PATENT SPECIFICATION

Convention Date (United States): Nov. 26, 1935. **485,566**

Application Date (in United Kingdom): Nov. 17, 1936. No. 31428/36.

Complete Specification Accepted: May 17, 1938.

COMPLETE SPECIFICATION

Improvements in and relating to Signalling Devices on Toy Vehicles

We, THE LIONEL CORPORATION, a corporation organized and existing under the laws of the State of New York, United States of America, of 15, East 26th Street, City and State of New York, United States of America, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

The present invention relates to signalling devices for toy vehicles, and more particularly to noise producing signalling devices, for example, whistles, and to the construction of such whistles.

Efforts heretofore made to provide toy trains with intermittently operated sound signalling devices such as whistles or bells have generally resulted in devices which are incapable of completely simulating corresponding parts of regular trains. Where a whistle is operated by the propulsion motor of the train, whistle operation is dependent upon train movement and cannot be had when the train is standing still. Where the propulsion motor is reversed, a fan type blower cannot be used and resort has therefore been had to bellows types of device. With propulsion motor operated whistles or whistles controlled from the track there is no opportunity for producing the signal at will. Efforts to operate whistles by bellows have been unsatisfactory, as they are not adapted to produce a sustained signal, or satisfactory volume and tone.

The present invention has for its object to obviate the aforesaid disadvantages and to this end consists in a toy vehicle adapted for operation on a track including two electrical conductors, having a propulsion motor arranged to be connected between said conductors for propelling the vehicle, a second motor adapted to be operated by current drawn from said conductors, a sound signal producing device operable by the second motor and means for controlling the flow of operating current to the second motor.

The accompanying drawings show, for purposes of illustrating the present invention, four of the many embodiments 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:—

Fig. 1 is a top plan view of a whistle unit embodying the present invention;

Fig. 2 is a side elevational view of the same taken from the side carrying the motor, and relay and showing a wiring diagram;

Fig. 3 is a section taken on the broken line 3—3 of Fig. 2;

Fig. 4 is an elevational view taken on the side opposite that of Fig. 2, parts being broken away to show interior construction;

Fig. 5 is a longitudinal sectional view on the line 5—5 of Fig. 1;

Fig. 6 is a transverse sectional view on the line 6—6 of Fig. 2;

Fig. 7 is a fragmentary view of a detail; and

Figs. 8, 9 and 10 are wiring diagrams showing different arrangements for control.

In the form shown in the drawings, the sound producing structure is designed to be secured to a fixed support 10, such as the base or floor of a toy car, and for this purpose is provided with a supporting foot 11 mounted between soft rubber pads 12 and 13. These pads are secured to a body casting 15 by lugs 16 integral therewith and a plate 17.

The body casting 15 may conveniently be made as a die casting. It has a continuous flat front wall 20 apertured as indicated at 21 and at one end has rearwardly extending walls 22 of involute shape adapted to form a chamber 22^1 for a blower. The other end of the casting has rearwardly extending peripheral walls 23 forming a resonating chamber but preferably a rearwardly extending dividing wall 24 is provided adapted to form two resonating chambers 25 and 26. The wall 24 is connected to a wedge-shaped air deflector 27 slightly narrower than the throat 28 formed by the ends 22*a* and 22*b* of the wall of the blower casing. These parts provide constricted air passages 29 and 30. The side walls of the casting

[*Price* 1/-]

are cut away as indicated at 31 and 32 to provide for the escape of the air passing through these air passages and for initiating the sound waves. The casting is provided with holes 33 adapted to receive barbed rivets 33¹. These rivets pass through openings in a gasket 34 and a cover plate 35 and secure the cover plate and gasket in place. In this way resonating chambers are formed with no possibility of leakage of air.

The blower chamber 22¹ is provided with a cover 35 secured in place by screws 36 tapped into the die casting. This cover member has openings 37, adjacent the shaft of the motor operating the sound signalling device, to admit air.

The casting 15 is provided with three forwardly extending posts 40, 41 and 42 which support an insulating plate 43. The casting 15 also has a number of alignment lugs 44 to hold the motor field structure 45 in position. This field structure is secured to the casting by studs 46 riveted to the casting. The motor armature 47 is mounted on a shaft 48 having one end carried in a bearing 49 in the insulating plate 43, and the other end carried in a bearing 50. The bearing 50 is supported in a bridging piece 51 forming part of the blower chamber cover 35, and is held in place by a strap 52 secured to the rear face of the cover plate 35. This bearing carries a ball 54 to take the thrust produced by the brushes and brush springs which are carried in brush boxes 55 and 56 secured to the insulating member 43 and provided with wiring straps 55¹ and 56¹.

The impeller blades on the motor shaft are indicated at 57. These blades may conveniently be made up of two pieces of bent sheet metal shaped as indicated in Figures 4 and 7 and welded together as shown at 58.

The casting 15 is provided with a forwardly extending supporting lug 60. This lug supports, for example, a relay 61 which is designed to be continuously energized by the alternating current in the track circuit, but not actuatable thereby, and also so designed that, when a small direct current potential is superposed on the alternating current of the track circuit, or direct current substituted therefor, the relay functions.

If desired the relay may be replaced by a high impedance choke coil which will only allow passage of direct current in the blower motor circuit, or, should direct current operation be used, a rectifier could be substituted such that current will only pass through the blower motor circuit when the current passes in a predetermined direction.

Suitable wiring diagrams are diagrammatically shown in Figs. 2, 8, 9 and 10. In the arrangement shown in Fig. 2 the wheel bearing rails of a typical toy electric railroad track are indicated at 62. The vehicle carried apparatus is earthed to these rails as usual through the trucks. The third rail 63 is connected through a current collector 64 and wire 65 both carried by the toy car, with a terminal plate 66 on the relay. The terminal plate is connected to the coil 61 by a wire indicated at 67 and to the brush box lead 55¹ by a wire indicated at 68. The other end of the coil is connected to a plate 69, which is earthed through a wire 70 connected to the support 11. The other brush box lead 56¹ is connected by a wire 71 with the field winding 72, and the other end of this field winding is connected by a wire 73 with an insulated relay contact 74. The relay carries a movable contact 75 earthed to the frame so as to complete the circuit of the blower motor when the relay 61 is energized in a manner which will cause the relay to function. It will be noted that the circuit just described is in parallel with the propulsion motor but works independently of the circuit of the propulsion motor 76 which operates on direct current or alternating current. The usual reversing mechanism for this motor is omitted. The relay coil is of high impedance such as to cut down the alternating current to a value which will not operate the relay contact, thereby providing an inhibiting circuit which will only admit direct current which can be applied in any suitable manner in sufficient amounts to operate the relay.

The arrangement shown in Fig. 8 is very similar to that shown in Fig. 2. Here the track rails 80 and third rail 81 are connected to a switch 82 adapted to be connected with the alternating current source 83 or direct current source 84 so that alternating or direct current of sufficient voltage and current capacity for train operation may be applied to the track. The propulsion motor 85 is connected to the third rail 81 and truck 86 in the usual way.

The relay coil 87 is permanently connected in circuit as shown, and here again is provided with sufficient inductance to cut down the alternating current so low as not to operate the contacts 88. So long as alternating current is supplied to the track circuit, the contact 88 are open and the whistle motor 89 is idle. When, however, direct current is applied to the propulsion circuit, the relay operates to close the circuit for the whistle motor 89. The structure employed on the locomotive or car may be like that shown in Figs.

1—7 inclusive, except for the way in which the relay is wound.

In Fig. 9 the parts are much the same as shown in Fig. 8 and corresponding reference characters are used for the corresponding parts.

In the arrangement shown, the blower motor 90 is provided with a high impedance choke coil 91 in series with it, or the field of the motor is made of high impedance so that insufficient alternating current will flow through the circuit of the motor 90 for operating the same. The whistle will therefore be idle on alternating current operation but will operate when direct current is applied to the track circuit.

The arrangement shown in Fig. 10 contemplates direct current operation from a direct current source 92 connected through a reversing switch 93 with the rails 80 and 81 of the track circuit. The propulsion motor 94 is connected in as usual. The whistle motor 95 however is connected to a rectifier 96 which will allow current to flow in one direction only. The motor 95 will operate only when the reversing switch is in the proper position.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A toy vehicle adapted for operation on a track including two electrical conductors having a propulsion motor arranged to be connected between said conductors for propelling the vehicle, a second motor adapted to be operated by current drawn from said conductors, a sound signal producing device operable by the second motor and means for controlling the flow of operating current to the second motor.

2. A toy vehicle according to claim 1 in which the circuit of the second motor is normally open.

3. A toy vehicle according to either preceding claims wherein the sound signal producing device is in the form of a blower-actuated whistle.

4. A toy vehicle according to any preceding claim wherein the means for controlling the flow of operating current to the second motor is in the form of a relay.

5. A toy vehicle according to claim 4 wherein the coil of the relay is of high impedance such that it will not be affected by alternating current and will only admit direct current, when applied in sufficient amounts, to operate the relay.

6. A toy vehicle according to claims 1 to 3 wherein the means for controlling the flow of operating current to the second motor comprises a rectifier which allows current to flow to the second motor only when the current supplied is of the proper polarity.

7. A toy vehicle according to claim 1 wherein the propulsion motor operates on either alternating or direct current.

8. A toy vehicle according to claim 4 wherein the relay is mounted on the body of the whistle.

9. A toy vehicle according to claim 3 wherein the blower-actuated whistle has a blower chamber and at least one resonant chamber in the same casting.

10. A toy vehicle according to claim 9 provided with constricted air passages between the blower-chamber and each resonant chamber, an air inlet for each resonant chamber adjacent the air passage leading thereto, and a cover for said chambers.

11. A toy vehicle according to claim 10 wherein the second motor is secured to the casting on the side opposite the blower-chamber cover, the blower-chamber cover adjacent the motor shaft having openings to admit air.

12. A toy vehicle according to claim 11 wherein the field structure of the second motor is secured by studs to the blower chamber, and the armature of said second motor is supported in bearings in the blower-chamber cover and in a plate supported by posts secured to the blower chamber.

13. A toy vehicle substantially as described with reference to the accompanying drawings.

Dated this 17th day of November, 1936.

MARKS & CLERK.

Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1938.

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

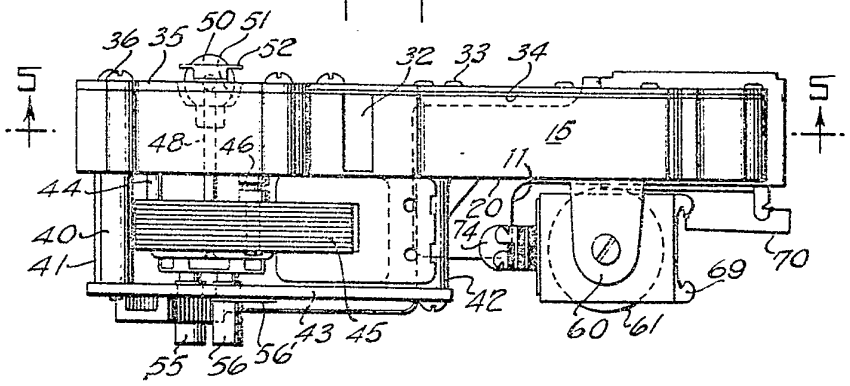


Fig. 2.

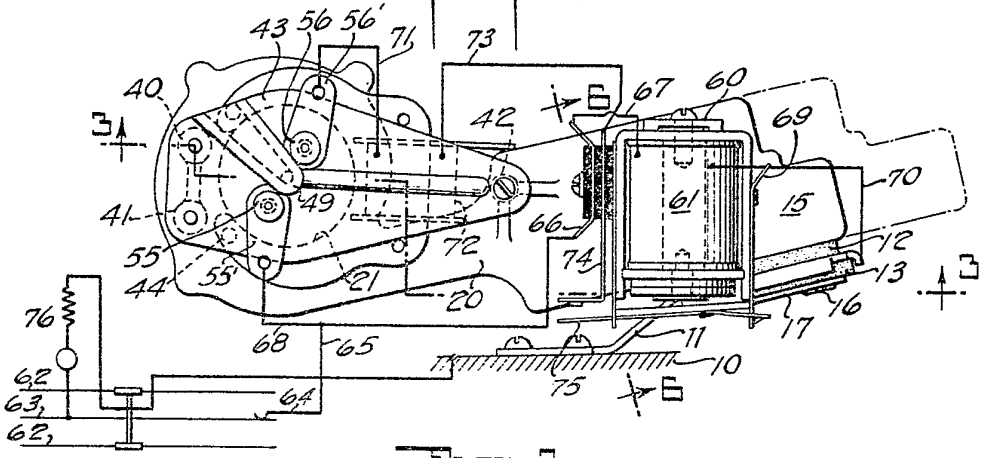


Fig. 3.

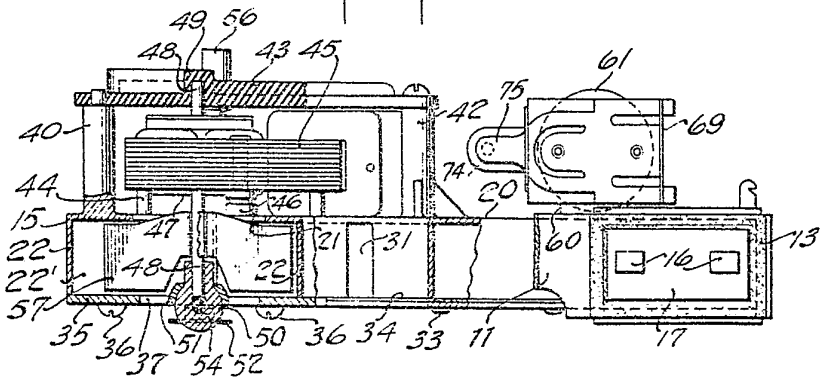


Fig. 4.

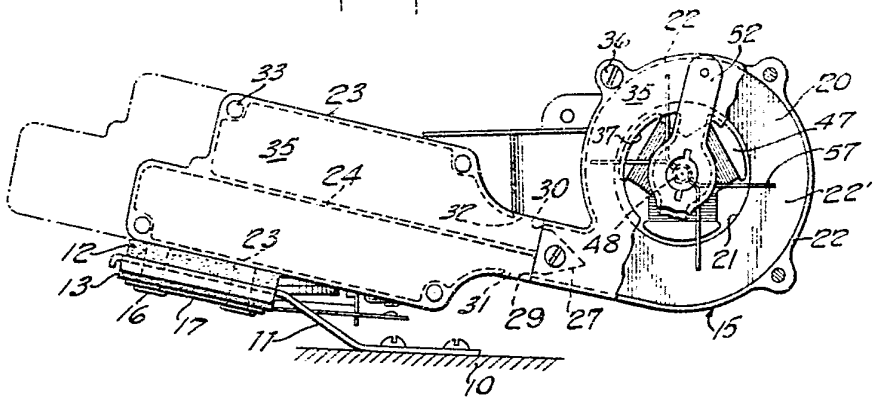


Fig. 5.

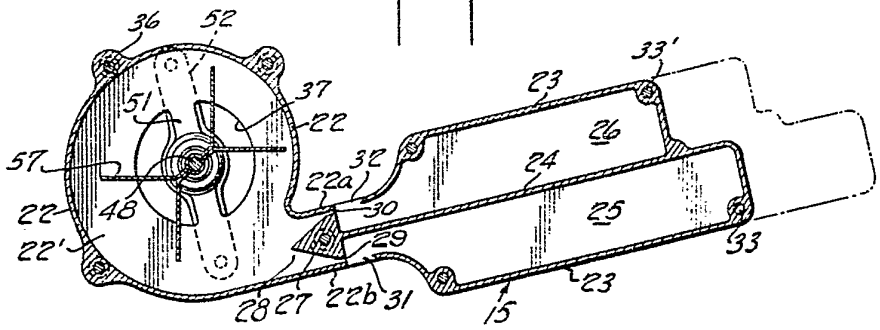


Fig. 6.

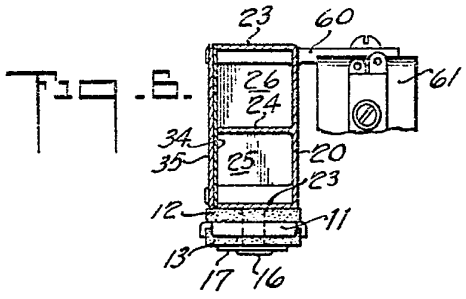
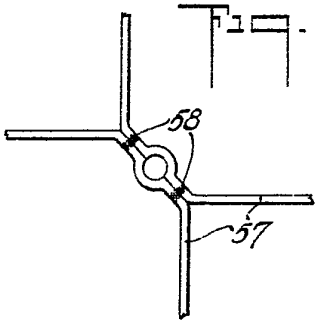


Fig. 7.



485,566 COMPLETE SPECIFICATION

3 SHEETS

SHEET 1

SHEET 2

[This Drawing is a reproduction of the Original on a reduced scale.]

Fig. 1.

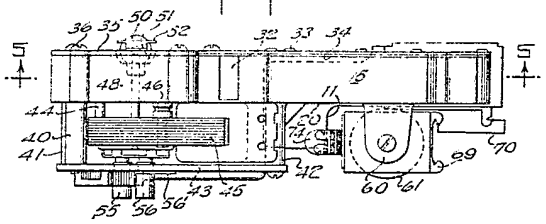


Fig. 2.

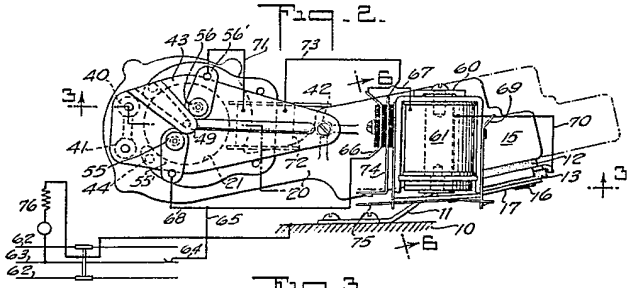


Fig. 3.

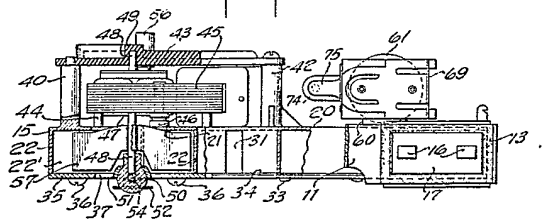


Fig. 4.

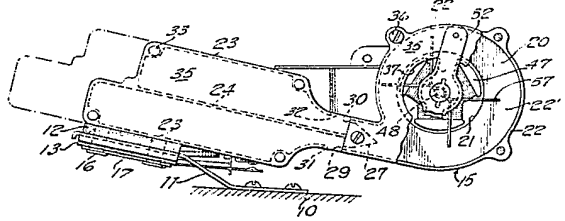
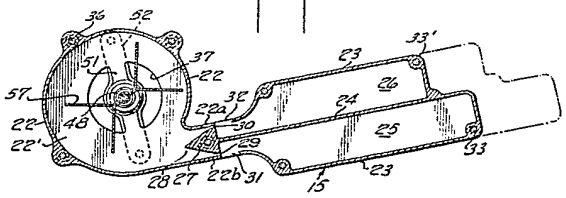


Fig. 5.



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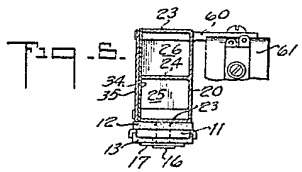

Fig. 7.

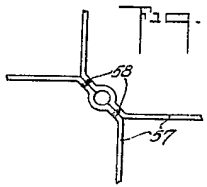

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Fig. 8.

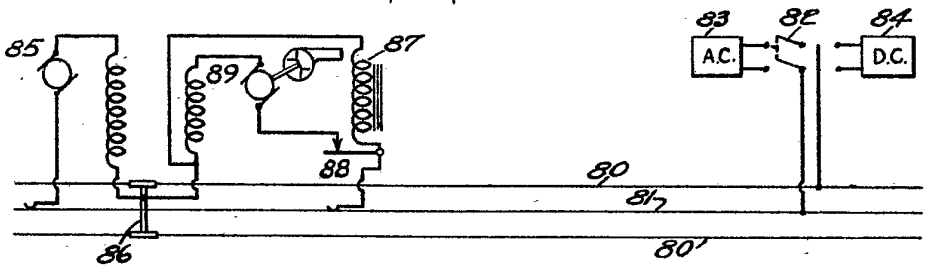


Fig. 9.

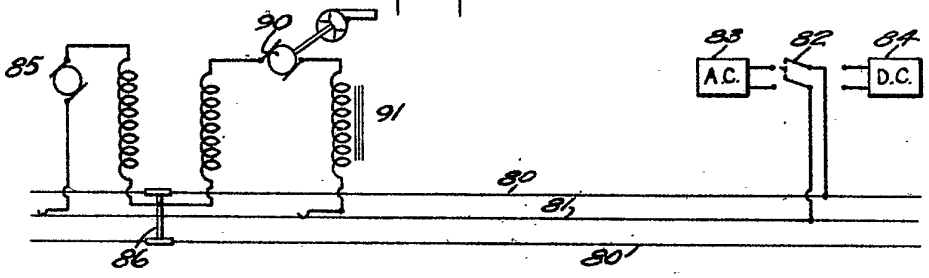
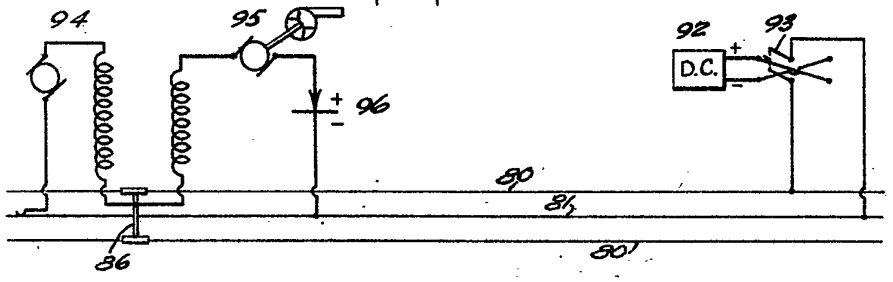


Fig. 10.



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