

June 10, 1924.

H. F. WOERNLEY

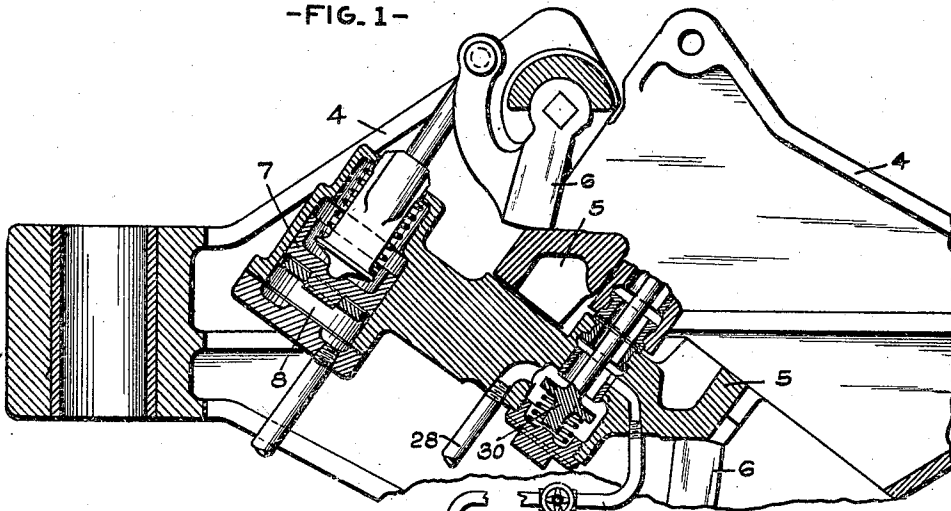
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AUTOMATIC ELECTRIC COUPLING

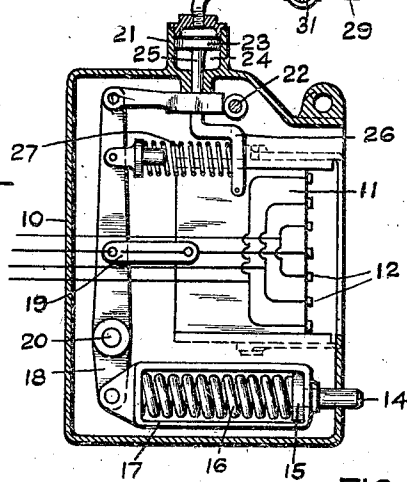
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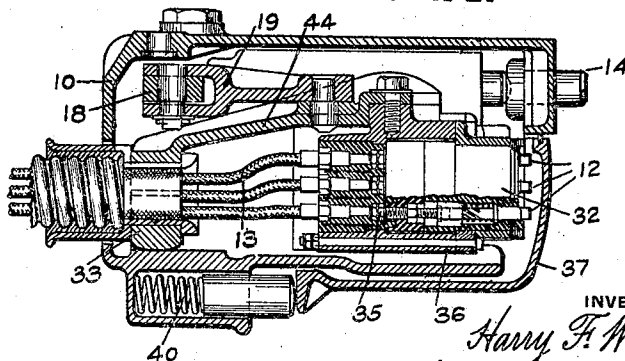
-FIG. 1-



-FIG. 1a-



-FIG. 2-



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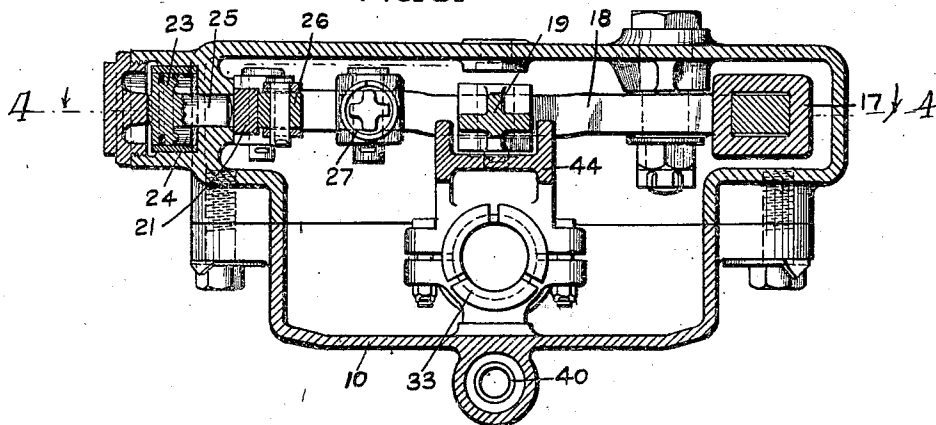
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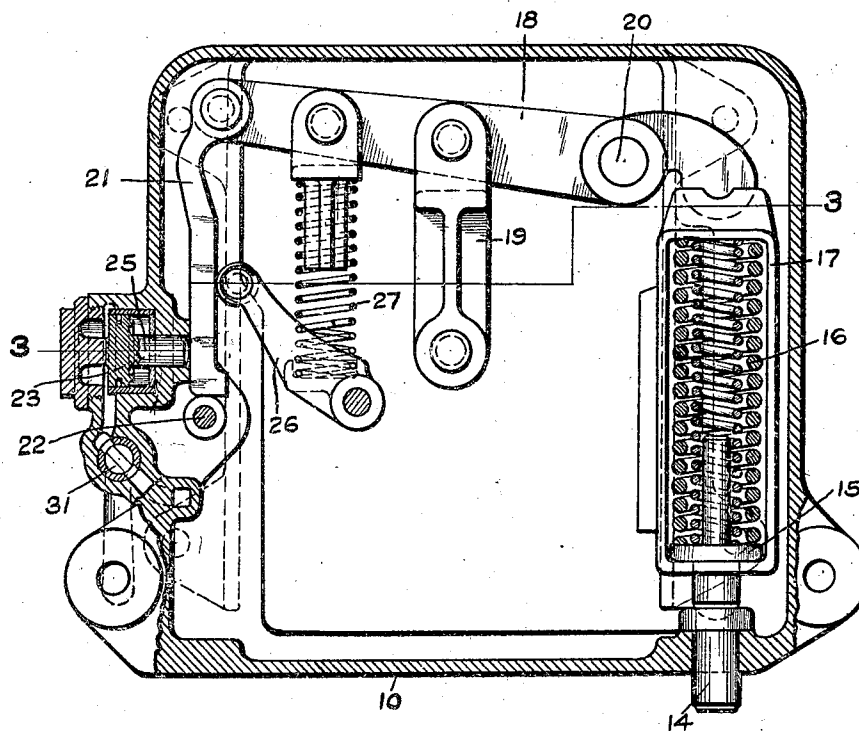
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-FIG. 3-



-FIG. 4-



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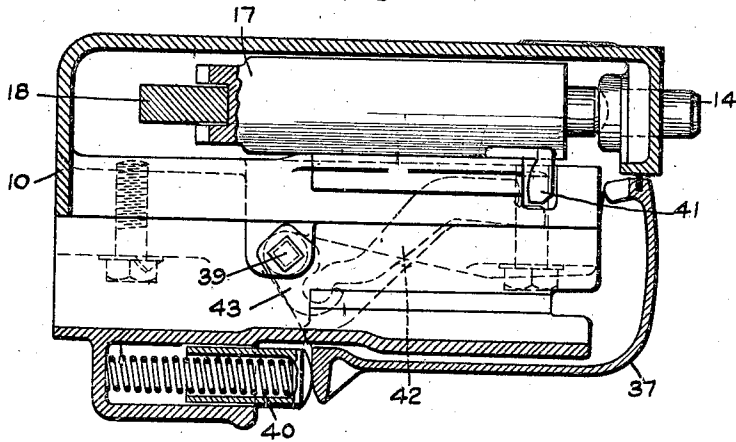
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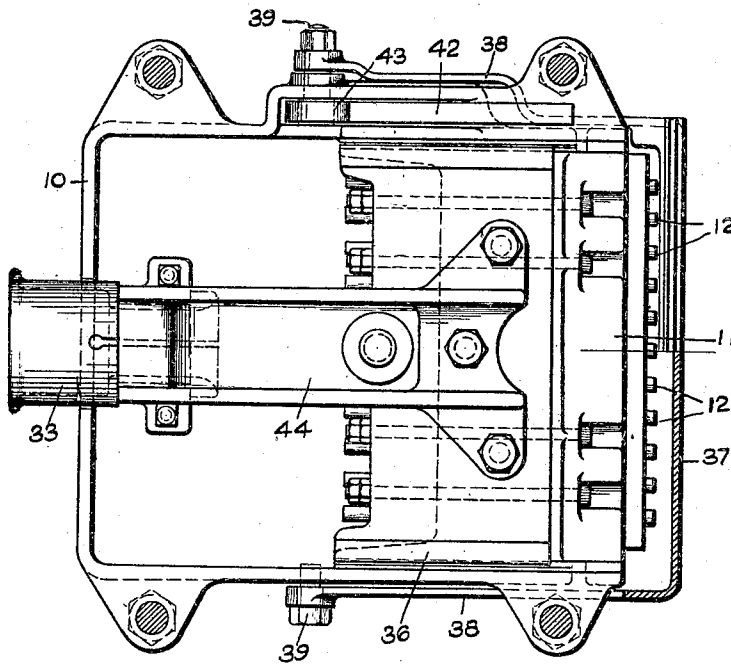
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-FIG. 5-



-FIG. 6-



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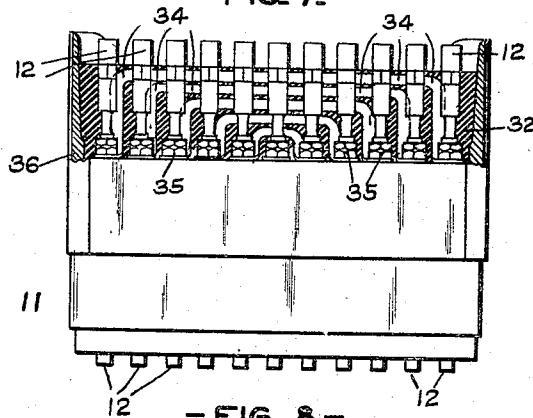
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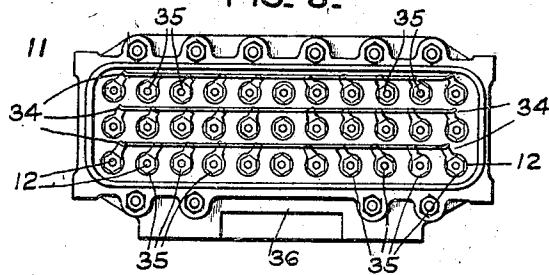
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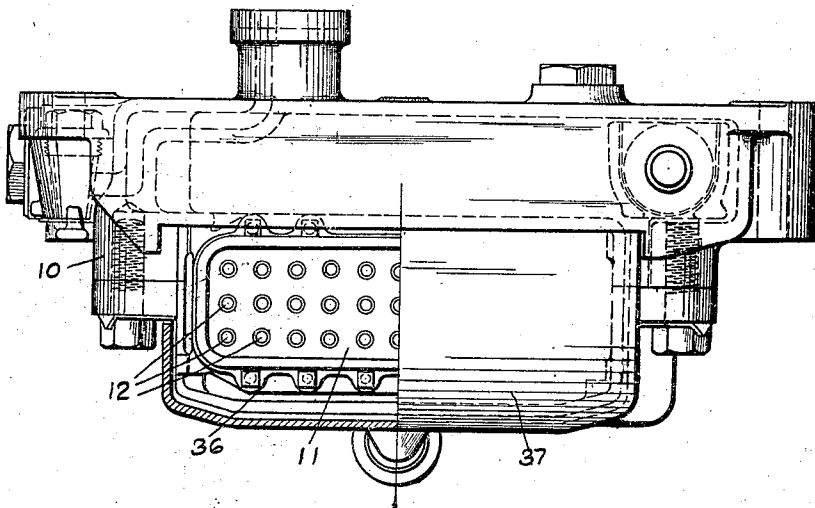
-FIG. 7.-



-FIG. 8.-



-FIG. 9.-



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Patented June 10, 1924.

1,497,353

# UNITED STATES PATENT OFFICE.

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

## AUTOMATIC ELECTRIC COUPLING.

Application filed July 5, 1918. Serial No. 243,497.

*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 Automatic Electric Couplings, of which improvement the following is a specification.

This invention relates to apparatus for coupling electric train line circuits between the cars, and more particularly to devices of this character having a movable electric portion, or carrier, for the electric contacts, adapted to be operated automatically by the coming together of the cars in the act of coupling, and to be projected outward at the end of the car for making contact with the contact terminals of the counterpart coupler of the adjoining car.

Generally stated my invention comprises an improved construction of this type in which the movable contact carrier is actuated by force derived from the coming together of the couplers, which is, however, stored up during a part of the approach movement, as by the compression of a spring, which is then tripped as the final coupled position is reached and by its expansive force serves to project the contact carrier to its extended coupled position.

Another feature comprises an improved shutter and means for automatically operating the same to close the open end of the casing and protect the contact terminals when the carrier is withdrawn to its retracted position.

One form of apparatus embodying my improvement will now be more fully described in detail and the features of novelty will be set forth in the claims.

In the accompanying drawings Figure 1 is a horizontal section of a car coupler with which the improved electric coupling may be employed; Fig. 1<sup>a</sup>, a diagrammatic horizontal section of the electric coupler adapted to be suspended beneath the car coupler; Fig. 2 a vertical longitudinal section of the electric coupler; Fig. 3 a transverse section taken on the line 3—3 of Fig. 4; Fig. 4 a horizontal section taken substantially in the plane indicated by the line 4—4 of Fig. 3; Fig. 5 a vertical longitudinal section showing the cover and operating mechanism; Fig. 6 a plan with the top portion removed,

showing the contact carrier, and a portion of the cover indicated in horizontal section; Fig. 7 a plan of the contact carrier with the rear portion shown in section; Fig. 8 a rear elevation of the contact carrier; and Fig. 9, a front elevation of the electric coupler, one half of the protecting shutter being cut away to show the electric contacts.

According to the construction shown, the car coupler 4, is of the rigid lock type having hook-shaped projections 5, each adapted to engage a corresponding inclined surface of a counterpart coupler and be rigidly clamped together by the spring actuated locking levers 6, which may be released by fluid pressure admitted to pistons 7, in cylinders 8. Beneath the car coupler is suspended the electric coupler comprising a casing 10, containing a movable member or slide 11, carrying electric contacts 12, which are adapted to engage corresponding contacts of the counterpart coupler when said couplers are coupled together and the slides carrying said contacts are projected outward to the extended position.

For the purpose of projecting the contact carrier automatically by the coming together of the couplers I provide a yielding tappet member 14, preferably slidably mounted in the casing 10, and having a head 15, adapted to compress the spring 16, in the yoke 17, for operating the lever 18, mounted on a pivot 20, and attached to the slide 11, by a link 19, as shown more particularly in Fig. 4. An arm 21, pivoted to the lever 18, and normally engaging the stop 22, is provided for temporarily holding the lever and slide against movement during the first part of the yielding action of the tappet when being depressed by the approaching casing of the other coupler for compressing the spring 16, and storing up power therein for the subsequent operation of the lever and slide. The tappet member 14, may be formed in two parts abutting against each other, as shown in Fig. 4.

Various forms of tripping devices actuated by the final part of the coupling movement, may be employed for releasing the lever to permit the movement of the same under the expansive force of the spring, but I have shown for this purpose a small piston 23, mounted in a cylindrical chamber 24, and having a stem 25, bearing against

the pivoted arm 21. An arm 26, pivoted to the casing and actuated by a spring 27, bears against the arm 21, for normally holding the same in the locked position against the stop 22. A supply of fluid pressure, such as compressed air from a reservoir pipe line 28, through the coupler, through the pipe 29, to piston 23, is controlled by the tappet valve 30, which is unseated at the final part of the coupling movement, as indicated in Fig. 1. This tappet valve 30 may be the ordinary closing valve of the reservoir pipe line through the coupler. A hand operated cock 31, may also be located in the pipe 29, to cut off the supply of air to the piston 23, whenever desired.

The contact carrier 11, is mounted to slide within the casing and carries a plurality of electric contact terminals 12, arranged in pairs, one on each side of the center line, each electric circuit being divided into two branches connected to the respective contacts of each pair. One form of carrier is shown in Figs. 2, 6, 7 and 8, and comprises a block of insulation 32, carrying three horizontal rows of contacts 12, extending longitudinally through the block. The rear end of one half, or one of each pair, of these contacts is connected to a train line wire 13, which wires extend through a collar 33, slidably mounted in an opening in the rear wall of the casing. The branch connection for the contacts of each pair consists of a metal strip 34 embedded in the insulation and fastened to the respective contacts 12, by means of nuts 35. The insulation block is carried by the frame 36, of the carrier which is slidably mounted in the casing and rigidly connected to the collar 33, by means of a bar 44, to which is pivotally attached the link 19, of the actuating lever 18.

For the purpose of protecting the exposed ends of the contact terminals 12, from the dirt, dust and moisture, there is provided a shutter 37, adapted to close the open front end of the casing, as shown in Fig. 5, and having side arms 38, pivoted at 39, to the casing. A spring 40, is mounted to operate on the shutter and normally holds the same closed. For opening the shutter there is a lug or extension 41, formed on the head 15 of the tappet, which operates an arm 42, connected to a crank 43, on one of the pivots of the shutter.

When two cars are brought together in the act of coupling each of the yielding tappets engages a fixed portion of the opposing counterpart coupler and is depressed thereby, compressing the spring 16, and moving the head 15, arm 42, and crank 43, to swing the shutter 37 downward away from the front opening of the casing. As the spring 16 is thus compressed by the coming together of the couplers a certain amount of force is stored therein for the operation of the contact car-

rier. As the couplers reach their final coupled position in which the coupler heads are clamped together by locking levers 6, the valves 30, of the reservoir line in the car coupler are opened by their stems engaging each other and fluid flows through pipe or passage 29, to the piston 23, forcing the same inward to trip the arm 21, from the stop 22. The spring 16 is thus released and expands to actuate the lever 18, and project the contact carrier 11, forward to its extended position in which the contact terminals 12, make a butt contact with the corresponding pairs of contact terminals of the counterpart coupler of the adjoining car, thereby establishing electrical connection through the respective train line circuits. Such contact terminals as may be located on the vertical center line of the couplers do not, of course, require a connection in pairs as but one contact terminal is necessary for each of these circuits.

When the locking levers 6, are released for uncoupling, and the cars are pulled apart, the spring 27, acts to return the lever 18, slide 11, yoke 17, and tappet 14, to the normal position, and also presses the arm 26, against the trip arm 21, to return same to its normal position against the stop 22, the piston 23, being pushed back in its cylinder as the air is exhausted through the open gasket of the reservoir line at the face of the coupler. When for any reason it is desired to prevent the operation of the electric coupler at the time of coupling cars together the cock 31, may be closed to cut off the supply of air to the piston.

What I claim is:

1. In an electric coupling for cars, the combination of a pair of counterpart couplers, each comprising a movable member carrying electric contacts connected to the respective train line circuits, a tappet member adapted to be depressed by the coming together of the counterpart couplers of adjoining cars, a spring for storing up pressure from the movement of the tappet, means on each coupler controlled by the final movement of the couplers for simultaneously releasing the spring on each coupler, a mechanical connection on each coupler actuated by the expansive force of the spring for projecting each corresponding contact member into contact with the other contact member, and automatic means for returning the contact members when the couplers are pulled apart.

2. In an electric coupling for cars, the combination of a pair of counterpart couplers, each comprising a movable member carrying electric contacts connected to the respective train line circuits, elastic means adapted to be compressed by the coming together of the couplers, means on each coupler controlled by the final movement of the

couplers for simultaneously releasing said elastic means on each coupler, a mechanical connection on each coupler actuated by said elastic means for projecting each corresponding contact member into contact with the other contact member, and automatic means for returning the contact members when the couplers are pulled apart.

3. In an electric coupling for cars, the combination of a movable member carrying electric contacts connected to the respective train line circuits, a spring adapted to be compressed by the coming together of the couplers for projecting said contact carrying member, a stop device for restraining said spring, a trip means for releasing said stop device, and means operating automatically to return said contact member and reset the stop device when the couplers are pulled apart.

4. In an electric coupling for cars, the combination of a movable member carrying electric contacts connected to the respective train line circuits, a spring, a tappet member adapted to be depressed by the coming together of the couplers for compressing said spring, a stop device for restraining the spring, a trip means controlled by the final movement of the couplers for releasing said stop device, a mechanical connection actuated by said spring for projecting the contact carrying member, and means operating automatically to return said contact member and reset the stop device when the couplers are pulled apart.

5. In an electric coupling for cars, the combination of a movable member carrying electric contacts connected to the respective train line circuits, a spring, a tappet member adapted to be depressed by the coming together of the couplers for compressing said spring, a lever actuated by said spring and connected with the contact carrier, a stop device for said lever, a trip mechanism for releasing said stop device, and means operating automatically to return the contact member and reset the stop device when the couplers are pulled apart.

6. In an electric coupling for cars, the combination of a movable member carrying electric contacts connected to the respective train line circuits, a spring adapted to be compressed by the coming together of the couplers for projecting the contact carrier, a stop device for restraining said spring, and a fluid pressure operated trip mechanism for releasing said stop device.

7. In an electric coupling for cars, the combination of a movable member carrying

electric contacts connected to the respective train line circuits, a spring adapted to be compressed by the coming together of the couplers for projecting the contact carrier, a stop device for restraining said spring, and a fluid pressure operated trip mechanism, controlled by the final movement of the couplers for releasing said stop device.

8. In an electric coupling for cars, the combination of a movable member carrying electric contacts connected to the respective train line circuits, a spring, a tappet member adapted to be depressed by the coming together of the couplers for compressing said spring, a lever actuated by said spring and connected with the contact carrier, a stop arm for said lever, a piston for releasing said stop arm, and a valve actuated by the final movement of the couplers for controlling a supply of fluid to said piston.

9. In an electric coupling for cars, the combination of a movable member carrying electric contacts connected to the respective train line circuits, a spring, a tappet member adapted to be depressed by the coming together of the couplers for compressing said spring, a lever actuated by the spring and connected to said contact carrier, a stop arm for said lever, a trip mechanism for releasing said stop arm and another spring for returning said lever and contact carrier to normal position.

10. In an electric coupling for cars, the combination of a casing, a movable member carrying electric contacts connected to the respective train line circuits, a spring, a tappet member adapted to be depressed by the coming together of the couplers for compressing said spring, a lever actuated by said spring and connected to the contact carrier, a swinging shutter pivoted on said casing, a spring for normally closing the shutter, and a crank and arm connection operated by the movement of the tappet for opening said shutter.

11. In an electric coupling for cars, the combination with a casing and a movable contact carrier mounted therein, of a tappet member adapted to be depressed by the coming together of the couplers, a swinging shutter pivoted on said casing, a lug carried by said tappet member, a crank movable with said shutter, and an arm interposed between said lug and said crank for operating said crank and shutter upon depression of said tappet member.

In testimony whereof I have hereunto set my hand.

HARRY F. WOERNLEY.