on the side of the casing, the rod having an adjustable nut, 29, and a carrying a spring, 28, between the abutment and said nut. The nut is adjusted to impart a certain amount of initial compression to the spring, 28, and normally hold the fulcrum block, 26, against the abutment, 20.

In order to hold the contact carrier in its forward coupled position, the lever, 18, is provided with a pivoted spring latch, or locking lever, 21, having a notch adapted to engage a pin, 22, in the coupled position. For releasing said locking lever when it is desired to withdraw the contact carrier, there is a small piston, 23, mounted in cylinder, 24, and having a stem, 25, engaging said latch, 21. A spring, 27, opposes the forward movement of the lever and acts to return the same and the contact carrier when releasing. A passage or conduit, 35, communicates with the cylinder of the actuating piston, 16, and also leads to a gasket opening, 36, at the face of the coupler for communication with the corresponding passage in the counterpart coupler, whereby both pistons may be operated from either car. Another passage or conduit, 47, communicates with the chamber of the releasing piston, 23, and with the opening, 48, at the face of the coupling. A branch passage or conduit, 49, leads from the passage, 47, up to the unlocking cylinder, 8, of the car coupler, all as shown diagrammatically in

Fig. 6. A valve, 46, may be employed for cutting off the supply of fluid from conduit, 47, to the conduit, 49, when for any reason it is desired to release the contact carriers without unlocking the car couplers.

For the purpose of protecting the exposed ends of the contacts, 12, from dirt, dust, and moisture, there is a vertically swinging shutter or cover, 37, adapted to close the open front end of the casing, when the carrier is withdrawn, said shutter having side arms, 38, pivoted at 39, to the casing. A spring, 40, operates upon the shutter to normally hold the same closed, as indicated in Fig. 2. For opening the shutter, there is a tappet, 14, adapted to be depressed by engagement with the counterpart coupler, and having a projection, 41, for operating an arm, 42, connected to a crank, 43, on one of the pivots of the shutter. This construction is similar to that shown in my prior application above referred to, but my present improvement includes the additional feature of providing the contact carrier and the shutter with co-operating portions or surfaces, 44, and 45, whereby when the shutter has been partially opened by the movement of the tappet, 14, it may then be moved to a full open position by the action of the carrier in being projected forward to its coupled position, as indicated in Fig. 5.

When the ends of the two cars are brought together in the act of coupling, the car couplers engage each other and are coupled in the usual way by means of the locking levers, 6, and springs, 9, as will be readily understood. At the same time, the tappets, 14, engage the opposite couplers, being depressed thereby, and act through the arms, 42, and cranks, 43, to swing the shutters downward to the partially open position, shown in Fig. 5. Fluid under pressure, such as compressed air, is then admitted to the passage or conduit, 35, from which it passes to cylinders, 17, of both couplers and forces out the pistons, 16, and levers, 18, which turn on fulcrums, 26, and projects the contact carrier, 11, forward until the contacts, 12, engage each other. During this movement, the shutters, 37, are engaged by the carriers and moved to the full open position, as before described. The dimensions of the moving parts are so arranged that the contacts, 12, are adapted to meet and butt together before the actuating pistons and levers have made their full travel. The further movement of the piston then operates to shift the fulcrum of lever, 18, from pivot, 26, to the pivot on link, 19, of the carrier, and to turn the lever about this latter pivot, thereby drawing the block, 26, away from the abutment, 20, and compressing the spring, 28, as shown in Fig. 3. As the piston completes its travel, the latch 21,

engages the locking pin, 22, and holds the contact carrier in its forward coupled position with the springs, 27, and 28, compressed. By means of this construction, the last part of the forward movement serves to transfer the pressure of the spring, 28, to the contact carrier, and it then continues to act to press the contacts, 12, together with a substantially constant and uniform pressure as long as the couplers remain in the coupled position. The fluid may then be released from cylinder, 17, and passage, 35, as the latch, 21 holds the parts in the coupled position.

When it is desired to uncouple, fluid under pressure is admitted to the passage or conduit, 47, from which it flows into chamber, 24, on each coupler, and actuates the piston, 23, to trip the latch lever, 21, whereupon the release spring, 27, returns the carrier and other moving parts to the uncoupled position shown in Figs. 1 and 2. Fluid also flows through conduit 49, to the unlocking cylinder, 8, of the car coupler on each car, thereby actuating the pistons, 7, to release the coupler locks, 6, and allow the cars to be pulled apart. As the couplers separate, the spring, 40, returns the shutter, 37, to its closed position, and the tappet, 14, is again extended as shown in Fig. 2. Any suitable or well known form of valve means operated either manually or automatically may be employed for controlling the supply of fluid to the passages or conduits, 35, and 47.

It will now be seen that the supplemental springs, 28, the pressure of which is transferred to the contact carriers during the last part of the forward movement of the pistons after the contacts are brought into engagement with each other, will, operate to hold said contacts together with a substantially constant and uniform pressure regardless of slight variations due to wear or inaccurate construction, thereby preserving good electric contact and also holding the gaskets, 50, of the carriers closely together to exclude dirt and moisture when the parts are coupled together.

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

1. In an electric coupling for cars, the combination with a movable carrier having a plurality of electric butt contacts connected to respective circuits, of a lever, means for operatively connecting said lever to said carrier, a movable fulcrum member connected to said lever, a spring acting on and compressible by the movement of said fulcrum member, and means for actuating said lever to project said carrier forward to engage the contacts of a counterpart contact carrier with said fulcrum member as a fulcrum and cooperating with the means

connecting the lever with the contact carrier for actuating said lever and fulcrum member to compress said spring.

2. In an electric coupling for cars, the combination with a movable carrier having a plurality of electric butt contacts connected to respective circuits, of a lever, means for operatively connecting said lever to said carrier, a movable member connected to said lever, a spring compressible by the movement of said member, and means for actuating said lever to project said carrier forward to engage the contacts of a counterpart contact carrier, the contact carrier then acting as a fulcrum for said lever in cooperation with the means connecting said lever with said contact carrier upon a further movement of the lever by said lever actuating means to cause the lever to operate said movable member and thereby compress said spring.

3. In an electric coupling for cars, the combination of a movable carrier having a plurality of electric butt contacts connected to the respective circuits, a piston and connections actuated by fluid pressure for projecting said carrier forward to engage the contacts of a counterpart coupler on the adjoining car, a spring, and means operated by the forward movement of the piston to compress said spring and transmit its pressure to said carrier to hold the contacts together.

4. In an electric coupling for cars, the combination of a movable carrier having a plurality of butt contacts connected to the respective circuits, a lever connected to said carrier, a piston for actuating the lever to project said carrier forward to engage the contacts of a counterpart coupler on the adjoining car, a lock for holding the carrier in its projected position, a spring acting on said lever and means operated by the movement of the piston after the contacts are brought together for transmitting the pressure of said spring to said carrier.

5. In an electric coupling for cars, the combination of a movable carrier having a plurality of butt contacts connected to the respective circuits, a lever pivotally connected to said carrier, a piston for actuating the lever to project said carrier forward to engage the contacts of a counterpart coupler on the adjoining car, a fulcrum for the lever, and a spring for holding the fulcrum of the lever during the forward movement to bring the contacts together, and means for permitting the piston to make a further forward movement to turn said lever upon the carrier as a fulcrum.

6. In an electric coupling, the combination of a casing open at its front end, a contact carrier movably mounted therein

and having a plurality of electric contacts, means for projecting said carrier through the open end of the casing for making electrical connection with the corresponding circuits of another coupler, a cover adapted to swing vertically over the front end of the casing for protecting the contacts, means operated by the coming together of the couplers in the act of coup-

ling for swinging said cover downward, said carrier having a portion adapted to engage a corresponding portion of the cover in the partially open position and co-act therewith to move the cover to its full open position.

In testimony whereof I have hereunto set my hand.

HARRY F. WOERNLEY.