United States Patent

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[54] **AERIAL BALANCING TOY**
7 Claims, 6 Drawing Figs.

[52] **U.S. Cl.** ..... **46/244 R,** 46/100
[51] **Int. Cl.** **A63h 17/20**
[50] **Field of Search** 46/100, 101, 130, 131, 212, 243, 244

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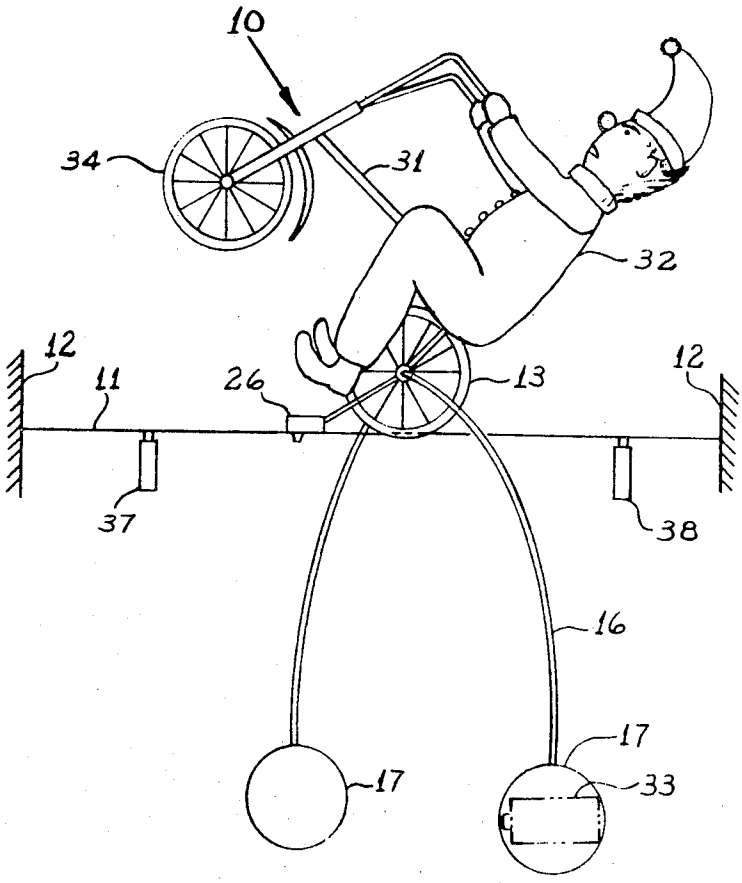
ABSTRACT: A toy body having a driving wheel and an idler wheel in tandem travels reversibly on an aerial cable. A weighted balancing yoke is suspended from the driving wheel axle and a reversible electric motor on the body is connected to the driving wheel. The body is rockable within limits on the driving wheel axle by reactive torque so that both wheels engage the cable when the toy travels in one direction, but the toy body is raised and the idler wheel lifted off the cable when the toy travels in the opposite direction. The motor is in circuit with a reversing switch which is engageable with travel limiting detents on the cable.



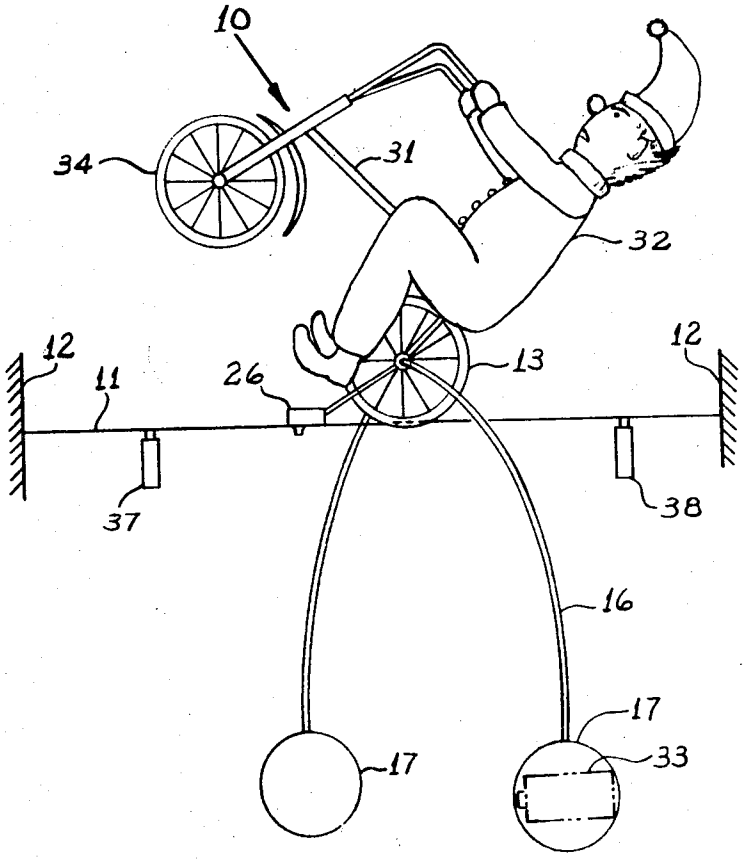


FIG. 1

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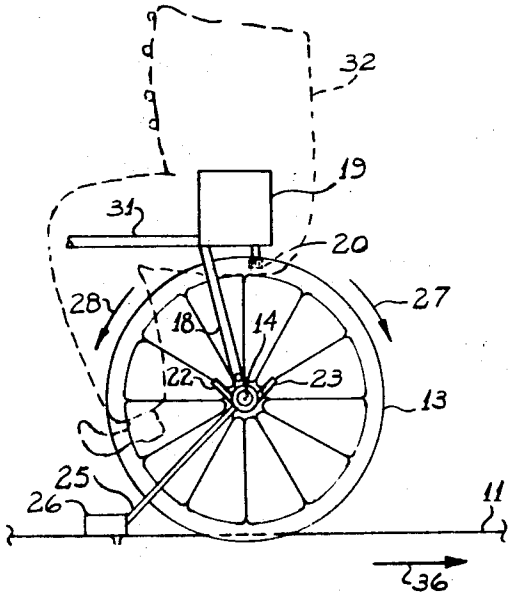
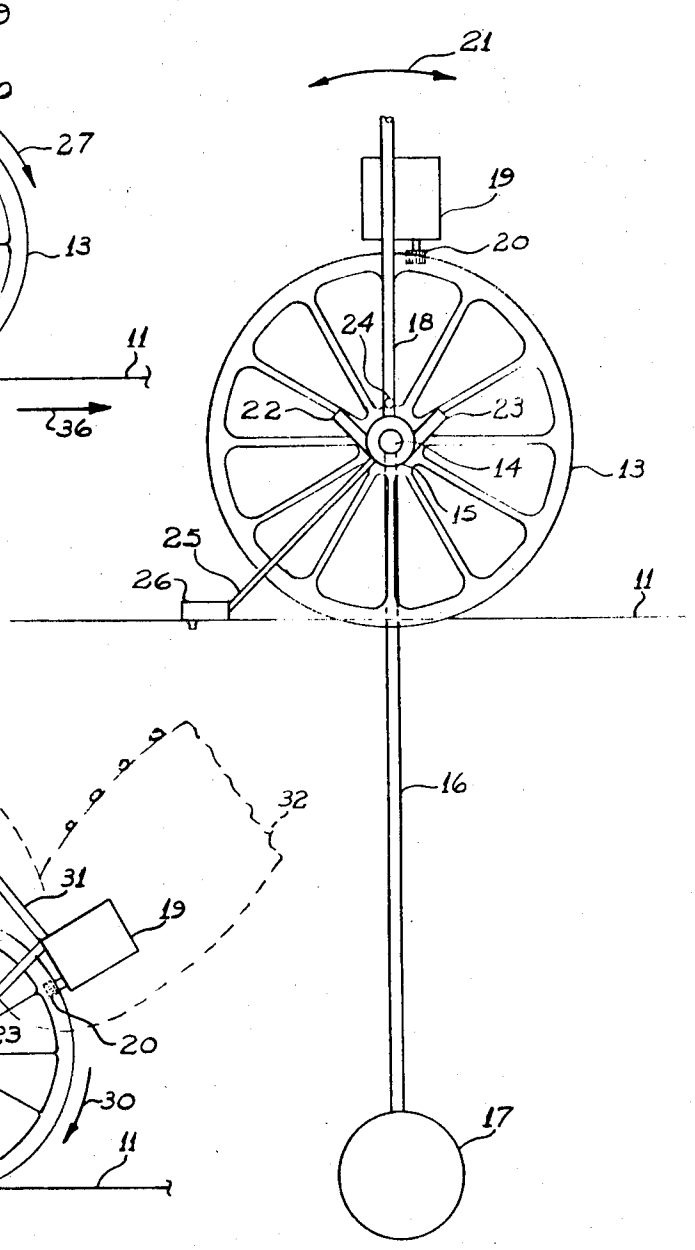


FIG. 3



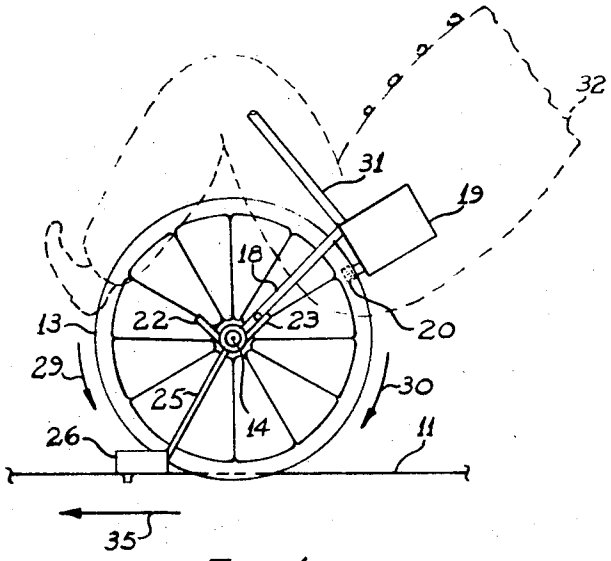


FIG. 4

FIG. 2

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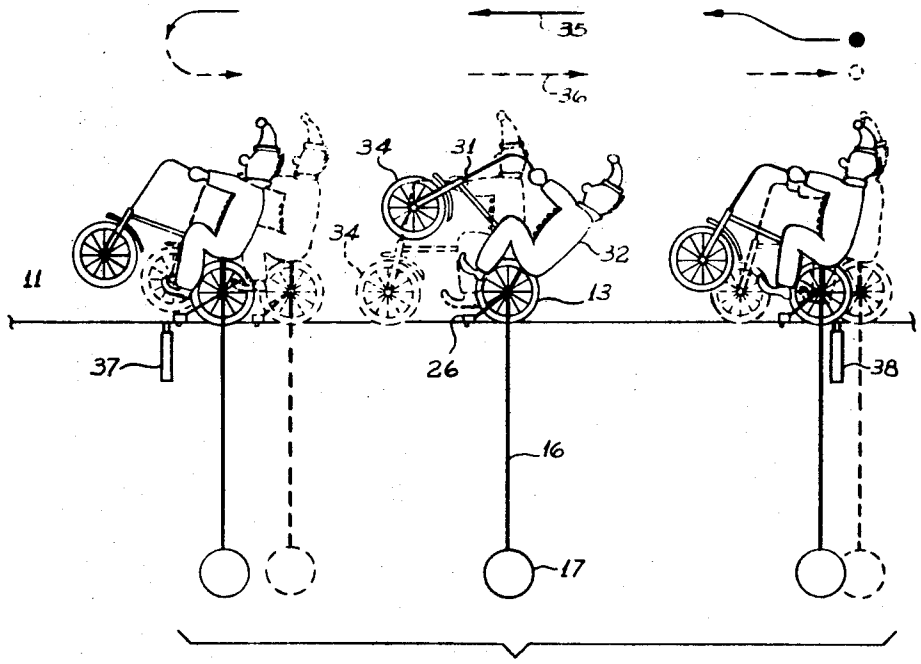

FIG. 6

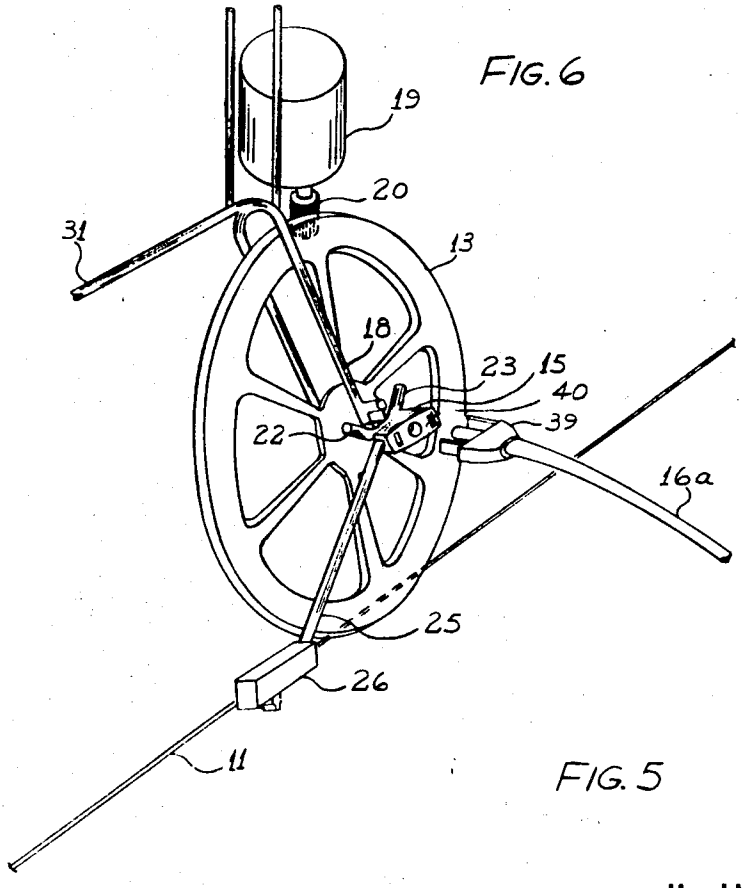

FIG. 5

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AERIAL BALANCING TOY

This invention relates to new and useful improvements in balancing toys, and in particular the invention concerns itself with a balancing figure toy which travels reversibly on an aerial cable or tightrope.

The principal object of the invention is to provide a highly amusing figure toy which can provide much entertainment and attract considerable attention by its unique performance in riding in a balancing manner on an aerial cable alternately in opposite directions, the toy having two wheels in tandem and riding on both wheels in one direction, but raising itself to lift the front wheel off the cable in a "wheelie" fashion when traveling in the opposite direction.

The toy is electrically driven and electrically controlled as to be self-reversing, and inasmuch as for most part its actuating components are concealed from view, the unique performance of the toy gives the impression of being caused by mystic forces.

The toy may be utilized for ordinary amusement purposes and the like, but is also well suited for use as an animated display, such as in a store window for example, where its positioning on an aerial cable occupies elevated space which otherwise may not be used and where the unique performance of the toy on the cable serves to attract attention to the toy as well as to items of merchandise which may be displayed beneath it.

With the foregoing more important object and features in view and such other objects and features which may become apparent as this specification proceeds, the invention will be understood from the following description taken in conjunction with the accompanying drawings, wherein like characters of reference are used to designate like parts, and wherein:

FIG. 1 is a perspective view of the aerial balancing toy of the invention;

FIG. 2 is an enlarged side elevational view showing the basic components of the toy as related to the concept of its manner of operation;

FIG. 3 is a diagrammatical illustration showing the action of the toy in traveling rearwardly;

FIG. 4 is a diagrammatic illustration showing the action in traveling forwardly;

FIG. 5 is a fragmentary perspective view of a portion of the toy in which the arms of the balancing yoke are removable; and

FIG. 6 is a diagrammatic illustration of the action of the toy, its forward travel being shown by full lines and its rearward travel by dotted lines.

Referring now to the accompanying drawings in detail, FIG. 1 shows one embodiment of an aerial balancing toy in accordance with the invention. In this particular instance the toy designated generally as 10 is a figure toy simulating a clown riding a bicycle on an aerial cable or tightrope 11 stretched between a pair of suitable supports 12. However, it will be understood that this particular figure simulation is by no means critical and that various other figure simulations may be utilized.

Thus, for purposes of explanation of the basic concept of the invention reference is drawn to FIG. 2 which shows a peripherically grooved wheel 13 adapted for rolling on the aerial cable 11 and having an axle 14 at its axis of rotation. The axle 14 carries a suitable mounting 15 from which is suspended a balancing yoke 16, the yoke extending laterally from both sides of the wheel and downwardly below the cable 11 where the lower ends of the yoke are provided with weights 17 so as to maintain the wheel 13 in a balanced condition on the cable.

A support member 18 is rockably mounted on the axle 14 and extends generally upwardly therefrom. A reversible electric motor 19 is supported by the member 18 and is drivingly connected to the peripheral portion of the wheel 13, as by suitable gearing 20. The support member 18 carrying the motor 19 is swingable or rockable about the wheel axle 14 in

opposite directions as indicated by the arrow 21, the extent of its rocking being limited by fixed stops 22, 23 which are provided on the axle mounting 15, forwardly and rearwardly of the axis of wheel rotation. The member 18 may be shaped so as to engage the stops 22, 23 directly, or a pin 24 may project laterally from the member 18 to engage the stops. Also fixed to the axle mounting 15 is an arm 25 which extends downwardly and has secured to its lower end a reversing switch 26 disposed in close proximity to the cable 11. The switch 26 and the motor 19 are in circuit with a source of current, such as dry batteries hereinafter described.

It will be understood from the foregoing that the yoke 16, the switch-equipped arm 25 and the stops 22, 23 are fixedly associated with the axle mounting 15, while the wheel 13 driven by the motor 19 is free to rotate, and also while the motor-carrying support member 18 is free to rock about the axle 14 within limits set by the fixed stops 22, 23.

With this in mind, attention is directed to FIGS. 3 and 4 from which it will be apparent that when the motor 19 is energized so as to drive the wheel 13 in the direction of the arrow 27, the reactive torque through the gearing 20 between the wheel and the motor will cause the motor-carrying member 18 to rock or swing about the axle 14 in the opposite direction as represented by the arrow 28, that is, in the direction of the stop 22 as shown in FIG. 3. On the other hand, when as shown in FIG. 4 the motor 19 is energized to drive the wheel 13 in the direction of the arrow 29, the reactive torque will swing the motor-carrying member 18 about the axle 14 in the direction of the arrow 30 and against the stop 23. This alternate rocking of the motor-carrying member is effectively utilized to obtain a unique performance of the toy on the aerial cable, as will be presently explained.

In FIG. 1 the figure toy simulation is that of a rider on a bicycle and this includes a vehicle frame 31 of which the aforementioned member 18 is a component. The driving wheel 13 is the rear wheel of the simulated bicycle and the driving motor 19 is conveniently concealed in the body of the simulated rider 32. The body of the rider may also accommodate dry batteries for energizing the motor, although it is preferred that such batteries be housed within containers at the lower ends of the balancing yoke 16, as indicated at 33 in FIG. 1, so that the batteries themselves may serve as weights for the yoke, in place of the weights 17. In any event, the bicycle frame 31 is also provided with a peripherally grooved front wheel 34 which may be regarded as an idler wheel in the sense that it is not driven like the driving wheel 13. Unlike in an actual bicycle, the front wheel 34 is not steerable, and is arranged in tandem with the back wheel 13 so that during a certain stage of operation of the toy, both wheels may ride along the cable. It will be understood that the front wheel 34, not shown in FIGS. 3 and 4, is disposed forwardly or to the left of the driving wheel 13, as viewed in these FIGS. wherein the forward direction of travel of the toy is indicated by the arrow 35 and the rearward direction of travel is indicated by the arrow 36. It will be also understood that the vehicle frame 31, the front wheel 34, the motor 19 and the rider 32 are all fixedly connected to the frame member 18 and are swingable therewith, as at 28 or 29, about axle 14, between the limits provided by the stops 22, 23.

Reference is now drawn to FIG. 1, FIG. 4 and to the solid line showing in the diagrammatic illustration of FIG. 6 in which the toy travels in the forward direction of the arrow 35. Under these conditions, as already explained in regard to FIG. 4, the reaction torque of the motor 19 driving the wheel 13 in the direction of the arrow 29 will pivot the support member 18 upwardly and rearwardly as at 30, thus causing the entire vehicle frame 31 to be swung upwardly about the axle 14 and the front wheel 34 to be raised off the cable 11, until the member 18 comes into engagement with the stop 23. At that point the driving wheel 13 will propel the toy along the cable forwardly in the direction of the arrow 35, but the reaction torque will still maintain the vehicle frame in its raised position, with the front wheel 34 off the cable.

Any suitable type of a travel-limiting detent **37** is positioned on the cable **11** at the forward limit of travel of the toy, and when this detent becomes engaged by the switch **26**, the switch is automatically actuated to reverse the direction of rotation of the motor **19**. As this occurs, the forward travel of the toy is immediately arrested and during a short subsequent period the reversed rotation of the motor produces a reactive torque which causes the member **18** to swing about the axle **14** in the direction of the arrow **28** (see FIG. **3**), that is, in the direction of the stop **22**. This results in lowering of the entire vehicle body **31** so that the front wheel **34** comes into engagement with the cable **11**, whereupon the driving wheel **13** will propel the toy rearwardly in the direction of the arrow **36** while both the wheels **13**, **34** run along the cable **11**, as indicated by the dotted line showing in FIG. **6**.

A second travel limiting stop **38** is placed on the cable **11** at the rear end of the vehicle travel and when the switch **26** comes into engagement with the stop **38**, it is actuated to again reverse the direction of rotation of the motor **19** so that the vehicle frame is again raised to lift the front wheel **34** off the cable and forward travel of the toy is repeated, with only the rear driving wheel **13** in contact with the cable.

It is possible that during forward movement of the toy, the rear driving wheel **13** may not engage the cable **11** with such precision as to assure engagement of the front wheel **34** with the cable when the toy body is lowered at the forward end of its travel. In such an event the front wheel will miss the cable and drop to some extent on one side of the cable or the other, but by that time the support member **18** will come in contact with the forward stop **22** and further dropping of the front end of the vehicle will thereby be prevented so that even under such unlikely conditions, the toy will remain in position on the cable.

Suitable electrical conductors (not shown) are of course suitably arranged to connect the switch **26** and the motor **19** in series to the batteries **33** which, as already indicated, may be housed in containers at the lower ends of the balancing yoke **16**.

In order to provide the required low center of gravity for the toy, the balancing yoke **16** must extend considerably below and also to both sides of the toy body, and if the yoke were permanently attached to the mounting **15** on the axle **14** of the driving wheel **13**, some problems may be encountered in compact packaging of the toy for purposes of shipment or storage. Thus, FIG. **5** shows an arrangement whereby such problems may be avoided in that the yoke is made in two separate pieces **16***a*, only one of which is shown, the yoke piece **16***a* being provided at its upper end with a pronged plug **39** which is separably connectable to a socket **40** in the mounting **15**, thus permitting the yoke piece to be removed when the toy is not in use.

The prongs of the plug **39** may be electrically insulated from each other and in circuit with different poles of the batteries at the ends of the yoke, and appropriate electrical connections may be made from the socket **40** to the switch **26** and motor **19** so that the electrical circuit through the pug and socket **39**, **40** is automatically interrupted when the yoke members **16***a* are separated from the toy body is automatically reestablished when the yoke members are installed in their position. If the yoke members **16***a*, the switch arm **25** and the motor supporting member **18** are formed from metal, they may in themselves be used as the ground portion of the electrical circuit and may be hollow to accommodate wires of the rest of the circuit, thus making the use of double conductors unnecessary.

What is claimed as new is:

1. A balancing toy capable of self-reversing travel along an aerial cable, said toy comprising a peripherally grooved driving wheel adapted for rolling on an aerial cable and having an axle at its axis of rotation, a mounting on said axle, a weighted balancing yoke suspended from said mounting, a support member rockably positioned on said axle, a reversible electric motor supported by said support member and drivingly connected to said wheel, said support member being rockable on said axle between a pair of fixed stops on said mounting which stops are angularly related to the axis of wheel rotation so that said support member is moved by reactive torque against one of said stops when the wheel rotates in one direction and is moved against other of said stops when the wheel rotates in the opposite direction, a current source for said motor, and a reversing switch in circuit with the motor and current source, said switch being supported by said mounting and operatively engageable with travel limiting detents on the aerial cable.

2. The device as defined in claim **1** together with a toy body which includes said support member as a fixed component thereof and is rockable with the support member about said axle within limits set by said pair of stops, and a peripherally grooved idler wheel rotatably journaled on said body in tandem with said driving wheel, said idler wheel being engageable with the aerial cable during rotation of the driving wheel in one direction but being retractable from the cable by rocking movement of said body when the driving wheel is rotated in the opposite direction.

3. The device as defined in claim **2** which is further characterized in that said toy body simulates a vehicle having said driving wheel at the rear and said idler wheel at the front thereof, both of said wheels being engageable with the cable when the vehicle is traveling rearwardly and only the driving wheel being engageable with the cable during forward travel of the vehicle.

4. The device as defined in claim **1** wherein said balancing yoke includes a pair of arms extending downwardly from said mounting and a pair of weight containers provided at the lower ends of said arms, said current source comprising batteries positioned in said containers and assisting to serve as weights for said yoke.

5. The device as defined in claim **4** wherein said arms include electrical conductor means connecting said batteries to said motor and switch.

6. The device as defined in claim **4** together with separable means connecting said arms to said mounting.

7. The device as defined in claim **4** wherein said arms include electrical conductor means connecting said batteries to said motor and switch, and separable means connecting said arms and said conductor means to said mounting.