Oct. 17, 1950 J. L. BONANNO 2,526,453

COMBINED ELECTRONIC RECEIVER AND RELAY ASSEMBLY

Filed Aug. 30, 1947

Fig. 1.

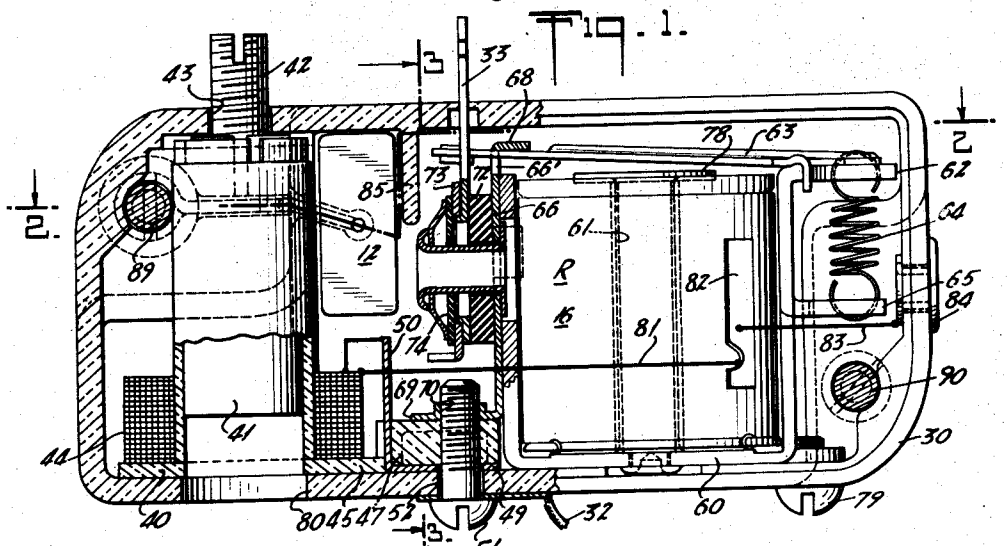


Fig. 2.

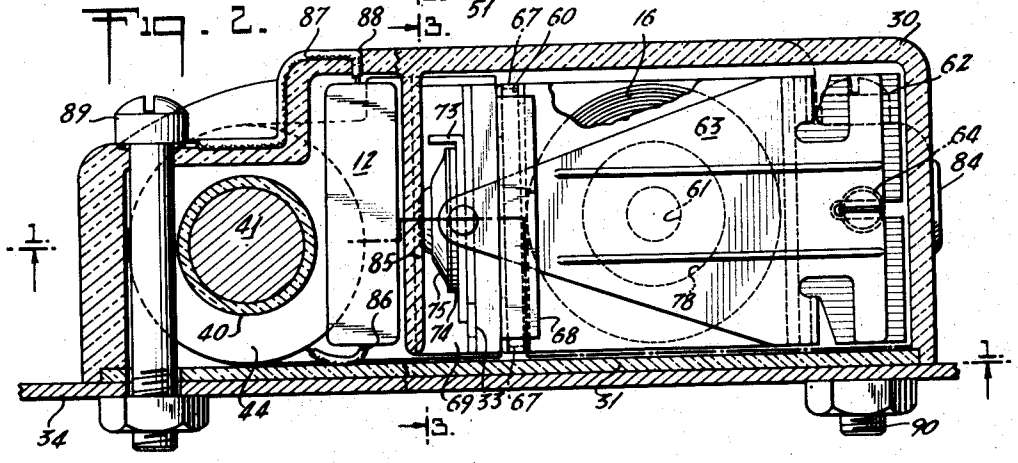


Fig. 3.

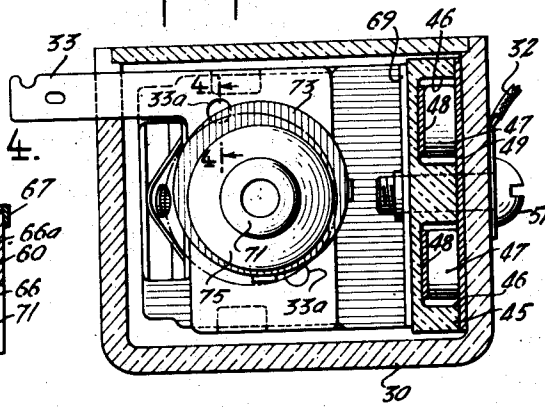


Fig. 4.

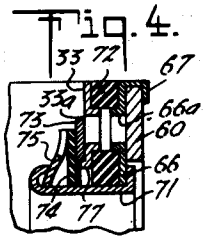
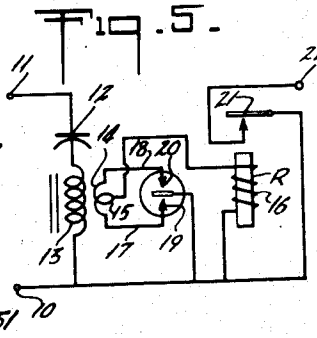


Fig. 5.



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COMBINED ELECTRONIC RECEIVER AND RELAY ASSEMBLY

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Application August 30, 1947, Serial No. 771,447

2 Claims. (Cl. 175—320)

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The present invention relates to combined electronic receivers and relay assemblies and is more particularly directed toward such assemblies for use in the control of toy electric railroad apparatus and accessories.

The present invention contemplates a compact inexpensive assembly of radio frequency receiver and rectifier with relay adapted to be operated by rectified radio frequency currents for the control of toy railroad, or other apparatus.

According to the present invention these parts are constructed and assembled in a manner to permit using them in a small closed casing or housing which can be attached to or placed in the toy railroad car or accessory without conspicuously changing its appearance.

According to the present invention the radio receiver and rectifier elements are embodied in one completely pre-assembled unit and the relay is embodied in another completely pre-assembled unit and these units together with a timing condenser, are received in a housing so that they may be secured to the car or other accessory.

The combined receiver and rectifier form the subject matter of application for patent Serial No. 771,448, while the relay forms the subject matter of application Serial No. 771,449, both filed August 30, 1947.

Other and further objects will hereinafter appear as the description proceeds.

The accompanying drawings show, for purposes of illustrating the present invention, one embodiment in which the invention may take form, it being understood that the drawings are illustrative of the invention rather than limiting the same.

In these drawings:

Figure 1 is a longitudinal sectional view taken on the line 1—1 of Figure 2 with parts in elevation from the open side of the housing, and illustrating the assemblage of parts;

Figure 2 is a cross-sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a transverse sectional view on the line 3—3 of Figures 1 and 2;

Figure 4 is a fragmentary section on line 4—4 of Figure 3; and

Figure 5 is a wiring diagram.

The combined electronic receiver and relay assemblage shown herein has been designed more specially for use with an electronic transmitter operated directly off the alternating current, or direct current, service lines with an output of approximately 0.6 watt and having tuned circuits adapted to transmit selected frequencies of a

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range of from 225 to 365 kilocycles. This radio frequency current of known frequency is impressed upon the power circuit of the toy railroad system. The system employs a number of receivers each tuned to a transmitter frequency, and a full wave rectifier whereby output of the radio frequency source is of the order of 6 milliwatts for operating the relay. The relay is one capable of handling currents up to 4 amperes at 18 volts for a large number of operations so as to have long life. The relay is a very sensitive relay adapted to operate on this low input and is yet able to control circuits for any of the loads customarily met in toy railroad systems.

Figure 5 shows input leads 10 and 11 which may, for example, be the contact roller and the wheels or grounded side of the toy vehicle. The lead 11 is connected through a fixed condenser 12 of predetermined capacity (0.0005 mfd. for example) and the other side of the condenser is connected to a coil 13 connected with the other side 10 of the power supply. This coil is inductively coupled with a step down secondary coil 14. This coil has a center tap 15 connected to the coil 16 of a relay R. The other side of the relay is connected to the power line 10 as is obvious. The end leads 17 and 18 of the secondary are connected through rectifiers 19 and 20 to the other end of the relay coil and to the power supply lead 10. The relay contact 21 and power line are connected to load terminal 22 and power supply as indicated.

In the drawings all the electrical parts were shown as contained in an insulating housing 30 generally in the form of a 5 sided box which is closed by a cover 31. As indicating the small size of the parts, applicant would indicate that this housing may be 1 inch, by 2¼ inches, by ⅞ inches.

In the structural embodiment the current supply connection corresponding with 10 of the circuit diagram is in the form of a lead indicated at 32. The soldering lug or terminal for the relay controlled circuit is shown at 33. It protrudes from the housing and may extend in the proper direction to facilitate connection to the load. The grounded return connection is in the form of a plate 34 (Figure 2), which may form a part of the car or locomotive structure.

The tuning assembly employs an insulating body 40 carrying a magnet core 41 adjustable by means of a screw 42 threaded into the body and extending out through an opening 43 in the housing. The body member 40 also carries a coil unit 44 which includes both primary and secondary coils of the transformer. Its electrical

characteristics may be selected according to the frequency at which response is desired. The body member 40 has a lateral extension 45 having recesses 46 to receive rectifiers 47 and rectifier contacts 48. These rectifier contacts are connected to the secondary as indicated in the wiring diagram. The rectifiers are held in place by a plate 49 crimped on to the lateral extension 45 of the body member. This plate has an upwardly extending soldering lug 50. The plate 49 and body member are apertured to receive a mounting screw 51 which passes through a hole 52 in the housing.

The relay R occupies the right hand side of the housing as shown in the drawings. This relay has a U-shaped frame 60 which receives the coil 16 and the core 61. The relay has an upper bracket 62 on which is pivoted the armature member 63 biased to open circuit position by a spring 64 secured to anchorage member 65. The other side of the U-shaped frame 60 carries a sheet metal armature guide and mounting member 66. This member has inturned lugs 67 by which it may be secured to the frame 60, a slot 66' to accommodate the armature 63, a downwardly bendable flange 68 to adjust the position of the armature and a mounting bracket 69 having a drawn threaded opening 70 to receive the screw 51. The mounting member 66 carries an insulated contact assembly which includes a tubular rivet 71, as insulating plate 72, the conducting plate 33 locked against rotation by extruded prongs 66*a* and 33*a* (Figure 4), a conducting disc 73, an insulating washer 74, and a spring washer 75. The conducting disc 73 is eccentric and adjustable about the extruded section 77 of the plate 33 as indicated by the full and dot-and-dash line positions in Figure 3 so as to vary the air gap between the pole piece 78 and the armature 63 at the time the relay contacts are closed. This disc is preferably made of palladium silver alloy.

The receiver and rectifier unit may be completely preassembled, and, except for the iron (or magnetic) core, may be inserted from the open side of the housing to position it in the housing. The rectifier unit may also be completely assembled and inserted into the housing in the front. When the screw 51 is tightened up the two units are secured to one another and to the housing and current connections are made from the supply lead 32 to the transformer primary, the full wave rectifier and the relay frame. The other end of the relay frame is anchored in place by a small screw indicated at 79. The core 41 of the tuning assembly may be inserted through an opening 80 in the wall of the casing and threaded into place in the body member 40. The position of the magnetic core may be varied by adjusting it back and forth in the housing as explained in my application Serial No. 719,811, filed January 2, 1947. The wiring between the units is completed by securing the center tap 81 of the secondary to the soldering lug 82 carried by the relay coil. For purposes of testing the device a wire 83 connects the relay coil with a testing terminal 84 carried by the end wall of the housing.

The fixed condenser 12 is received between the body member 40 and a fin 85 integral with the housing. One terminal 86 of the condenser is connected to the primary winding of the transformer while the other terminal or lead 87 passes through a hole 88 in the housing and extends over so as to be received under the head of a mounting bolt 89. The mounting bolt 89 and another similar bolt 90 are employed to secure the cover 31 to the housing 30 and to secure the complete unit to the mounting plate 34.

Since it is obvious that the invention may be embodied in other forms and constructions within the scope of the claims, I wish it to be understood that the patricular form shown is but one of these forms, and various modifications and changes being possible, I do not otherwise limit myself in any way with respect thereto.

What is claimed is:

1. In combination, a fixed condenser, a preassembled tuning assembly unit having an insulating body having a bracket, two rectifiers carried by the bracket, a terminal plate carried by the bracket and in contact with both rectifiers, the insulating body also carrying a transformer with adjustable core, primary coil and secondary coil, the primary coil being connected with the condenser and with the terminal plate, the ends of the secondary coil being connected to the rectifiers, the secondary coil having a central output tap, a relay unit having a magnetic frame, a coil connected to the frame, a mounting bracket secured to the frame, a movable armature connected to the frame, an insulated output contact, a housing about the two units, a means securing the two brackets together and to the housing wall and providing a current supply connection for the transformer, the rectifier and the relay, and a connection from the secondary output tap to the relay coil, the transformer core having an externally accessible element extending through an opening in the housing wall.

2. The combination claimed in claim 1, wherein the insulating body has a tubular portion lateral of the bracket thereof and on which the coils are carried, the output contact of the relay is close to the securing means, and the condenser is located between the tubular portion of the insulating body and the output contact of the relay.

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