

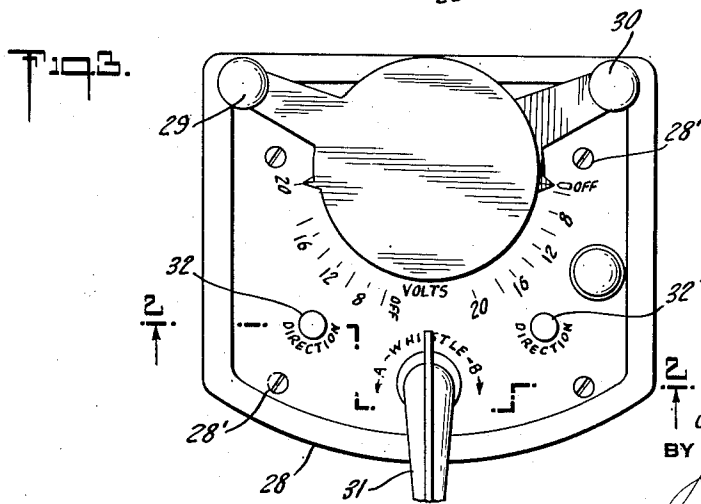
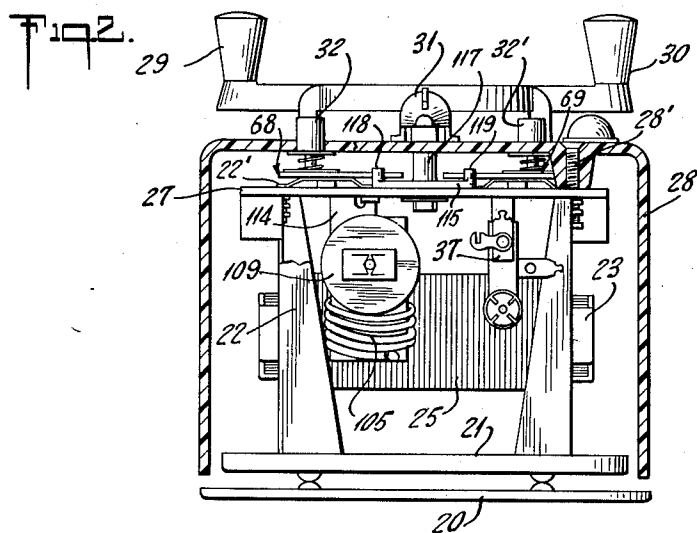
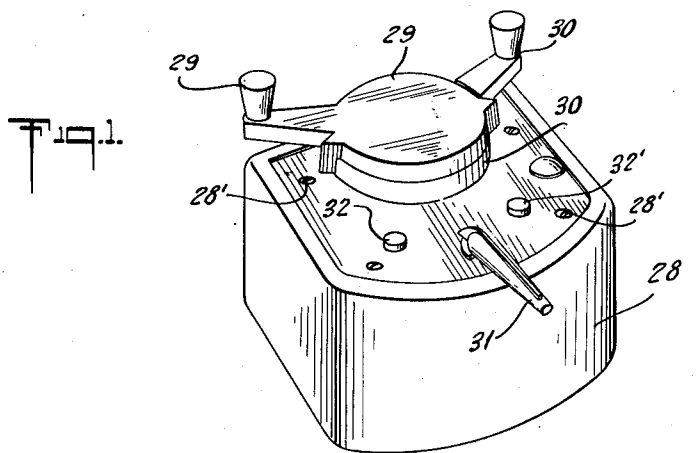
May 25, 1954

J. L. BONANNO
COMBINED TRANSFORMER AND TRAIN CONTROLLER
FOR USE WITH TOY RAILROADS

2,679,600

Filed Oct. 16, 1951

4 Sheets-Sheet 1



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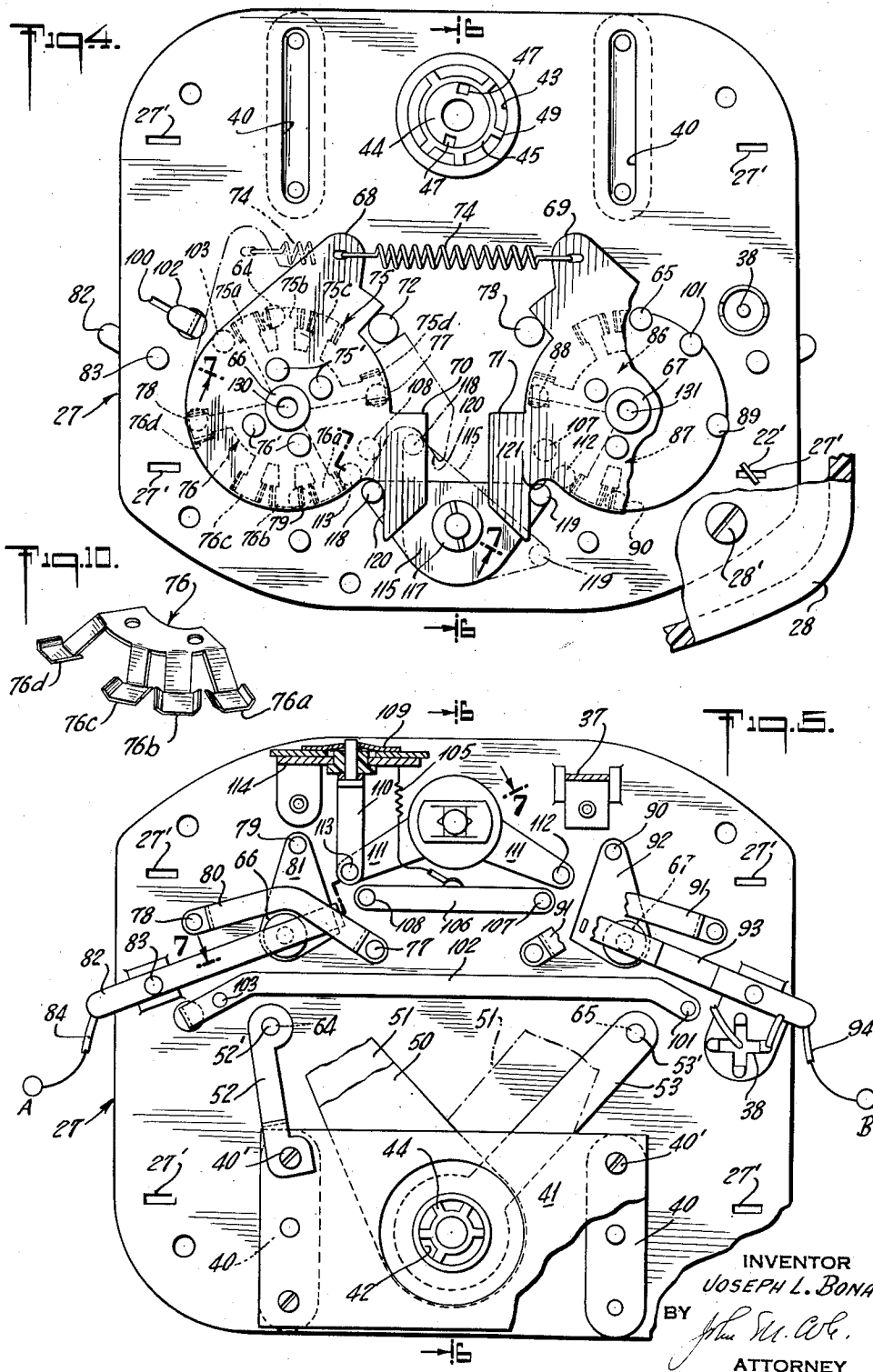
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4 Sheets-Sheet 2



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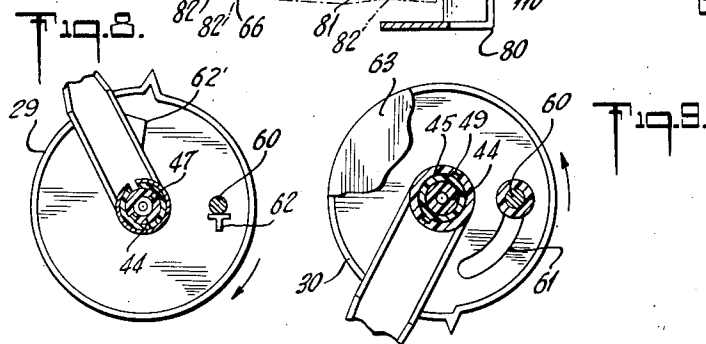
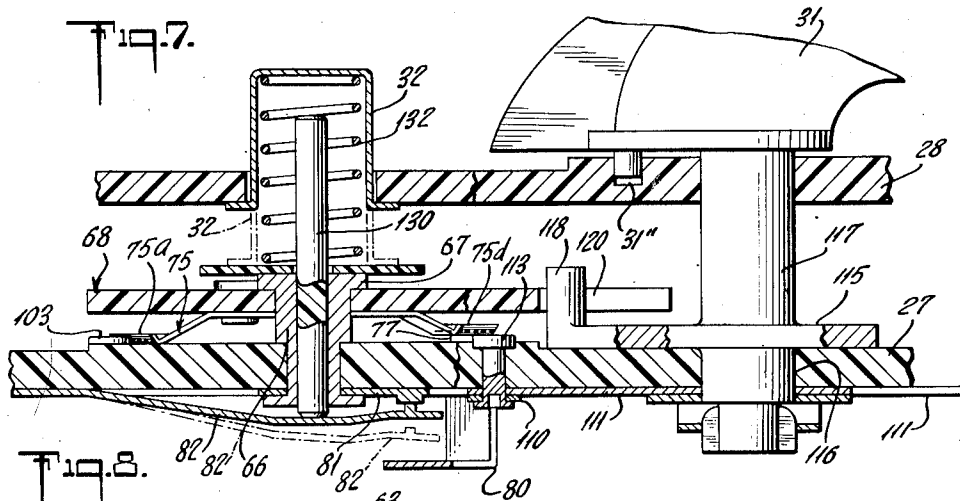
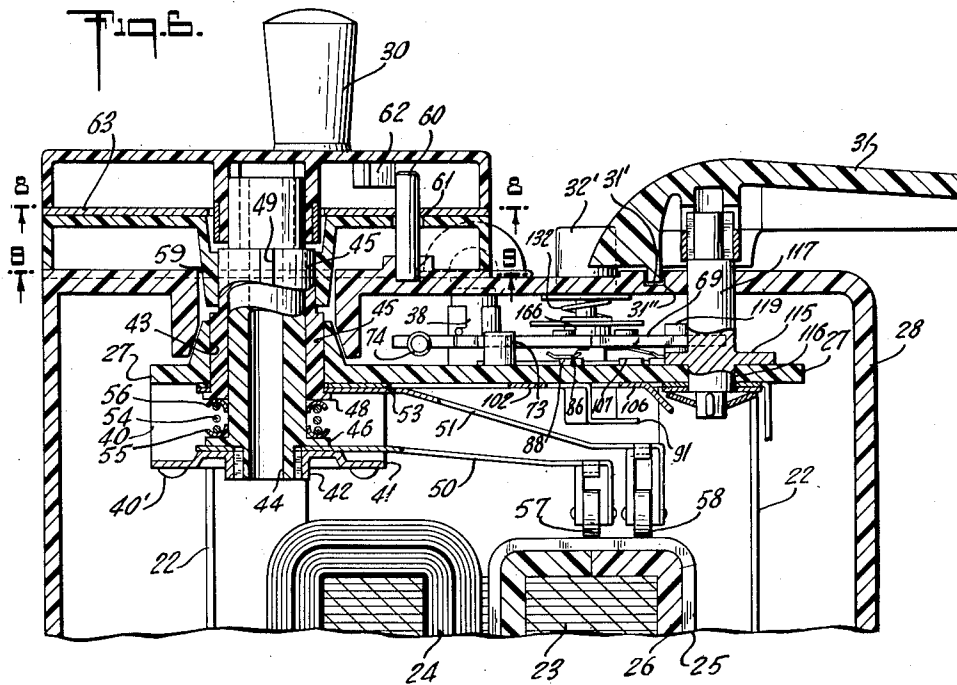
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4 Sheets-Sheet 3



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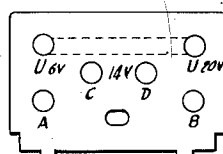
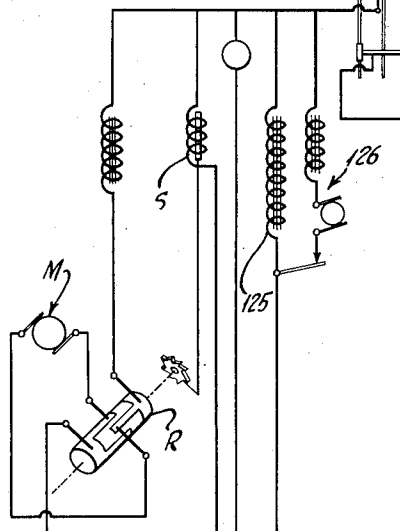
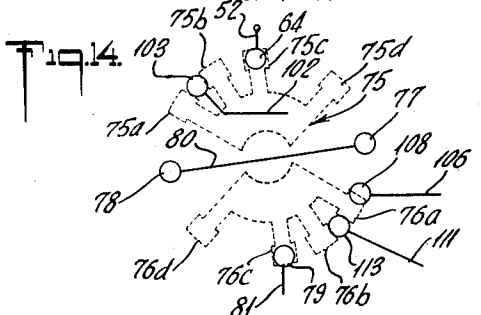
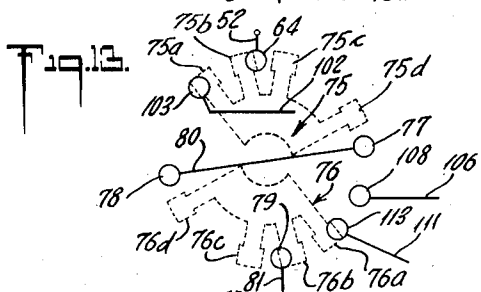
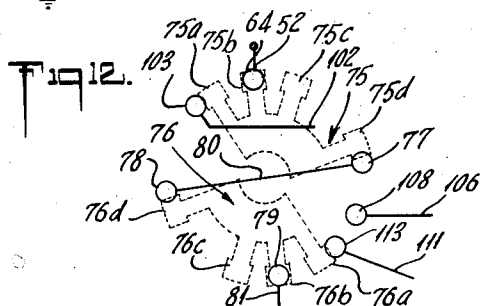
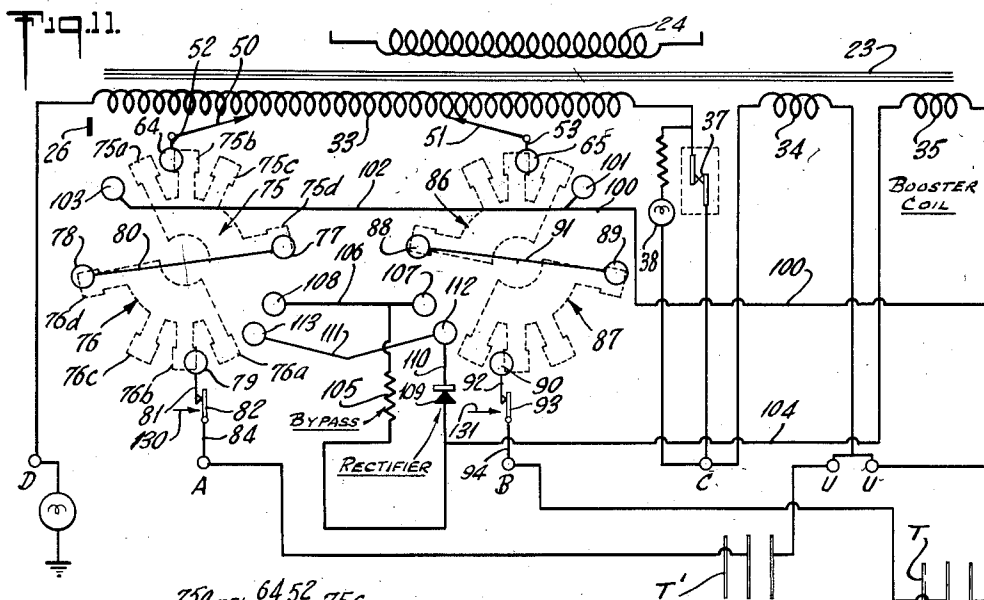
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4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

2,679,600

COMBINED TRANSFORMER AND TRAIN
CONTROLLER FOR USE WITH TOY
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Application October 16, 1951, Serial No. 251,566

17 Claims. (Cl. 307-2)

1

The present invention relates to combined transformers and train controllers for use with toy railroads.

The device contemplated by the present invention is one designed for independently controlling the operation of a plurality of trains on separate track layouts and for controlling the operation of a whistle or other train carried accessory which is responsive to superposed direct current so that either train can be operated at variable speeds in either direction, and the whistle blown.

The operation of a toy train whistle by a motor operated by propulsion current and under the control of a relay unaffected by the propulsion current but sensitive to superposed direct current, and a circuit arrangement by which the direct current component can be introduced is shown in my Patent 2,155,343. These controls have been made in the form of units extraneous of the transformer, as shown in my Patent 2,317,727, or built into the transformer housing as in my Patent 2,316,551, or 2,526,456. These patents show transformers for a single track layout only. Where the transformer had provisions for the independent control of a plurality of track layouts as in Patent 2,312,382, a whistle-controller was required for each track layout. In my pending application Serial No. 120,269, filed October 8, 1949, now Patent No. 2,652,500, I have shown a transformer with four secondary circuits, each with independently variable voltage, and in two of these circuits two complete whistle-controllers, each with separate rectifier, resistance, booster coil, and switches.

The present invention relates to transformers and train controllers adapted for use with a plurality of tracks and trains with whistles, or the like, and employing but one rectifier, one resistance, one booster coil and a plurality of switches, only one of which is operable at a time to introduce the direct current component in the circuit for the selected track layout. The present invention makes it possible to secure this more flexible control with a unitary preassembled piece of apparatus of less cost than involved in the duplication of apparatus heretofore required.

Other and further objects will 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 the accompanying drawings:

Figure 1 is a perspective view of the combined transformer and train controller taken from the front;

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Figure 2 is a front elevational view of the operative parts, the housing being in section on the bottom line 2-2 of Figure 3;

Figure 3 is a top plan view of the combined transformer and train controller;

Figure 4 is a top plan view of the bearing plate and parts carried thereby, taken from the front, also a fragment of the enclosing housing, the voltage and whistle-control arms being omitted, and showing in full lines both whistle controls in normal, inactive position and in dot and dash lines the left whistle-control in whistle blowing position, also the shafts for the voltage control arms in position to place the contacts in the high voltage position;

Figure 5 is an inverted plan of the bearing plate and associated parts, certain of them being broken away for clearness, and the movable contacts being shown in dotted lines in the off position;

Figure 6 is a vertical section on the line 6-6 of Figures 4 and 5, also showing the enclosing housing, the voltage and whistle-control arms and the transformer core and windings, the voltage control contacts being in a mid-position on the secondary windings;

Figure 7 is an enlarged section view on the broken line 7-7 of Figures 4 and 5, showing one of the whistle and reverse controls, and a fragment of the enclosing housing;

Figures 8 and 9 are fragmentary sectional views on lines 8-8 and 9-9 of Figure 6 illustrating the stops for limiting movement of the voltage control arms;

Figure 10 is a fragmentary perspective view of one of the movable, whistle-control contactors;

Figure 11 is a complete wiring diagram for the combined transformer and train controller; the whistle-controller being in normal position;

Figures 12, 13 and 14 are views illustrating the whistle-control contactors in the successive position through which they pass in establishing a circuit for impressing superposed direct current on the selected track circuit; and

Figure 15 is a view of the terminal plate.

The structure illustrated here is designed for use with A. C. lighting circuit and for the independent control of two toy railroad trains on two separate systems of track to start, stop, or reverse the same, to operate a whistle or horn carried by either of the trains, as well as to supply current for accessories, yard, lighting, signals, switches and the like and may conveniently have a full load rating of 190 watts. It is a completely assembled unit.

As shown in the drawings, all parts are carried by a sub-base 20 which in turn supports a metal base 21, carrying upwardly extending metal brackets 22, which support the transformer core 23, primary coils 24, secondary coils

25, secondary coil form 26, as well as an insulating plate 27 on which is mounted all the circuit controlling elements. The plate 27 is secured in place by twisted extensions 22' of the brackets which pass through holes 27' in the plate. The electrical parts are enclosed by a cover 28 above which are two voltage control handles or arms 29 and 30, a whistle-control arm or handle 31 having a projection 31' entering an arcuate slot 31'' in the cover 28 and two reverser buttons 32 and 32'. The cover is secured to the brackets 22 by screws 23'.

Current is supplied as usual to the primary coil 34 through a lamp cord, not shown. The secondary coil is shown (Figure 11) as having three windings, namely: 33, adapted to have, for example, an output of 14 volts; 34, adapted to have, for example, an output of 6 volts; and 35, adapted to have an output of 5 volts. The portion 33 of the secondary is bared as indicated in the drawings and is used to supply variable voltage to the variable voltage secondary output circuits. The coil-core assembly may be constructed in the manner shown in my Patent No. 2,238,037. The coil 33 is connected at one end to binding post D and at the other end to a circuit breaker 37, shunted by the circuit for signal lamp 38. Both are connected to binding post C. This binding post C is connected to the secondary winding 34 which, in turn is connected to binding posts U, U. The coil 35 is connected to the whistle controller in a manner to be described.

The bearing plate 27 is a flat slab of molded insulating material having at the rear two depending ribs 40, 40, Figs. 4, 5 and 6, to which are secured by screws 40' a metal plate 41. The plates 41 and 27 have aligned holes 42 and 43, the upper hole 43 being the larger. These holes carry concentric insulating shafts 44 and 45. The inner insulating shaft 44 is outwardly flanged as indicated at 46 and extending through the outer shaft 45 and has keyways 47. The upper outer shaft 45 has a bottom flange 48, extending above the bearing plate 27, and has splines or keys 49. The inner shaft carries a swingable contact arm 50 while the upper shaft carries a swingable contact arm 51. The arm 50 bears against the metal plate 41 to which is connected a conducting strip 52 (Fig. 5), and the arm 51 bears against a contact strip 53. A spring 54 about shaft 44 and bearing against washers 55, 56 insures good contact between the swingable arms 50 and 51 and the connector strips 52 and 53. The arms 50 and 51 are resilient, and downwardly biased and carry rollers 57 and 58 which are adapted to traverse the bared secondary and press against the same.

The shafts 44 and 45 extend up through an opening 59 in the cover and carry the left and right voltage controlling arms 29 and 30, respectively. These arms are keyed and grooved to fit the shafts and the extent of movement is controlled by a post 60 (Figures 6, 8 and 9), carried by the cover or housing 28, which passes through an arcuate slot 61 in the lower or right-hand arm 30 and is received between two stops 62 and 62' carried by the upper or left arm 29. An apertured plate 63 is between the arms 29 and 30. When the arms 29 and 30 are in the extreme counter-clockwise position as viewed from above, the rollers are on the insulated core from 26 and the circuit is open, and when moved to the opposite position, they are at the high voltage end of the secondary.

The variable voltages impressed on the conducting strips 52 and 53 are used for controlling

the respective track circuits. Each is, however, connected to that circuit through a whistle-controller which will now be described.

The front ends of strips 52 and 53 (Fig. 5) are connected to rivets 52', 53' (Figs. 5 and 11) having contact buttons 64 and 65 on the upper face of bearing plate 27 and disposed to the rear of tubular, switch plate, pivot posts 66 and 67. These posts carry insulating switch plates 68 and 69, notched as indicated at 70 and 71 to receive stop lugs 72 and 73 carried by plate 27. The rear ends of the switch plates are biased toward one another by a coiled spring 74. The left switch plate 68 carries a rear segmental contactor 75, and a front segmental contactor 76. These are alike and are held in place by rivets 75' and 76'. The rear contactor has four arms 75a, 75b, 75c, 75d and the front contactor 76 has four arms 76a, 76b, 76c and 76d. When in the normal position of Figures 1, 4, 6, 7 and 11, arm 75b of contactor 75 bears on button 64, and contacts 75d, 76d and 76b bear on contact buttons 77, 78 and 79, respectively. Arms 75c and 76c bear on the insulating plate 27. A U-shaped strap 80 connects the lower ends of buttons 77 and 78. The contact 79 is secured to a conducting plate 81 fastened to the pivot post 66, and a spring 82 secured by rivet 83 bears on the plate 81. The spring 82 is connected by wire 84 to binding post A on the terminal plate 85 (Figure 15). Thus, in the normal position of the switch plate 68, the secondary voltage taken off by contact roller 57 is applied to terminal post A.

The right switch plate 69 carries another pair of segmental contactors 86 and 87, cooperable with similarly located contacts oppositely oriented with respect to contact 65 above referred to, the same being shown at 88, 89, 90. Contacts 88 and 89 are bridged to strap 91 like strap 80. The contact 90, like contact 79, is connected to a conducting plate 92, fastened to pivot post 67 and similarly cooperates with spring contact 93 connected by wire 94 to binding post B on the terminal plate 85. The voltage selected by contact roller 58 is therefore applied to B.

The coil 34 is always in series with the circuit breaker 37 and is connected to binding post U—U on the terminal plate 85 so that variable voltage of 6 volts to 20 volts may be applied, as shown by the wiring diagram, Figure 11, to either of two tracks T or T', or 6 volts less may be had between A or B, and C.

One side of the voltage boosting coil 35 is connected by wire 100 to a bridging strap 102 which connects a contact 101 (to the right of 65) with a contact 103 (to the left of 64). The other side of the coil 35 is connected by wire 104 through a bypass resistance 105 to a strap 106, which is secured to contacts 107 and 108, and through a rectifier 109 by means of an angle strap 110 with V-shaped strap 111 which is connected to contacts 112 and 113. The rectifier is carried on a bracket 114 secured to the plate 27 and projecting downwardly. The resistance 105 is wound about the bracket.

The resistance 105 above described acts as a low impedance bypass of the rectifier reverse current. It carries the half wave which does not pass through the rectifier and the two divide the other wave half. This impedance bypass may utilize other forms of low impedance shunt employing a condenser, a choke, a rectifier or combination of the same. The resistance is the least expensive and lasts indefinitely.

The output of coil 35 is thus available between

terminals 103 and 108 or 113 or between 101 and 107 or 112 and both ends are disconnected from the track circuit.

The switch plate 68, or the switch plate 69, but not both of them at one time, can be shifted an angular amount determined by the notch 70 or 71 by means of an oscillatory operator 115 pivoted in a hole 116 and having an upwardly extending shaft 117 to which the whistle operating arm 31 is detachably secured. The operator 115 has two laterally disposed posts 118 and 119, and the switch plates 68 and 69 have cutouts 120 and 121 to receive these posts and shaped so that the spring 74 holds them in the mid-position shown in full lines in Figure 4.

When the arm 31 is swung to the left, the operator 115 and plate 68 are shifted to the dot and dash line position of Figure 4, and irrespective of how rapidly it is made, it effects the introduction into the track circuit of the rectifier 109 and bypass 105 so as to superpose a D. C. component, without opening the track circuit. The first significant moved position is shown in Figure 12, where it will be seen that while segments 75b and 76b, 75d, 76d are still bearing on fixed contacts 64, 79, 77, 78, respectively, the segments 75a, 76a have moved far enough to contact 103 and 113. The next circuit condition is attained when the parts reach the position of Figure 13. Here 75d and 76d have moved off contacts 77 and 78; 75a and 76a are on 103 and 113; and 75b and 76b are still on 64 and 79. The final position of the contacts carried by the switch plate is indicated in Figure 14. Here 75c is on 64 and 76c is on 79, the coils 33 and 35 are in series and the rectified D. C. component produced by the rectifier is impressed on the terminals A and C (or U).

The variable A. C. with D. C. component is supplied to a track T and the D. C. sensitive relay 125 (of the type shown in Patent 2,155,343) closes and operates the whistle motor 126.

A similar series of controls for track T' is obtained by shifting the handle 31 to the right which actuates the right-hand switch plate 69. It will be noted that only one rectifier and resistance are required to energize either of the two whistle circuits.

The above described arrangement of fixed, manually movable, contacts by which the D. C. component is introduced into the circuit without interfering with propulsion motor operation is preferred to move expensive snap switch arrangements which interpose the rectifier, the bypass and booster coil so quickly that the selected circuit is open too short a time to release the motor reverser.

The propulsion motor M of the train is connected to a reversing switch R under the control of a solenoid S, as usual. To secure an interruption of the current to track T or T', it is only necessary to open the circuit. In the device here shown, provision is made for such circuit opening. The contacts 82 and 93 are biased to circuit closing position, but either may be opened by an insulating plunger 130 or 131 extending through the hole in switch plate supporting post 66 and 67 and bearing on the spring contact beneath it. These plungers are below the reverser buttons 32 and 33 which are biased upwardly by springs, one of which is shown at 132, Figure 7. Pressure on the button flexes the spring contact and opens the track circuit, deenergizing the solenoid S.

Since it is obvious that the invention may be embodied in other forms and constructions with-

in the scope of the claims, I wish it to be understood that the particular 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. A transformer having a low voltage secondary winding, and a booster winding, a return terminal connected to one end of the first winding, and adapted for connection to a number of work circuits, a plurality of output terminals adapted for separate connection to the different work circuits, voltage taps from the first winding for each output terminal, a rectifier and a rectifier bypass connected to one side of the booster coil, a plurality of sets of fixed contacts, there being one set for each output terminal and seven contacts in each set, one of the fixed contacts being connected to the corresponding tap, another to the corresponding output terminal, another to the bypass, another to the rectifier, another to the other side of the booster coil, and the two others to one another, a plurality of sets of contactors one set for each output terminal and mounted to have limited movement out of a normal position, the movable contactors in the normal position establishing a circuit between the first and second fixed contacts without including the booster coil, rectifier or bypass and in the other position establishing a circuit which includes the booster coil, bypass and rectifier, and an operator cooperable at one time with the movable contactor of one output circuit only.

2. The combination of claim 1, wherein the fixed contacts and movable contactors corresponding with each work circuit are disposed about a common axis.

3. The combination of claim 1, wherein each pair of movable contactors is secured to an oscillatory insulating member and the corresponding fixed contacts are angularly disposed about the same axis.

4. The combination of claim 1, wherein the movable contactors of each pair are segmental and secured to an oscillatory plate.

5. The combination of claim 1, wherein all the fixed contacts are carried on a fixed insulating bearing plate and each pair of movable contactors is carried on a movable plate and the operator is engageable with but one of the said movable plates at a time.

6. The combination of claim 1, wherein all the fixed contacts are carried on a fixed insulating bearing plate and those corresponding with each work circuit are angularly disposed about an axis, and each pair of movable contactors is carried by a coaxially supported oscillatory plate, and the operator is engageable with but one of said oscillatory plates at a time.

7. A combined transformer and train controller for controlling a plurality of toy trains on separate track layouts, comprising a transformer secondary having a secondary with a portion bared, a common return terminal for all the track layouts and connected to one side of the secondary, individual output terminals connectible to the respective track layouts, variable voltage selection contacts cooperable with the bared secondary and corresponding in number with the output terminals, a secondary booster coil permanently connected to a rectifier and a rectifier bypass, and normally disconnected from the output terminals, and cooperative fixed connectors and fixed and movable contacts for directly connecting each voltage selection contact

with the corresponding output terminal and for interposing between any one of said voltage selection contacts and its corresponding output terminal the booster coil, rectifier and bypass so that current of altered voltage and wave form is supplied the corresponding track layout, and an operator cooperable at one time with the movable contacts for a single track layout circuit only.

8. A combined transformer and train controller for use with a plurality of toy railroad track layouts each carrying a train with propulsion motor and an electrically operated accessory control responsive to direct current, comprising a primary, a secondary having one section which includes a bared coil and a second section forming a booster coil, a common return terminal connected to one end of the first section of the secondary and adapted for connection to both track layouts, a plurality of independently adjustable, voltage selection contacts corresponding in number with the track sections and moveable over the bared secondary coil, pairs of corresponding fixed contacts, one of each pair being connected to one of the adjustable contacts, corresponding output terminals connectible to the other side of the respective track layouts and connected to the other fixed contacts of each pair, a rectifier and a rectifier bypass connected to one side of the booster coil, additional fixed contacts connected respectively to the bypass, the rectifier and to the other side of the booster coil and corresponding in number with the said pairs of fixed contacts, additional pairs of fixed contacts permanently connected to one another, a plurality of pairs of movable contactors each pair concurrently movable and biased to a normal position, each contactor having specially related contacts so disposed that in the normal position certain of them bear on the fixed contacts of the first pair and on the permanently connected fixed contacts to provide connection from the voltage selection contacts to the corresponding output terminals and none of them bear on the bypass connected, the rectifier connected or the booster coil connected contacts, and in the second position of any pair of contactors certain of the contacts thereof bear on the fixed contacts of the first pair, and on the corresponding bypass connected, rectifier connected and the ballast coil connected contacts so that the booster coil, rectifier and bypass are introduced into the circuit to increase the voltage available and introduce a direct current component, and a common operator for all the pairs of contactors cooperable with but one pair at a time so that the rectifier, bypass and booster coil can be connected to but one track layout at a time.

9. In combination, a transformer having a secondary including a main coil and a booster coil, two work circuits each of which has a common connection to one end of the main coil, two voltage taps from the main coil, a rectifier and a bypass connected to one side of the booster coil, individual switching means associated with each voltage tap for normally connecting that tap to one of the work circuits and with the bypass, rectifier and other side of the booster coil for interposing the same into one only of the work circuits at a time, and means for biasing the switching means to the normal position.

10. A combined transformer and train controller for controlling two toy trains on two separate track layouts, comprising a fixedly supported coil-core assembly which includes a bared

secondary portion and a booster coil, a fixed insulating bearing plate, two swingable contact arms carried by the bearing plate and movable over the bared secondary, a fixed contact connected to the swingable contact, a fixed output contact connected to each of the swingable contacts, a fixed output contact connected to each track layout, two oscillatory switch plates supported from the bearing plate, each carrying two segmental contactors and being biased to a predetermined normal position in which it has a segment bearing on one of the said fixed contacts, a pair of additional, jumper-connected, fixed contacts corresponding with each of the segmental contacts carried by a switch plate and on which said segmental contacts bear to complete a circuit from the first fixed contact to the corresponding output contact, six additional fixed contacts arranged in sets of three each, jumper-connected and disposed out of contact relation with the segments when in normal position, but engageable therewith when shifted, one contact of each set being connected to the booster coil, a rectifier connected to one of the latter mentioned jumper-connected contacts, a bypass connected to the other of said latter mentioned jumper-connected contacts, a connection from the bypass and rectifier to the other side of the booster coil, the segmental contactors carried by a plate when shifted from the normal position interposing into the corresponding circuit the booster coil, rectifier and bypass, and a rocker arm carried by the bearing plate for shifting one only of the switch plates.

11. In combination a work circuit including two fixed contacts permanently connected to the circuit, two fixed contacts permanently connected together, the four contacts being angularly disposed about an axis, a first movable segmented contact having one segment bearing on one of the circuit connected contacts and another on one of the permanently connected contacts, a second movable segmented contact having a segment bearing on the other circuit connected contact and another on the other permanently connected contact, an oscillatory contact carrier supporting both segmented contacts and biased to a position to so place the contacts, an inductively energized booster coil adapted to produce alternating current voltage for increasing the voltage in the circuit, a rectifier and a rectifier bypass connected to the booster coil, a fixed contact connected to the bypass, a fixed contact connected to the rectifier, and a fixed contact connected to the other side of the booster coil, the last three mentioned contacts being angularly disposed about the said axis, the movable segmented contacts having two additional segments which do not bear on any of the four first mentioned fixed contacts when the contact carrier is in the first position, but which are so disposed that upon a limited movement away from said first position a segment on the first contact engages the booster coil connected contact while the other segments thereof retain the stated contact with the named contacts and a segment of the second contact engages the bypass connected contact while the other segments thereof retain the stated contact with the named contacts, and upon completion of the movement, the segments on the movable contacts bear only on the first two mentioned fixed contacts and the contacts connected to the booster coil, the bypass and the rectifier.

12. A switch having seven fixed contacts angu-

larly disposed about an axis, a jumper connecting two of the contacts, a coaxially supported oscillatory contactor carrier biased to one position and carrying two segmental contactors insulated from one another, one contactor having two segments which normally bear on one of the fixed contacts and one of the jumper connected contacts, the other contactor having two segments which normally bear on one of the other fixed contacts and on the other jumper connected contact to form a principal circuit connection, each contactor also having two segments normally out of contact with any of the other three fixed contacts, the spacial relation of the fixed contacts and all the segments on the contactor being such that during the movement to the other extreme position two segments on the first contactor bear on one of the first mentioned fixed contacts and one of the other three fixed contacts and the two segments on the other contactor bear on the second fixed contact and another one of the three fixed contacts, and in an intermediate position one of the segments of the second contactor bears on the other of the three fixed contacts before the segments in contact with the jumper connected contacts move away from the same, whereby the auxiliary circuit connected to the three other fixed contacts may be interposed between the first mentioned fixed contacts without opening the principal circuit therebetween.

13. The combination with a switch such as claimed in claim 12 of a second similar switch forming part of the second principal circuit, and wherein the fixed and movable contacts are oriented in the other angular direction about a parallel axis and the contactor carrier is biased in the other direction, jumpers connecting each of the said three normally disconnected fixed contacts of each switch together so that they are in parallel, and an oscillatory operator engaged with each contactor carrier, biased thereby to a neutral position, and shiftable in either direction out of said neutral position to actuate a selected one of the contactor carriers so that auxiliary circuit can be inserted into but one of the principal circuits at a time.

14. A preassembled unit for use with a transformer having a bared secondary coil, one terminal of which is connected to two work circuits and also having a booster coil, comprising an insulating bearing plate having two fixed output contacts for connection to the respective work circuits, two plate supported movable contact arms adapted to take off variable voltages from the bared secondary when in contact therewith and connected to plate carried fixed contacts, two contactor carrying members mounted on the bearing plate for oscillation through a limited angular extent and biased in opposite angular directions, two contactors carried by each contactor carrying member, one bearing on one arm connected contact and the other in the corresponding output contact, plate carried, jumper-connected fixed contacts on which the contactors bear to complete the circuit from each arm contact to the corresponding output contact, a plate carried rectifier and rectifier bypass connected to a common terminal adapted to be connected to one side of the bypass, two jumper-connected, plate carried bypass connected contacts, two jumper-connected, plate carried rectifier connected contacts, two jumper-connected, plate carried contacts adapted for connection to

the other side of the booster coil, the jumper-connected contacts being disposed in the path of movement of the contactors and normally out of contact therewith, but engageable thereby on movement out of the normal position to be connected into the circuit from the corresponding arm connected contact to the corresponding output contact, and an oscillating member engageable with one only of the contact carrying members to shift the same out of normal position whereby the rectifier and bypass can be interposed into but one circuit at a time.

15. A preassembled unit for use with a transformer such as claimed in claim 14, wherein the mounting for the contact carrier is tubular and the bearing plate carries a spring contact below each contact carrier in the circuit from the corresponding output contact, and having a plunger in each tubular mounting for shifting the corresponding spring contact to open circuit position.

16. A transformer for toy railroads, having a fixed frame, a coil-core assembly carried by the frame and including a field, a primary coil, a secondary coil a portion of which faces upwardly and is bared, a frame carried, insulating, bearing plate secured above the bared secondary, two bearing plate carried, concentric, vertical shafts disposed rearwardly of the bared secondary, each carrying a movable arm below the bearing plate and carrying a voltage selecting contact bearing on the secondary, plate carried fixed contacts connected with the respective movable arms, a cover about the frame, the coil core assembly and bearing plate and apertured to accommodate the vertical shafts, a stop post extending upwardly from the cover, a lower operating arm carried by the larger shaft and having an arcuate opening for the post and corresponding voltage selecting contact, and an upper operating arm carried by the inner shaft above the first arm and having spaced stops of corresponding angular spacing.

17. A transformer for toy railroads, having a fixed frame, a coil-core assembly carried by the frame and including a field, a primary coil, a secondary coil a portion of which faces upwardly and is bared, a frame carried, insulating, bearing plate secured above the bared secondary, a fixed metal plate spaced below the bearing plate, a tubular shaft rotatably mounted in the metal plate and bearing plate and extending above the bearing plate, an arm secured to the shaft and carrying a voltage selecting contact movable over the bared secondary and bearing on the metal plate, a concentric shaft in the first shaft and projecting above the first shaft, an arm secured to the second shaft and carrying a voltage selecting contact movable over the bared secondary, a conducting strap carried by the bearing plate and against which the second arm bears, an expansion spring between the arms and pressing them toward the metal plate and conducting strap, respectively, and fixed contacts carried on the upper face of the bearing plate and connected to the said metal plate and conducting strap, respectively.

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