July 2, 1940. S. NOVE 2,206,750

TOY

Filed Oct. 7, 1939 3 Sheets-Sheet 1

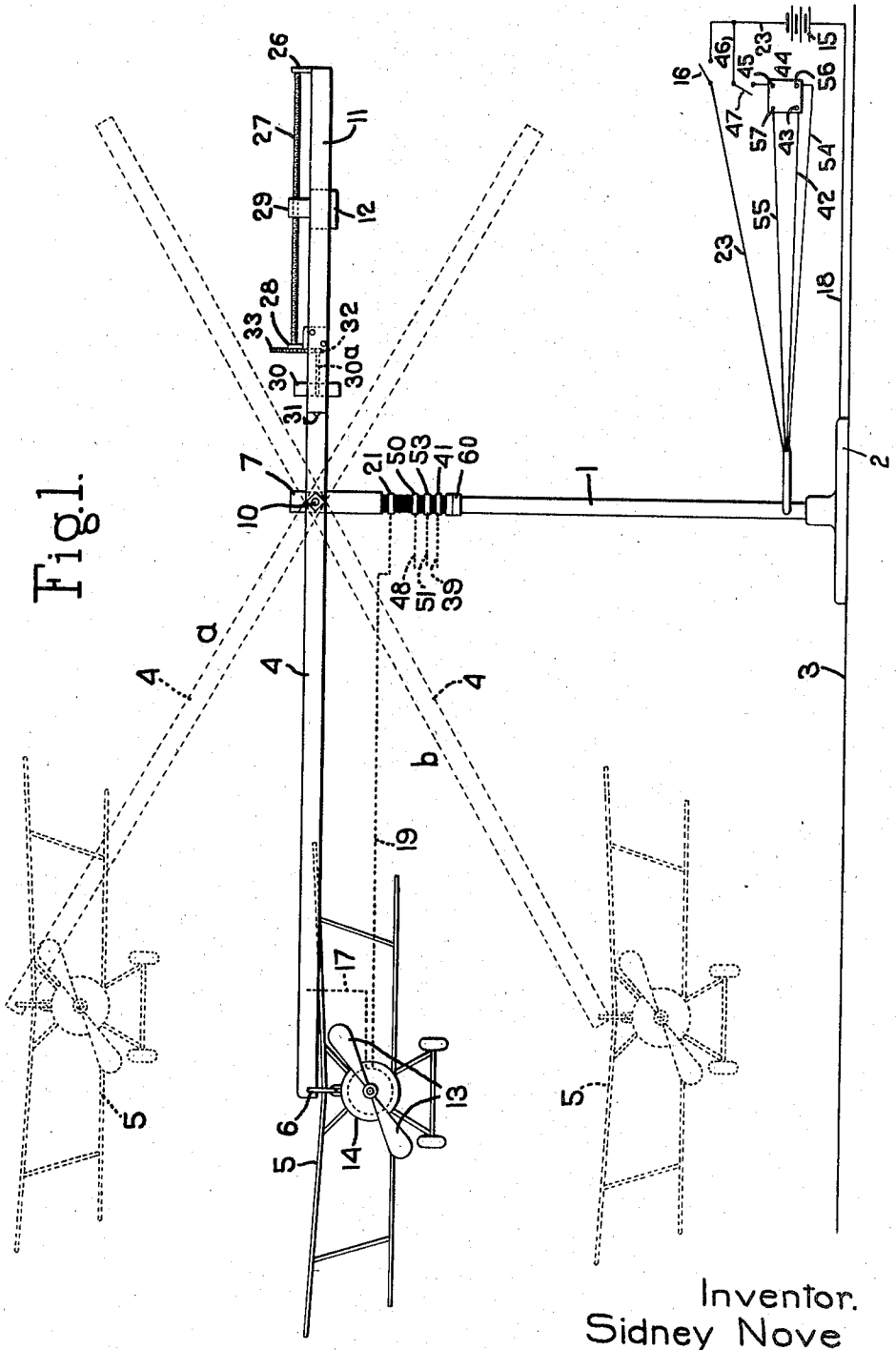


Fig. 1.

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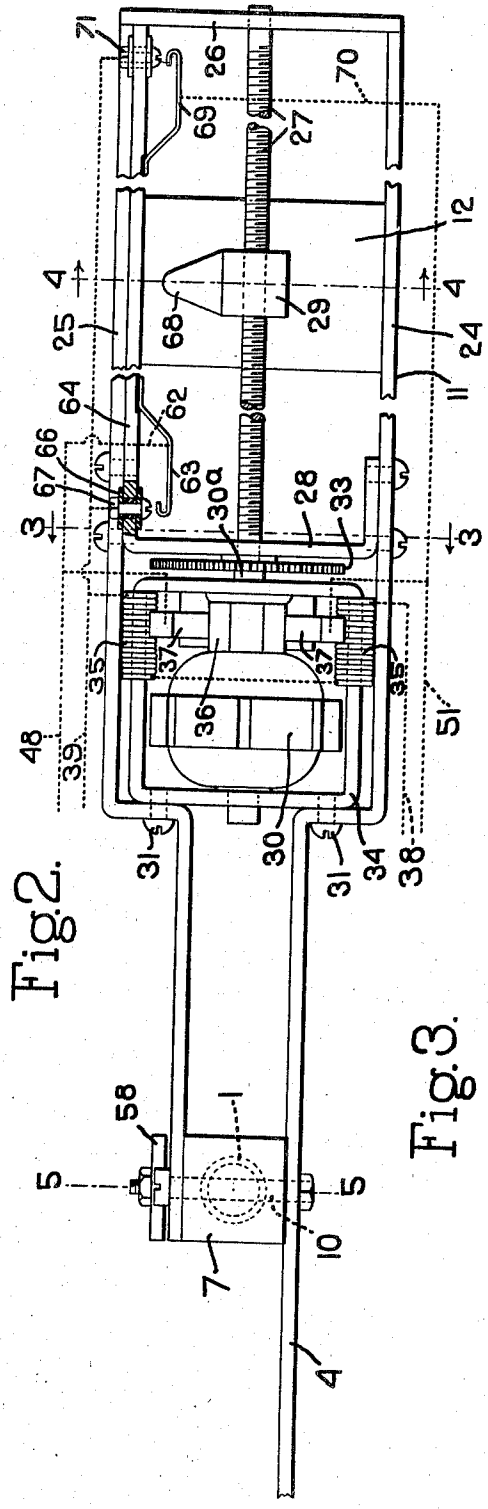


Fig. 2.

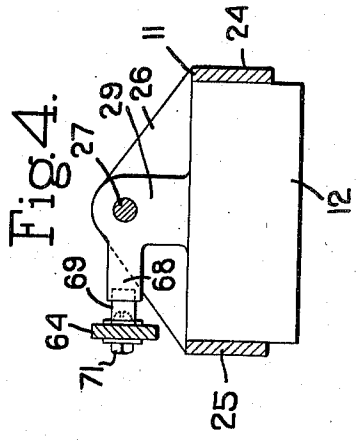


Fig. 4.

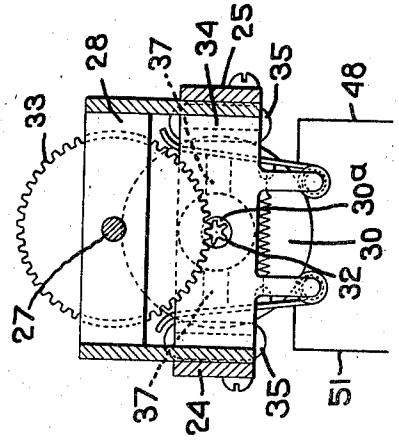


Fig. 3.

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Fig. 5.

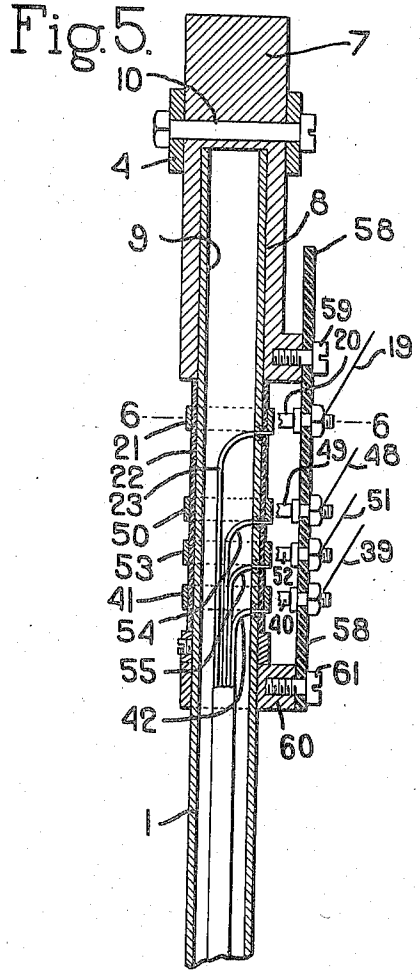


Fig. 6.

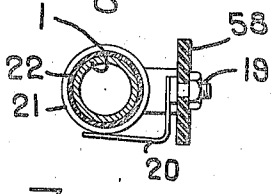
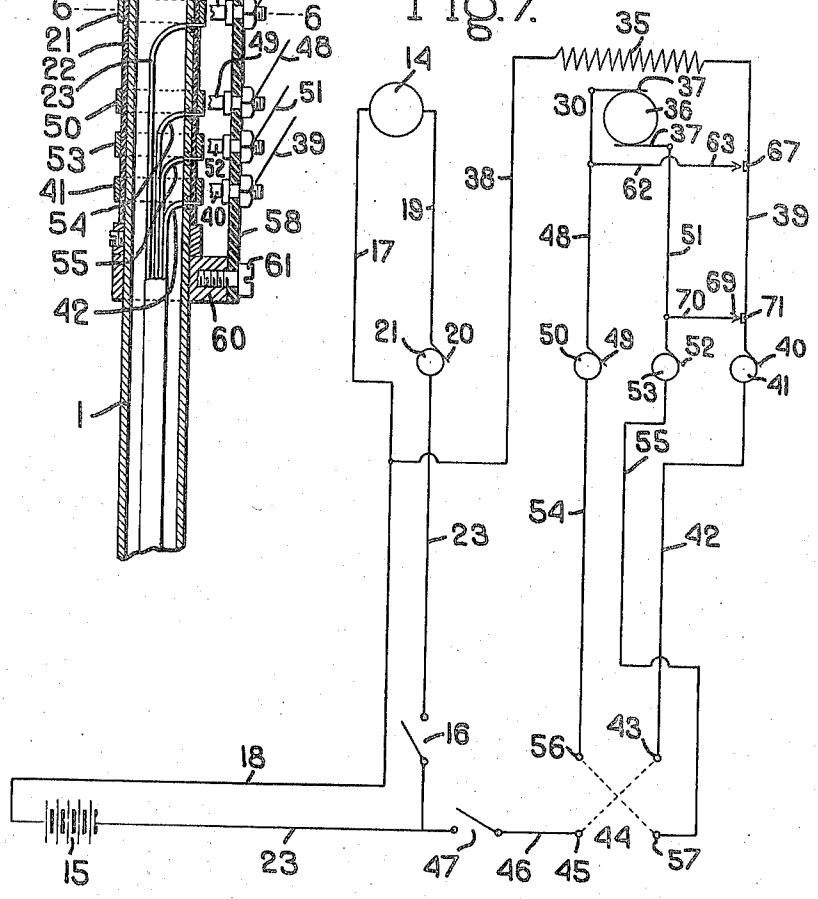


Fig. 7.



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2,206,750

TOY

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Application October 7, 1939, Serial No. 298,378

4 Claims. (Cl. 272—31)

This invention relates to toys, and especially to toys of that type which comprise a mast or post, an arm pivotally mounted on the mast at its upper end to rotate about a vertical axis, and a toy airplane attached to the end of the arm together with means for rotating the arm to cause the airplane to travel in a circular path.

One of the objects of my present invention is to provide a toy of this description in which the airplane is a self-propelled one, that is, one in which the airplane is equipped with a propeller and a motor so that when the motor is operated the operation of the propeller will cause the airplane to move through the air in the circular path determined by the attachment of the airplane to the arm.

Another object of the invention is to provide novel means for swinging the arm about a horizontal axis so as to place the airplane at a higher or a lower elevation.

A further object of the invention is to provide means carried by the arm for varying its position about its horizontal axis, thereby varying the elevation of the airplane from the ground.

A still further object of the invention is to provide a novel device of this character with remote control for the airplane motor and for the means for swinging the arm into different positions about its horizontal axis, so that the person playing with the toy can control the operation and location of the airplane at a point remote from the toy. Other objects of the invention are to provide various improvements in toys of this character as will be more fully hereinafter set forth.

In the drawings:

Fig. 1 is a view of a toy embodying my invention;

Fig. 2 is an enlarged plan view of a portion of the swinging arm carrying the means for swinging it about its horizontal axis;

Fig. 3 is a section on the line 3—3, Fig. 2;

Fig. 4 is a section on the line 4—4, Fig. 2;

Fig. 5 is a section through the upper end of the mast on the line 5—5, Fig. 2;

Fig. 6 is a section on the line 6—6, Fig. 5;

Fig. 7 is a wiring diagram.

Referring first to Fig. 1 of the drawings, 1 indicates a post or mast rising from a suitable base 2 which may be placed on the floor or on a table or any other support 3. This post or mast 1 may be of any desired height.

Mounted on the mast 1 at its upper end is a supporting arm 4 to the end of which is attached a toy airplane 5. The arm 4 is mounted on the mast 1 so that it can turn about the mast as an axis, and so that it can also swing about a horizontal axis, thereby placing the airplane 5 at a higher or a lower elevation. The airplane 5 may be attached to the end of the arm 4 in any suitable way, and I have herein illustrated a link connection 6 by which the airplane is suspended, said link connection permitting the airplane to maintain a horizontal position when the arm 4 is swung upwardly or downwardly into either of the dotted line positions, Fig. 1.

The arm 4 is carried by a head number 7 which is swiveled on the top of the mast 1 as best seen in Fig. 5. This head member 7 is formed at its lower end with an axial recess 8 of a size to fit over the upper end 9 of the mast 1, as shown in Fig. 5, so that said head rests on the upper end of the mast but is freely rotatable thereabout. The arm 4 is pivotally mounted on the head 7 through the medium of a pivot pin 10 which extends through the arm and the head, such pivotal connection permitting the arm to swing from its full line horizontal position, Fig. 1, into either of the dotted line positions in said figure.

The arm 4 is provided with an extension 11 on which is mounted a counterweight 12 of a size to balance the weight of the airplane. This counterweight 12 is adjustable longitudinally of the arm so as to overbalance or underbalance the airplane, thereby providing for swinging the arm into either of its dotted line positions, Fig. 1. If the counterweight 12 is moved outwardly toward the end of the extension 11, then it will overbalance the airplane, thereby carrying the arm 4 into the dotted line position indicated at *a*. On the other hand, if the counterweight 12 is moved toward the mast, then it will underbalance the airplane with the result that the arm 4 will be swung into the dotted line position *b*.

Means which will be presently described, are provided for shifting the counterweight along the extension 11 of the arm 4, into a position to overbalance the airplane or into a position to underbalance said airplane, or into a position where it correctly balances the airplane.

The airplane 5 is equipped with a propeller 13 and an electric motor 14 for operating the propeller. When the motor is in operation, the propeller serves to move the airplane through the air, and since the airplane is attached to the end of the arm 4, such movement will be in a circle. The airplane is thus a self-propelled one which moves under its own power.

I have also provided remote control means for the motor 14 so that the person playing with the

toy can control the operation of the motor at a point distant from the mast 1. The airplane motor 14 is supplied with current from a suitable source of current supply 15 located remote from the toy, and the motor circuit includes a control switch 16 by which said circuit can be closed or opened. Means are also provided for maintaining the circuit intact during the rotation of the arm 4 about the mast 1. In the construction herein illustrated, one side of the motor circuit may be grounded on the arm 1 and mast 4 by means of a circuit wire 17, and the ground side of the circuit is completed by a wire 18 connecting the mast with the source of current supply 15. The other side of the motor circuit includes a wire 19 leading to a brush 20 which is carried by but is insulated from the head 7, said brush having contact with a ring 21 that is fast on the mast 1 but is insulated therefrom by suitable insulation 22. This ring 21 has a wire 23 connected thereto, which wire is located inside the mast 1 and extends through the base and to the source of current supply 15, as indicated in Fig. 1. The motor control switch 16 is shown as being in the wire connection 23.

The brush 20 is shown as mounted on a plate 58 of insulating material which is secured to the head 7 by means of a screw 59. The lower end of the plate 58 is connected by a screw 61 to a collar 60 which is freely rotatable about the mast. The plate 58 and the brush 20 are, therefore, rotated about the mast as the head 7 and arm 4 rotate.

When the switch 16 is closed, the motor 14 will be operated and the action of the propeller will move the airplane forwardly, said plane travelling in a circular or orbital path due to the fact that it is attached to the end of the arm 4. The brush 20 and ring 21 ensure that the motor circuit will be maintained closed when the switch 16 is closed, notwithstanding the rotative movement of the arm 4 about the mast.

I have referred above to the fact that the weight of the plane is counterbalanced by a counterweight 12 which is carried by the extension 11 of the arm 4, and also to the fact that means are provided for shifting the position of the counterweight longitudinally of the arm 4, thereby to overbalance or underbalance the airplane with the result that the arm 4 will swing into either the dotted line position *a* or the dotted line position *b* during its rotative movement. The extension 11 of the arm 4 is in the form of two side rails 24, 25, which are connected at their outer end by a crossrail 26. The side rail 25 extends to the head 7 and is mounted on the pivot pin 10.

The counterweight 12 is situated between said side rails and is supported on a screw-threaded rod 27 which extends from the outer crossrail 26 to an intermediate crossrail 28. The counterweight 12 is provided with an upstanding projection 29 through which the screw-threaded shaft 27 extends and with which it has screw-threaded engagement.

Means are provided for rotating the screw-threaded rod 27 in one direction or the other, such rotative movement serving to shift the position of the counterweight longitudinally of the rod. If it be assumed that when the counterweight is in the position shown in Figs. 1 and 2, said counterweight will just counterbalance the weight of the airplane, then the arm 4 will stand in the horizontal position shown in full lines, Fig. 1. If the screw-threaded shaft 27 is turned in a direction to shift the counterweight outwardly, then said counterweight will overbalance the airplane, thus causing the arm 4 to assume the dotted line position *a*, Fig. 1, but if the screw-threaded shaft 27 is turned to shift the counterweight toward the left, Fig. 2, or toward the mast, then the counterweight will unbalance the airplane and the arm will assume the dotted line position *b*, Fig. 1.

I have provided herein counterweight-shifting means which is carried by the extension 11 of the arm 4 but is controllable from a remote control device situated at a distance from the toy. One form of counterweight-shifting means may be that of a reversible motor 30 which is geared to the shaft 27. This motor 30 is shown as carried by a motor frame 34 which is situated between the side rails 24, 25, and which is secured thereto by means of screws 31. The motor shaft 30*a* has a pinion 32 thereon (see Fig. 3) which meshes with and drives a gear 33 fast on the shaft 27.

As stated above, the motor 30 is a reversible motor so that it may be actuated to rotate the screw-threaded shaft 27 in either direction.

The motor includes the usual field coils 35, commutator 36 and brushes 37.

The complete motor circuit includes a circuit for the field coils 35 and a circuit including the brushes 37. The field coil circuit includes a wire connection 38 which is grounded on the mast 1 or arm 4 and is, therefore, connected to the source of electrical supply 15 through the wire connection 18. The field coil circuit also includes a wire connection 39 leading from the field coils to a brush 40 mounted on the plate 58, said brush 40 engaging a ring 41 carried by the insulating sleeve 22. This ring 41 is connected by a wire connection 42 to the terminal 43 of a reversing switch 44, and said switch is connected to the source of electrical supply 15 by a wire connection 46 which is shown as having a switch 47 therein.

The circuit for the commutator and brushes comprises the wire connection 48 leading from one commutator brush 37 to a brush 49 mounted on the plate 58 of insulating material, said brush engaging a ring 50 carried by the insulating sleeve 22. This ring has a wire connection 54 which extends down through the mast 1 and is connected to the terminal 56 of the reversing switch 44.

The other commutator brush 37 is connected by a wire connection 51 to a brush 52 mounted on the plate 58, said brush 52 engaging a ring 53 carried by the insulating sleeve 22, and said sleeve is connected by a wire 55 that extends down through the mast 1 and leads to the terminal 57 of the reversing switch. The wire connection 46 leads to the terminal 45 of the reversing switch.

If it be assumed that the reversing switch is set so that the terminal 43 is connected to the terminal 57 and terminal 56 is connected to the terminal 45, then when the switch 47 is closed, the motor circuit will include the wire 46, the connection between the terminals 45, 56, the wire 54, ring 50, brush 49, wire 48, the brushes 37 with the armature winding of the motor, the wire 51, brush 52, ring 53, wire 55, the connection between the terminals 57 and 43, wire 42, ring 41, brush 40, wire 39, field winding 35 and wire connection 38 to the arm and mast, and thence by wire 18 to the source of current supply 15. With this circuit closed, the motor will rotate in one direction.

If the reversing switch 44 is turned to establish a connection between the terminals 45 and 57, and between the terminals 43 and 56, then the direction of current through the brushes 37 and armature windings will be reversed, thereby reversing the direction of rotation of the motor.

Hence by closing the switch 47 and by manipulating the reversing switch 44, the counterweight 12 can be shifted in one direction or the other, thereby to overbalance or underbalance the airplane. When the counterweight has been brought into any desired position, the switch 47 may be opened which will render the motor 30 inoperative with the result that the counterweight will remain in the position into which it has been adjusted.

I have also provided herein means whereby when the counterweight 12 has reached the limit of its movement in either direction, the motor 30 will be rendered inoperative and will remain inoperative until the reversing switch has been reversed at which time the motor again becomes operative to shift the counterweight in the opposite direction.

The driving connection between the motor 30 and the counterweight 12 is such that the counterweight will have a relatively slow motor-driven movement so that when the motor 30 is operating, a considerable time will be required to shift the weight from one to the other extreme position. The circuit wire 48 of one of the brushes 37 of the motor is connected by a wire connection 62 to a spring contact 63 which is carried by but insulated from the plate 64 that is secured to the side rails 25. The plate 64 also carries a fixed contact 67 which is insulated therefrom by insulation 66, said contacts 63 and 67 normally being separated. The upstanding portion 29 of the counterweight 12 has a lateral cam extension 68 which engages the contact 63 as the counterweight approaches the left-hand end of its stroke in Figs. 1 and 2. The closing of the contacts 67 and 63 by the cam projection 68 will short circuit the armature winding, thereby cutting this circuit out and rendering the motor inoperative.

Another spring contact 69 similar to the contact 63 is carried by but insulated from the plate 64. This contact 69 is connected by a wire connection 70 to the wire connection 51 leading to the other brush 37 of the motor 30. Cooperating with the insulating contact 69 is a fixed contact 71 that is carried by but insulated from the plate 64.

When the counterweight 12 reaches the outer end of its movement, the cam member 68 will engage the spring contact 69, thereby closing it onto the insulated contact 71, and this will also result in short circuiting the armature circuit of the motor 30, thereby rendering the motor inoperative.

When the motor has been thus rendered inoperative by the movement of the counterweight as it approaches either end of its stroke, said motor can be again rendered operative by reversing the switch 44. This is illustrated in the wiring diagram in Fig. 7.

If it be assumed that the reversing switch 44 is set so as to connect the contact 57 with the contact 43, and the contact 45 with the contact 56, and that both contacts 63 and 69 are separated from their corresponding stationary contacts 67 and 71, as shown in Fig. 2, then upon closing the switch 47, the motor 30 will operate to shift the counterweight 12 in one direction or the other. If it be assumed that the movement of the counterweight is toward the left in Fig. 2, then when the cam projection 68 engages the spring contact 63 and closes it onto the stationary contact 67, the armature circuit will be short-circuited, the current passing through the field coil 35 only of the motor. This will result in stopping the motor, as will be obvious.

If, now, the reversing switch 44 is reversed so as to connect the contact 45 with the contact 57 and the contact 56 with the contact 43, then an operative circuit will be established through both the armature windings and the field windings of the motor 30, but in a direction to cause a reversal of the motor, thereby producing a movement of the counterweight 12 toward the right, in Fig. 1. As soon as the cam 68 has been carried off from the spring contact 63, the circuit connection 62 will be opened, but the circuit connection through the armature will still be closed through the reversing switch so that the motor will continue to operate until the switch 47 is opened or until the counterweight reaches the right-hand end of its travel in Figs. 1 and 2. As the counterweight does thus reach the right-hand end of its travel, the cam 68 will close the contact 69 onto the contact 71, thereby short-circuiting the armature winding and bring the motor to rest.

Another reversal of the reversing switch to bring it into its initial position will again establish a circuit through an armature winding and thus set the motor in operation.

The reversing switch 44 and the switches 16 and 47 may be placed at any point remote from the toy and, therefore, the person who is playing with the toy can control the movement of the airplane as to its travel in its orbital path and as to its elevation, by simply manipulating the switches 16, 47 and 44 from a distant point.

I claim:

1. A toy comprising a mast, an arm mounted thereon to rotate about a vertical axis and also to turn about a horizontal axis, an airplane suspended from the end of the arm, means controllable from a point remote from the mast to rotate the arm about its vertical axis, a counterweight carried by the arm for balancing the weight of the airplane, a reversible electric motor mounted on the arm and having a field circuit and an armature circuit, means actuated by said motor for shifting the counterweight on the arm in one direction or the other to cause it to overbalance or underbalance the airplane, a reversing switch remote from the mast for controlling the reversible motor, and means actuated by the movement of the counterweight as it reaches the end of its travel in either direction to short circuit the armature circuit and thus render said reversible motor inoperative.

2. A toy comprising a mast, an arm mounted thereon to rotate about a vertical axis and also to turn about a horizontal axis, an airplane suspended from the end of the arm, means controllable from a point remote from the mast to rotate the arm about its vertical axis, a screw extending longitudinally of the arm, a counterweight having screw-threaded engagement with said screw, a reversible motor connected to the screw to rotate the same, said motor having a field circuit and an armature circuit, a reversing switch remote from the mast for controlling the reversible motor and means to short circuit the armature circuit by the movement of the counterweight as it reaches the end of its travel in

either direction, thereby to render the reversible motor inoperative.

3. A toy comprising a mast, an arm mounted thereon to rotate about a vertical axis and also to turn about a horizontal axis, an airplane suspended from one end of said arm, said arm having a pair of parallel guide rails, a screw extending longitudinally of said arm and parallel to the guide rails, a counterweight operating between said guide rails and having screw-threaded engagement with said screws, a reversible motor carried by said arm for rotating the screw, and thereby moving the counterweight longitudinally of the arm, said counterweight being guided in its movement by said guide rails, means remote from the mast for controlling the operation of the reversible motor, and means actuated by the movement of the counterweight as it reaches the end of its travel in either direction to render the reversible motor inoperative.

4. A toy comprising a hollow mast, a head mounted on said mast for turning movement thereabout, said head having in its underside an axial bore in which the upper end of the mast is received, an arm pivoted to said head to turn about a horizontal axis, an airplane suspended from one end of said arm and having a motor and a propellor actuated thereby, a sleeve of insulating material carried by said mast immediately below the head, contact rings mounted on the sleeve, a plate of insulating material secured to said head and depending therefrom, a plurality of brushes carried by said plate and engaging said contact rings, a counterweight on the arm for counterbalancing the weight of the airplane, a reversible motor also carried by said arm for shifting the counterweight, a control switch remote from the mast, circuit connections between said motors and said brushes, and other circuit connections between said contact rings and the control switch, said latter circuit connections having portions located within the mast.

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