Aug. 8, 1933. A. N. SMITH 1,922,004

ELECTRICALLY LIGHTED TOY

Filed May 27, 1933

Fig. 1.

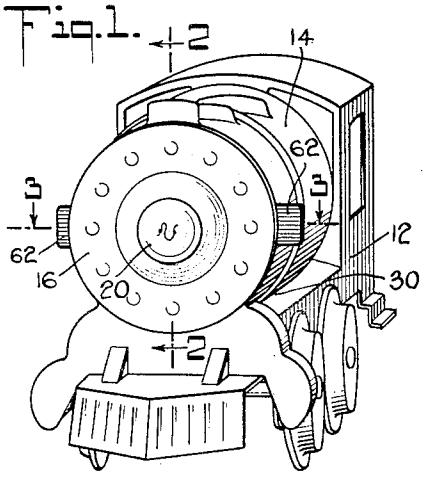


Fig. 3.

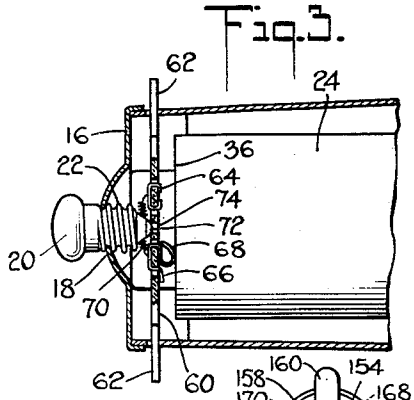


Fig. 2.

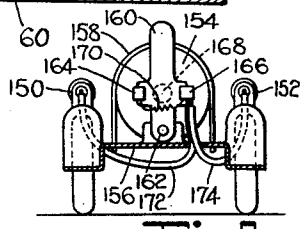


Fig. 8.

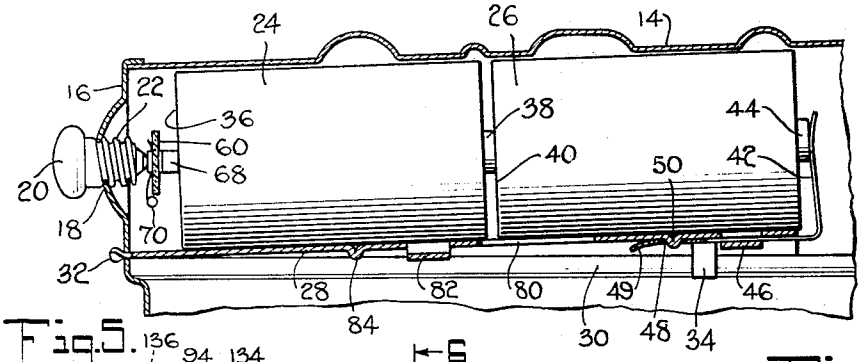


Fig. 5.

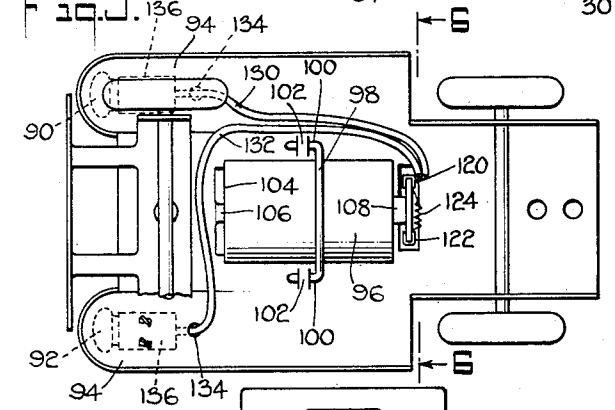


Fig. 4.

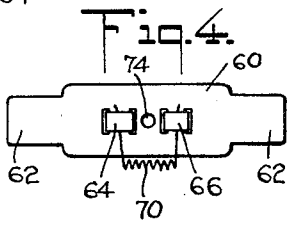


Fig. 6.

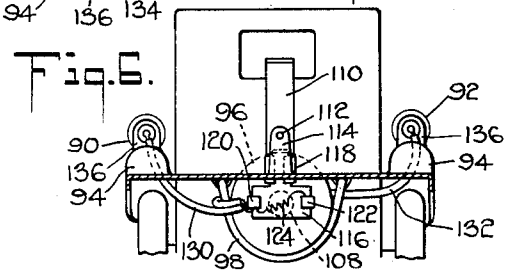
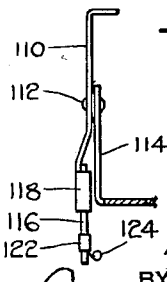


Fig. 7.



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Patented Aug. 8, 1933 1,922,004

UNITED STATES PATENT OFFICE

1,922,004

ELECTRICALLY LIGHTED TOY

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Application May 27, 1933. Serial No. 673,186

14 Claims. (Cl. 46—48)

This invention relates to electrically lighted toys, and more particularly to such toys arranged for either bright or dim illumination.

The object of the present invention is to generally improve electrically lighted toys, particularly vehicle toys having simulated head lights, by the provision of optionally usable bright or dim lighting of said head lights. A more particular object of the present invention is to accomplish the desired control or switching of the lights without necessitating a change in the number of battery cells employed, thereby making the arrangement particularly useful for toys having only a single battery cell, and, in a broader aspect, making the system of my invention applicable to toys receiving their electrical energy from a constant potential source, as in the case of track toys.

Further objects of my invention are to provide for the desired control of illumination in an inexpensive manner so that the necessary switching arrangement may be made and applied to the toy without noticeably increasing the cost of manufacture and the sales price of the toy; to concentrate all of the necessary insulation for the switching or control system into a single relatively small piece of insulation which may be stamped to desired configuration in a single stamping operation; to devise a complete switching system devoid of soldered connections and dispensing entirely with soldering; and to minimize the necessary wiring for the lighting system of the toy, and, in fact, in some cases to dispense entirely with wiring.

To the accomplishment of the foregoing and such other objects as will hereinafter appear, my invention consists in the electrically lighted toy arrangement for bright and dim illumination, and the elements thereof and their relation one to the other, as hereinafter are more particularly described in the specification and sought to be defined in the claims. The specification is accompanied by drawing, in which:

Fig. 1 is a perspective view showing a locomotive toy embodying my invention in one form;

Fig. 2 is a longitudinal section taken through the locomotive toy of Fig. 1;

Fig. 3 is a horizontal section at the forward end of the toy, showing the switching mechanism;

Fig. 4 is a front elevation of the switch used on the locomotive toy;

Fig. 5 is an inverted plan view of a truck hauler toy embodying my invention in different form;

Fig. 6 is a vertical section through the toy in upright position, this section being taken in the plane of the line 6—6 in Fig. 5;

Fig. 7 is a side elevation of the dimmer switch used in the truck hauler toy; and

Fig. 8 is a vertical section through a fire patrol toy embodying still another form of my invention.

Referring to the drawing and more particularly to Figs. 1 to 4 thereof, the invention is there shown applied to a toy locomotive comprising a toy body 12 including a boiler shell 14 the front end of which is closed by a header 16. The toy is provided with a flashlight bulb 20 which is screwed into a mating hole 18 in the header, 16 the base 22 of the bulb passing through the header and extending into the boiler shell cavity.

The illumination of the bulb is accomplished by the use of battery cells 24 and 26, preferably of the cylindrical flashlight type, which are received in end to end relation within the boiler shell 14. Specifically, the otherwise open bottom of the boiler shell is closed by an elongated trough-like support 28 the side edges of which are received above and supported by inwardly projecting beads 30 defining the lower edge of the boiler shell, and the support 28 is restrained from longitudinal movement by one or more tongues 32 passing through a mating slot in the header 16. If desired, straps 34 may be struck downwardly from the side walls of support 28 and bent outwardly to fit beneath the side beads 30, thereby locking the support in place against upward movement.

The battery cells 24 and 26 are slid into the boiler shell through the open rear end thereof and are confined between the top of the boiler shell and the bottom support 28. In the particular arrangement here shown, the cells are each inserted zinc-base foremost, thereby bringing the zinc base 36 of cell 24 adjacent the head light bulb 20 and connecting the cells in series by reason of the contact between the positive pole 38 of cell 24 with the zinc base 40 of cell 26. The cells are held against axial movement by a preferably resilient end stop 42 consisting essentially of an L-shaped strip of spring metal the shorter arm of which bears against the positive pole 44 of battery cell 26, and the longer arm of which is detachably secured to the battery support 28. Specifically, the battery support is transversely slit, and a strap of metal 46

is displaced downwardly, permitting the horizontal arm of the stop 42 to be slid therethrough, as will be evident from the drawing. To retain the end stop in position, it is perforated at 48 and the metal of the support 28 is struck downwardly to form a mating teat 50. It will thus be understood that after inserting the battery cells in the holder, the spring end stop 42 is slid into the mating means on support 28 until recess 48 springs around teat 50, thereby locking the end stop and the cells in position. For removal, the tab 49 is first bent downwardly.

The control of the head light bulb for bright or dim illumination is accomplished by the use of a series resistance and appropriate switch mechanism for cutting the resistance into or out of circuit. At the same time, the switch mechanism preferably is also arranged to open the circuit when desired. In the present case the switch comprises a single slab or strip of insulation 60, best shown in Fig. 4, which extends horizontally across the front portion of the boiler shell with its ends 62 protruding outwardly therefrom, as will be clearly evident from an inspection of Figs. 1 and 3. By reciprocating the switch member 60 from one side to the other, the head light may be burned brightly, dimmed, or extinguished.

To accomplish this desired result, the intermediate portion of the insulation member 60 is provided with spaced metallic contacts 64 and 66 interconnected by a tiny helical resistance element 70 which extends between the contacts 64 and 66 and which is carried by and movable with the switch member 60. One of the contacts, say, the contact 64, consists simply of a U-shaped clip of metal passed through slots on the switch member and clinched on the rear face thereof, as will be evident from an inspection of Figs. 3 and 4 of the drawing. The other contact, in this case the contact 66, is likewise passed through slots on the switch element and is clinched in place, but contact 66 differs importantly from contact 64 in having a rearwardly projecting wiper 68 formed on the rear face of the switch. The switch is positioned directly behind the center contact 72 of the lamp bulb, so that movement of the switch toward one side or the other brings either the contact 64 or the contact 66 against the terminal 72 of the bulb, while in the middle or center position the terminal 72 bears simply against insulation. This middle position may be better determined by the provision of a centering hole 74 in the switch member.

In operation, the spring stop member 42 urges the battery cells into contact with one another and into contact with the wiper 68. The positive pole of battery cell 26 is grounded by the spring stop 42, and one terminal of the lamp 20 is grounded to the header in which it is screwed. When the switch member is so moved as to bring contact 66 against terminal 72 of the lamp, a circuit is completed through the cells and lamp, and the full voltage of the battery is applied directly to the lamp. When, however, the switch is moved in the opposite direction, bringing the contact 64 against terminal 72, the circuit is completed through the dimming resistor 70, for the zinc base 36 of cell 24 bears against wiper 68 which in turn is connected through resistor 70 to the contact 64. Of course, when the switch member is centrally disposed, the battery circuit is opened and no illumination results.

It is important to notice that the construction herein shown requires no soldering at any point, and, in fact, requires no wiring, one terminal of the battery being grounded through the spring stop 42, and the other terminal being directly applied to the switch and thence to the lamp bulb. The resistor itself is tiny, inexpensive, and inconspicuously mounted on the slidable switch member. No difficulty of soldering the relatively hard resistor wire arises because the end terminals thereof are simply passed beneath the contacts 64 and 66 when the latter are being clinched onto the switch element, this construction being evident from an inspection of Figs. 2 and 4.

Another feature of the battery holder disclosed in this locomotive toy is its adaptation for receiving either one or two battery cells. For this purpose the support 28 is slotted at 80 and is provided with a downwardly struck strap 82 similar to the strap 46 previously mentioned, and a teat 84 similar to the teat 50 heretofore described. This construction constitutes a means for receiving the spring stop 42 and permitting the same to bear against the positive pole 33 of a single battery cell 24 when it is not desired to use two battery cells in series. When using a single battery cell, the procedure is to slide the battery cell in place and to then insert the vertical arm of spring stop 42 through the slot 80 while passing the horizontal arm of spring stop 42 through strap 82 and into engagement with teat 84. The holder is thereby equally well adapted for the accommodation of either one or two battery cells, and when using a single battery cell the same bulb may be retained, for dimmer illumination, or a lower voltage bulb may be used.

Referring now to Figs. 5, 6 and 7, I there illustrate my invention as applied to a truck hauler toy, that is, a toy adapted to have anchored thereon a truck trailer. For the present purposes it may be generally considered as a vehicle toy having head light bulbs 90 and 92 mounted on front mudguards 94, and a battery cell 96 mounted substantially below the bottom of the toy, or, in any case, in a relatively low position on the toy. Fig. 5 is an inverted plan view showing the wheels and axles of the toy and the battery 96 which is placed in a recess in the bottom of the toy and held against the recess by a wire yoke 98 at the ends 100 of which are slid into straps 102 struck downwardly from the bottom of the toy. The zinc base 104 of the cell bears against a contact lug 106 and is grounded thereby. The positive pole 108 of the cell is employed as a fixed contact cooperating with switch means to produce bright and dim illumination of the toy.

Referring to Figs. 6 and 7, the switch includes a generally upright metallic arm 110 pivoted at 112 on an upwardly struck pedestal 114. The lower end of the switch arm consists of a generally T-shaped piece of insulation 116 which is secured to the metallic switch arm 110 at 118. The insulation member 116 is provided with spaced metallic contacts 120 and 122 which are passed through slots near the side edges of the switch member and clinched therearound. A resistor 124 is connected between the contacts 120 and 122, preferably on the rear face thereof, as is clearly shown in the drawing. The contacts are disposed at an elevation corresponding to that of the positive pole 108 of the battery cell. It will thus be evident that upon

oscillation of switch lever 110 about the fixed fulcrum 112, the contacts are moved to one side or the other, thereby bringing either contact into sliding engagement with the positive pole 108 of the battery.

One of the contacts, in this case the contact 120, has secured thereto during the clinching operation the bare ends of a pair of insulated conductors 130 and 132, these conductors extending along the bottom of the vehicle toy and passing upwardly through holes 134 in the mudguards and thence into the housings 136 for the head lights 90 and 92. In the present case the conductor 130 feeds the lamp 90, while the conductor 132 feeds the lamp 92. It will be understood that the other terminals of the lamp bulbs are grounded to the body of the vehicle toy, thereby completing a circuit to the contact lug 106 which bears against and grounds the zinc base 104 of the battery cell.

The operation of the toy is practically self-evident, the lights being extinguished when the control arm 110 is in vertical position, the lights being brightly illuminated when the control arm is oscillated to the left, as viewed in Fig. 7, for then contact 120 bears against the battery pole and applies the full battery voltage to the wires 130 and 132, and, finally, the lights being dimly lighted when the lever 110 is oscillated to the right, as viewed in Fig. 6, thereby bringing contact 122 against the battery pole and connecting the light dimming resistor 124 in the supply circuit.

Still another form of toy is schematically indicated by the section of Fig. 8, showing the electrical features thereof. The particular toy here involved is a fire patrol toy which is provided with a pair of head light bulbs 150 and 152, which bulbs are preferably colored red in order to add realism to the appearance of the toy. The body portion of the toy carries a battery cell 154 mounted above the bottom 156 of the toy body, for this battery cell may be housed in a casing 158 which simulates a part of the fire fighting apparatus of the fire patrol toy. In this case the switching of the lights is controlled by a generally upright lever 160 which is pivoted at its bottom end 162. The lever may be made entirely from a suitable piece of fibre or like insulation and is widened at an intermediate portion to carry a pair of spaced contacts 164 and 166 which are clinched in place, much as has already been described. The contacts are on a level with the positive pole 168 of the battery cell and are adapted to bear against the same when the lever is oscillated to one side or the other. While contacts 164 and 166 are clinched in place, an appropriate resistor 170 is connected therebetween, the resistor preferably being located on the side of the lever opposite the battery. A pair of conductors 172 and 174 are also connected to one of the contacts, in this case the contact 166. The opposite ends of these conductors extend to the head lights 150 and 152, just as in the case of the truck hauler toy shown in Figs. 5, 6 and 7. The present arrangement of switch lever is especially desirable when the battery is mounted up within the vehicle, instead of at the bottom as in the truck hauler toy.

In operation, it will be understood that the lights are extinguished when the switch lever 160 is in vertical position; that the lights are brightly illuminated when the lever is oscillated to one side, bringing the contact 166 against the positive pole 168 of the battery; and that the lights are dimly illuminated when the switch lever is oppositely moved, thereby bringing the contact 164 against the positive pole 168 of the battery, for in the latter case the resistor 170 is connected in series with the lamp circuit.

It is believed that the mode of constructing and using the electrically lighted vehicle toys of my invention, arranged for bright and dim lighting, and the many advantages thereof, will be apparent from the foregoing detailed description thereof. The toys are made far more effective and appealing when provided with the bright and dim feature, and add greatly to the popularity of this class of toy. The dimming feature as well as a three-position switch control providing bright, dim, or no illumination, are available without changing the number of batteries used and are therefore applicable to relatively simple and inexpensive toys having only a single battery cell. The switch arrangement is itself compact and inexpensive and may be applied to the toy without appreciable increase in cost. Only a single piece of insulation is needed for the complete switching arrangement; no soldering is required; and wiring for the light system is minimized, or, in the case of the locomotive toy, entirely eliminated, and in the latter toy either one or two battery cells may be employed, as desired.

The dimmer switch may also be used with track toys, having a third rail for energization, instead of batteries, or with toys having still other sources of electrical energization.

It will be apparent that while I have shown and described my invention in preferred forms, many changes and modifications may be made in the structures disclosed without departing from the spirit of the invention, defined in the following claims:

I claim:

1. An electrically lighted vehicle toy comprising a metallic toy body, an electric light bulb mounted on the toy body and having one terminal grounded thereon, switch mechanism optionally movable to any of three positions for providing bright, dim, or no illumination from the bulb, said switch mechanism including a stationary contact and a movable control element and a pair of spaced contacts mounted thereon and interconnected by a resistor also mounted on said control element and movable therewith, and means electrically connecting the toy body, the switch mechanism, and the bulb in series.

2. An electrically lighted vehicle toy comprising a metallic toy body, a battery holder and battery, an electric light bulb mounted on the toy body and having one terminal grounded thereon, switch mechanism optionally movable to any of three positions for providing bright, dim, or no illumination from the bulb, said switch mechanism including a stationary contact and a movable control element and a pair of spaced contacts mounted thereon and interconnected by a resistor also mounted on said control element and movable therewith, and means electrically connecting the battery, the toy body, the switch mechanism, and the bulb in series.

3. An electrically lighted vehicle toy comprising a metallic toy body, a battery holder and battery, an electric light bulb mounted on the toy body and having one terminal grounded thereon, switch mechanism optionally movable

to any of three positions for providing bright, dim, or no illumination from the bulb, said switch mechanism including a single piece of insulation having a stationary contact and spaced metallic contacts connected by a small bare resistor, and means electrically connecting the battery, the toy body, the switch mechanism, and the bulb in series.

4. An electrically lighted vehicle toy comprising a metallic toy body, a battery holder and contained battery, an electric light bulb mounted on the toy body and having one terminal grounded thereon, a switch including a stationary contact and a movable insulation body having mounted thereon a pair of spaced contact elements and a small resistor interconnecting said contact elements, and means so electrically interconnecting the battery, the toy body, the bulb and the movable switch contacts as to provide for bright, dim, or no illumination of the bulb by the battery.

5. An electrically lighted vehicle toy comprising a metallic toy body, a battery holder and contained battery, an electric light bulb mounted on the toy body and having one terminal grounded thereon, a movable switch element arranged electrically in series with said battery and bulb and bearing against one of said elements as a stationary contact, said switch including an insulation body having mounted thereon a pair of spaced contact elements and a small resistor interconnecting said contact elements, and means completing a series circuit of battery, toy body, bulb, and switch, and thereby providing for bright, dim, or no illumination of the bulb by the battery.

6. An electrically lighted locomotive toy comprising a metallic toy body including a boiler shell, an electric light bulb passing through the front header of the boiler shell and having one terminal grounded thereon, a battery mounted within the boiler shell with its forward end facing the terminal of the electric light, means contacting and grounding the other end of the cell, and a movable switch interposed between the forward end of the cell and the ungrounded terminal of the bulb, said switch including insulation material carrying a pair of spaced contacts interconnected by a small resistor, whereby movement of the switch provides for bright, dim, or no illumination of the bulb.

7. An electrically lighted locomotive toy comprising a metallic toy body including a boiler shell, an electric light bulb screwed into the front header of the boiler shell and having one terminal grounded thereon, a flashlight battery mounted within the boiler shell with its zinc base facing the base terminal of the electric light, means contacting and grounding the positive pole of the cell, and a transversely reciprocable switch interposed between and contacting therewith the zinc base of the cell and the ungrounded terminal of the bulb, said switch including a strip of insulation material the ends of which protrude from the sides of the locomotive boiler shell, and the intermediate front portion of which carries a pair of spaced contacts interconnected by a small resistor, one of said contacts projecting a substantial distance on the rear side of the insulation strip for contact with the zinc base of the cell, whereby sliding movement of the strip from one side to the other provides for bright, dim, or no illumination of the bulb.

8. A vehicle toy comprising a metallic toy body, a light bulb, a battery, and means for supporting the same at the bottom of the vehicle, a switch lever intermediately pivoted on the vehicle with the lower end thereof disposed at one pole of the cell, said lower end of the lever being made of insulation and carrying a pair of spaced contacts interconnected by a small resistor, means connecting one of the contacts to the light bulb, means grounding the other terminal of the bulb, and means grounding the other terminal of the battery, whereby oscillation of the lever provides bright, dim, or no illumination of the head lights.

9. An automobile vehicle toy comprising a metallic automobile body including mudguards, a pair of head light bulbs mounted on the mudguards, a battery, and means for supporting the same at the bottom of the vehicle, a switch lever intermediately pivoted on the vehicle with the lower end thereof disposed at the positive pole of the cell, said lower end of the lever being made of insulation and carrying a pair of spaced contacts interconnected by a small resistor, wires connecting one of the contacts to the head light bulbs, means grounding the other terminals of the bulbs, and means grounding the negative terminal of the battery, whereby oscillation of the lever brings either one or the other contact against the positive battery terminal and thereby provides either bright or dim illumination of the head lights.

10. A toy comprising a metallic toy body, a battery cell mounted above the bottom of said toy body, an electric light bulb, and a switch lever pivotally mounted on the toy body at its lower end and having an intermediate insulation portion coming opposite one pole of the battery cell, said insulation portion carrying a pair of spaced contacts interconnected by a resistor, means connecting one of the contacts to the electric light bulb, means grounding the other terminal of the bulb, and means grounding the other pole of the battery.

11. An automobile toy comprising a metallic toy body, a flashlight battery cell mounted above the bottom of said toy body, electric light bulbs, and a switch lever pivotally mounted on the toy body at its lower end and having an intermediate insulation portion coming opposite the positive pole of the battery cell, said insulation portion carrying a pair of spaced contacts interconnected by a resistor, means connecting one of the contacts to the electric light bulbs, means grounding the other terminals of the bulbs, and means grounding the other pole of the battery.

12. In an electrically lighted toy, a holder for flashlight battery cells making either one or two cells optionally usable, said holder comprising an elongated support for receiving one or two cells in end to end relation, an end stop for the cells, said support being intermediately provided with means for detachably receiving the end stop when a single cell is used, and having similar means disposed further along the support for detachably receiving the end stop when two batteries are used.

13. In an electrically lighted vehicle toy, a holder for flashlight battery cells making either one or two cells optionally usable, said holder comprising an elongated support for receiving one or two cells in end to end relation, a resilient stop for bearing against the end of the cell, said support being provided with means for detachably receiving said stop for a single cell when a single cell is used, and having similar means disposed further along the support for

similarly receiving said stop to bear against the end of the second cell when two cells are used.

14. An electrically lighted toy locomotive comprising a metallic locomotive body, a head light bulb mounted on the front header of the body, a battery support for receiving either one or two batteries in end to end relation within the boiler shell, a movable switch interposed between the front end of a battery cell and the base of the head light bulb, said switch having spaced contacts interconnected by a resistor for providing either bright, dim, or no illumination of the head light, and means for grounding and holding either one or two battery cells as desired, including a resilient stop and means on the battery support for detachably receiving the stop at either the center or rear portions thereof, for bearing against and contacting with either one or two battery cells.

ANTHONY N. SMITH.