

June 14, 1932.

J. E. CUFF

1,863,267

TRANSFORMER RHEOSTAT CONTROL DEVICE

Filed June 23, 1930

2 Sheets-Sheet 1

Fig. 1.

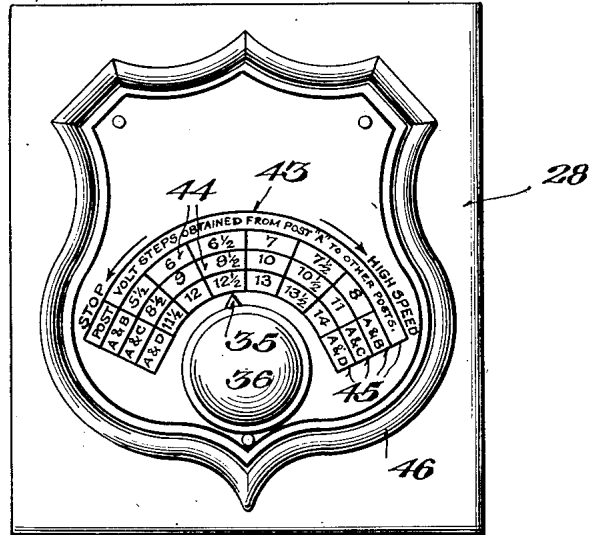
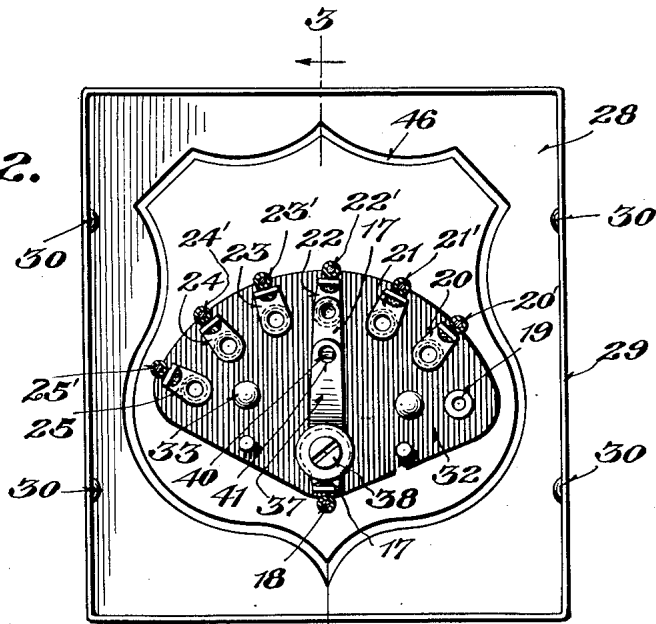


Fig. 2.



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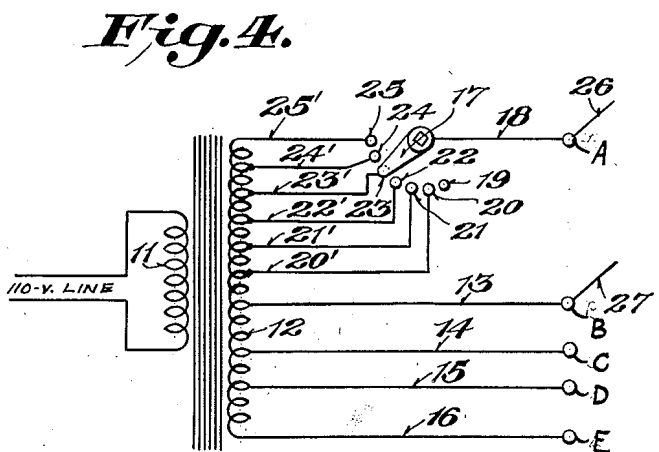
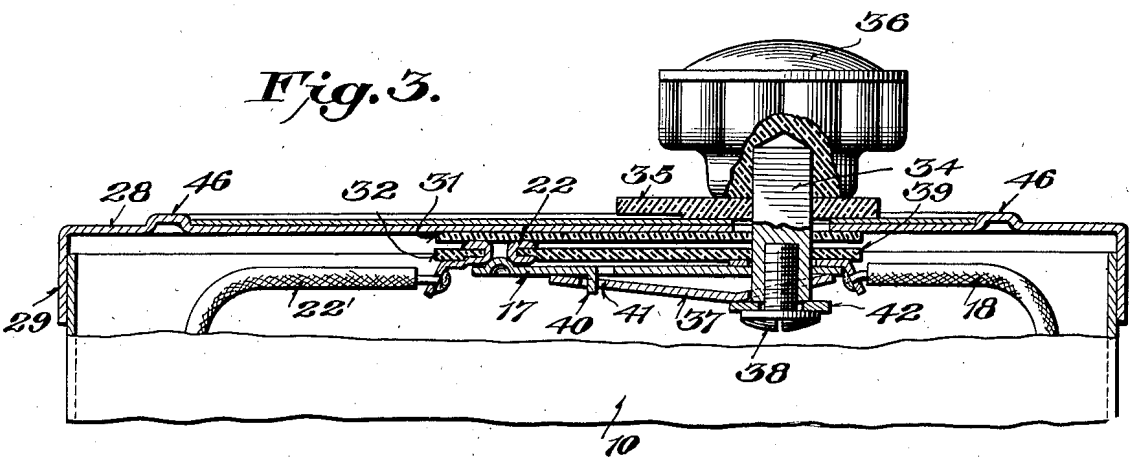
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TRANSFORMER RHEOSTAT CONTROL DEVICE

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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TRANSFORMER-RHEOSTAT CONTROL DEVICE

Application filed June 23, 1930. Serial No. 463,330.

This invention relates to control transformer-rheostats for toy electric railways and other electrically operated toys or devices, and has for its general object to provide a transformer-rheostat of attractive appearance and of generally improved construction designed to reduce a high voltage alternating current to selective lower voltages suitable for the operation of toys or devices of the character mentioned.

Another object of the invention is to provide a transformer-rheostat according to which all operating parts thereof with the exception of an adjustment knob are housed within a box provided with a removable cover, the cover carrying the switch or rheostat mechanism whereby the latter is removable as a unit with the cover and when so removed is completely exposed for convenient access for any purpose desired, this feature being particularly desirable from a practical and economical manufacturing and assembly standpoint.

Another object of the invention is to provide a transformer-rheostat of the character mentioned which is of relatively simple, inexpensive construction, strong and durable, and which is thoroughly reliable and efficient in use.

With the foregoing and other objects in view which will more readily appear as the nature of the invention is better understood, the same consists in the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the drawings wherein like characters of reference denote corresponding parts in the different views:

Figure 1 is a top plan view of a transformer-rheostat constructed in accordance with the invention.

Figure 2 is an elevation looking towards the inner face of the cover and showing the rheostat mechanism carried by the cover.

Figure 3 is an enlarged sectional view through the cover and the rheostat mechanism; and

Figure 4 is a wiring diagram of the device.

According to the practical embodiment of the invention illustrated in the drawings, a box 10 is provided within which are arranged a primary winding 11 and a secondary winding 12, the latter being connected at suitably spaced intervals by wires 13, 14, 15 and 16 with binding posts B, C, D and E shown in Figure 4 of the drawings and understood, of course, to be carried by the box at suitable locations to selectively have connected therewith one of a pair of wires to complete a circuit through a track, semaphore or the like.

Referring further to Figure 4 of the drawings, it will be observed that another binding post A is provided and that same is connected with a switch arm 17 by a wire 18. At 19, 20, 21, 22, 23, 24 and 25 are designated contacts which are adapted to be selectively engaged by said switch arm, these contacts with the exception of the contact 19, which is an idle or "off" contact being connected to the secondary winding 12 at suitably spaced points by wires 20', 21', 22', 23', 24' and 25', respectively.

The binding post A is adapted to have connected therewith the other of the pair of wires to complete the circuit through the track, semaphore or the like, this wire being designated as 26 and the wire for selective connection with the binding posts B, C, D or E being designated as 27. Thus, manifestly, regardless of which of the binding posts B, C, D or E the wire 27 may be connected with, the voltage in the circuit between the binding post A and the particular binding post B, C, D or E with which the wire 27 is connected, is capable of being varied by movement of the switch arm 17 into engagement with different of the contacts 20, 21, 22, 23, 24 and 25, since by engaging said switch arm with different of said contacts, the number of effective turns in the secondary winding 12 may be increased or diminished.

In the particular embodiment of the invention herein illustrated, the binding post E is connected by the wire 16 to one end of the secondary winding 12, and the contact 25 is connected by the wire 25' to the other end of said winding, the wires 15, 14 and 13 being connected with said winding at points

spaced successively inwardly from the point of connection of the wire 16 with the winding, and the wires 24', 23', 22', 21' and 20' likewise being connected with said winding at points spaced successively inward from the point of connection of the wire 25' with the winding.

Accordingly if the wire 27 is connected with the binding post B, for example and the switch arm 17 is engaged with the contact 20, the circuit through the binding posts A—B will include a minimum number of turns of the winding 12 for that circuit and the voltage for such circuit will be a minimum as determined by the number of turns in the secondary winding between the wires 13 and 20'. Therefore, if the switch arm is moved into engagement with the next contact 21', the number of effective turns in the winding 12 will be increased by an amount equal to the number of turns in the winding between the wires 20' and 21' and the voltage will be correspondingly increased. In the same way the voltage in the circuit A—B will be further increased as the switch arm is moved successively into engagement with the contacts 22, 23, 24 and 25, maximum voltage for the particular circuit under consideration being obtained when the switch arm is engaged with the last contact 25.

On the other hand, if the wire 27 is connected with the binding post C, the number of effective turns in the winding 12 for the circuit A—C will be increased over the number of effective turns of said winding for the circuit A—B, for any position of the switch arm 17, by an amount equal to the number of turns in the winding 12 between the wires 13 and 14 and the voltage for the circuit A—C will be correspondingly increased over the voltage of the circuit A—B for any given position of the switch arm. In the same way, higher voltage circuits obviously are obtainable by connecting the wire 27 with the binding posts D or E, and as is manifest, by predetermining the number of turns of the winding 12 between the various binding post and contact wires connected therewith, minimum and maximum voltages for each circuit, and the voltage variation in each circuit effected by movement of the switch arm from one to another of its related contacts, may be readily predetermined to adapt the device to any particular use.

Referring now to Figures 1 to 3 of the drawings, wherein is illustrated a practical embodiment of the invention diagrammatically shown in Figure 4, it will be observed that a cover 28 is provided for detachable engagement with the box 10, and that said cover to this end is provided with a depending marginal flange 29 adapted to fit around the top portion of the box, said flange being provided with suitable formations 30 for detachable interfitting engagement with com-

panion formations on the box to retain the cover normally assembled with the box.

Disposed in a suitable location against the under face of the cover 28 is a sheet 31 of insulating material, directly below which is arranged a second sheet of insulating material 32, the two sheets being secured to the cover in any suitable or desired manner, as, for example, by rivets 33. The contacts 19, 20, 21, 22, 23, 24 and 25 in the form of eyelets for example, are carried by the insulating sheet 32 and are insulated from the cover by the insulating sheet 31.

Extending through aligned openings in the insulating sheets 31, 32 and through an opening in the cover 28, is a shaft 34 which is freely rotatable with respect to the cover and said insulating sheets and which, preferably, is of square or other polygonal cross section. Mounted on this shaft for rotation therewith and disposed at the outside of the cover 28 is a pointer 35 and a fluted or serrated finger grip knob 36. Also mounted on said shaft for rotation therewith, but disposed inside of the cover, is the switch arm 17 and a leaf spring 37, the switch arm being disposed adjacent to the insulating sheet 32 whereby its free end is adapted for movement into engagement with the different contacts 19, 20, etc. by rotation of the shaft 34, and the spring 37 being disposed between said switch arm and a screw 38 threaded into the inner end of the shaft whereby the parts are held in assembly and a yielding pressure exerted against the switch arm to assure good contact thereof with the contacts 19, 20, etc.

On the shaft 34, against the switch arm 17, is mounted a clip 39 with which the wire 18 leading to the binding post A is connected, while struck outward from the switch arm is a tongue 40 which enters an opening 41 in the leaf spring 37 to hold said spring in operative relation to the switch arm. In this connection it will be observed that the spring 37 is bent into substantially shallow V-shape and has its ends in engagement with the switch arm at opposite sides of the shaft 34, its intermediate portion being engaged by the screw 38, or more correctly stated, by a washer 42 disposed between the screw and the spring, whereby good contact of the switch arm with both clip 39 and the switch contacts is assured.

The pointer 35 is disposed in radial alignment with the switch arm 17 so as to indicate at the outside of the cover the angular position of the switch arm which is concealed beneath the cover, and in this connection a feature of the invention resides in the provision of a chart 43 located on the outer face of the cover to indicate the exact voltage in the circuit, according to the position of the pointer 35, and according to the particular binding post, B, C, D or E with which the

wire 27 may be connected. That is to say, the chart 43, which may be formed directly on the cover or on a sheet separate from the cover and suitably secured thereto, is inclusive of a circumferential division 44 related to each contact 20, 21, etc. and a radial division 45 related to each binding post B, C, D and E, the circumferential divisions of each radial division having marked therein the voltage that is obtained in the respective circuits A—B, A—C, A—D and A—E when the switch arm 17 is engaged with any particular contact 20, 21 etc. Thus, knowing with which of the binding posts the wire 27 is connected, the person operating the knob 36 may ascertain at a glance the exact voltage in the circuit for any position of the switch arm simply by noting to which of the circumferential divisions 44 of the chart the pointer 35 points to and by reading the voltage in the proper radial division 45.

The chart 43 is formed of a suitable attractive shape and preferably is surrounded by a protective beading 46 pressed outward from the metal of the cover.

Without further description it is thought that the features and advantages of the invention will be readily apparent to those skilled in the art, and it will of course be understood that changes in the form, proportion and minor details of construction may be resorted to, without departing from the spirit of the invention and the scope of the appended claims.

I claim:

1. In a device of the character described, a box cover, a shaft extending through said cover, an operating member on said shaft outside of said cover, a series of contacts within the cover, a switch arm on said shaft for cooperation with said contacts, an abutment on said shaft, and a leaf spring between said abutment and said switch arm to urge the latter against said contacts, said leaf spring having an opening therein and said switch arm having a tongue projecting therefrom into said opening.

2. In a device of the character described, a box cover, a shaft extending through said cover, an operating member on said shaft outside of said cover, a series of contacts within the cover, a switch arm on said shaft for cooperation with said contacts, an abutment on said shaft, and a leaf spring between said abutment and said switch arm to urge the latter against said contacts, said leaf spring being of shallow V-shape and bearing at its ends against said switch arm to opposite sides of said shaft, respectively.

3. In a device of the character described, a switch comprising contacts and a cooperating switch arm, a shaft on which said switch arm is mounted, and means to urge the switch arm in the direction of the contacts, said means comprising a leaf spring mount-

ed on the shaft and pressing against the switch arm at a point remote from the shaft.

4. In a device of the character described, a switch comprising contacts and a cooperating switch arm, a shaft on which the switch arm is mounted, an abutment on the shaft spaced from the switch arm, and a bent leaf spring interposed between the switch arm and the abutment and reacting from the abutment against the switch arm at a point remote from the shaft to urge the switch arm against the contacts.

In testimony whereof he hereunto affixes his signature.

JAMES E. CUFF. 80

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