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[54] **AIRCRAFT, BATTERY AND BATTERY-CARRYING MEANS, WHEREIN THE CONDUCTIVE WIRES SERVE AS MANIPULATING WIRES**
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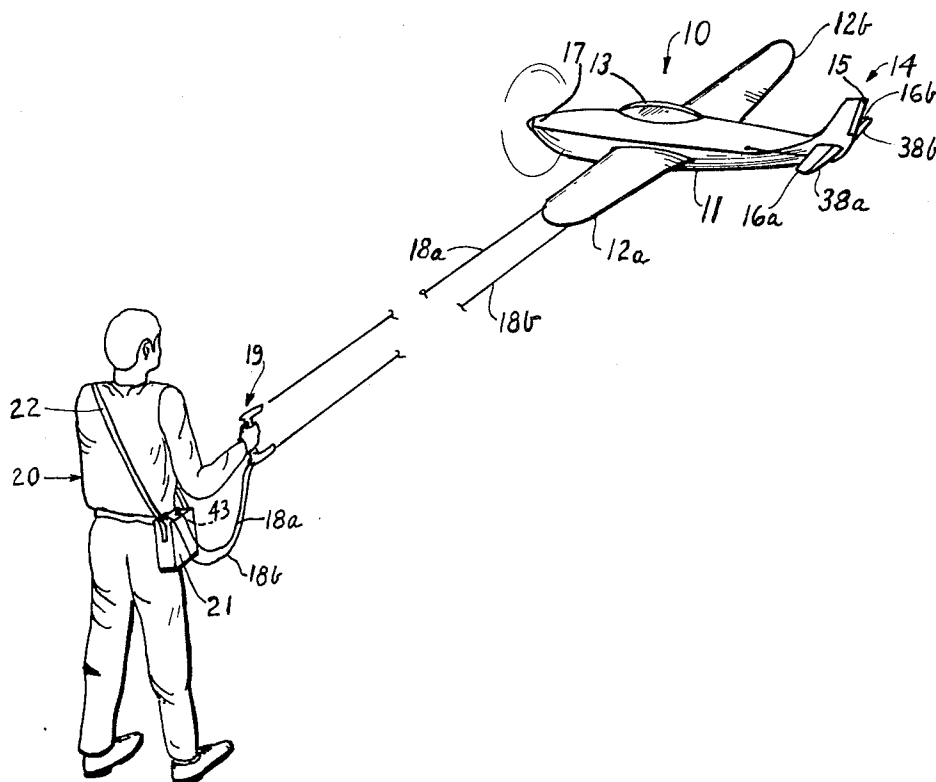
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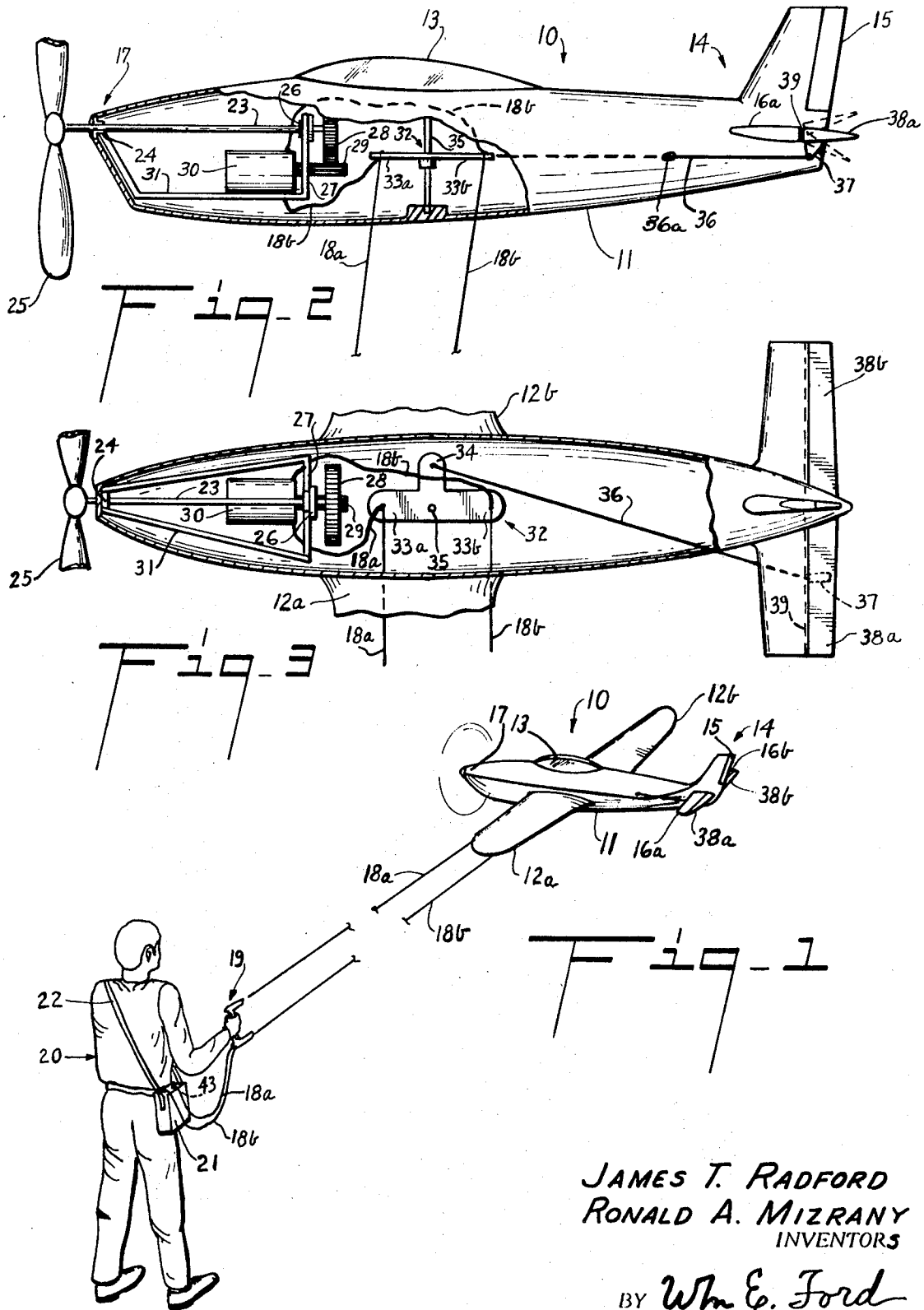
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ABSTRACT: A fractional horse power motor in a toy aircraft has slack conductive wires therefrom connected to opposite ends of the crossarm of a pivotally mounted bellcrank with its short arm connected to control the elevator. From the crossarm the wires extend for operative distance to a handle, including a switch and thence to a battery housed in a case having a shoulder strap. A single operator needs only to hold the handle and to carry the power source, as a battery, at which the wires terminate; thus pressing the switch drives the engine and manipulating the wires for bellcrank movement controls flight elevation.

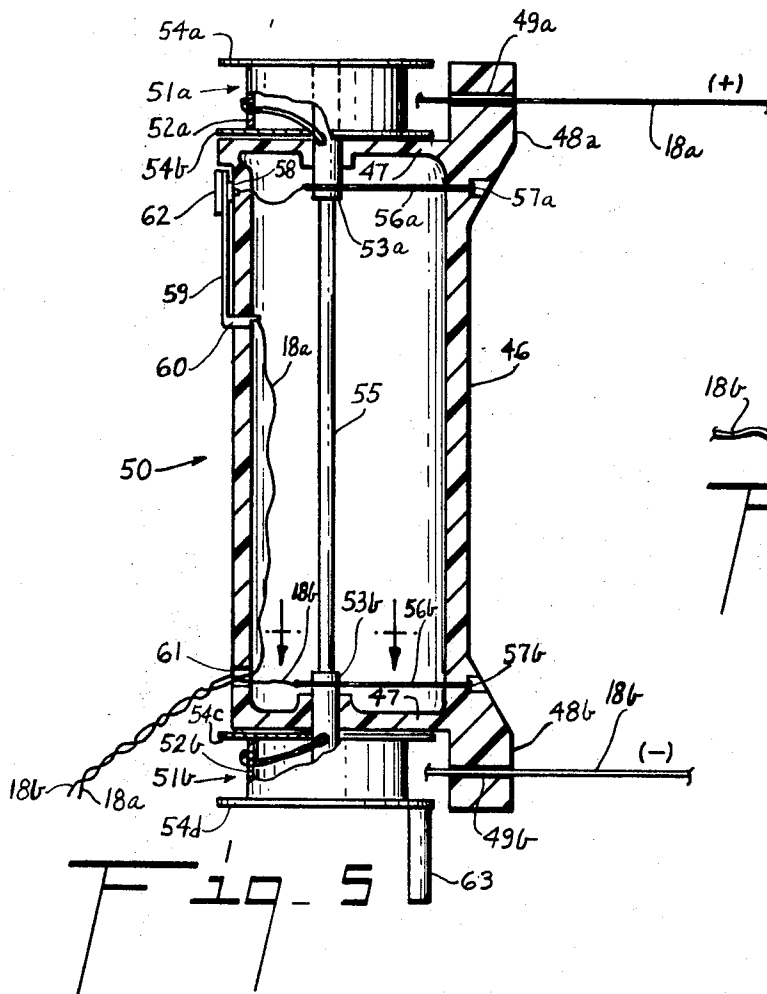
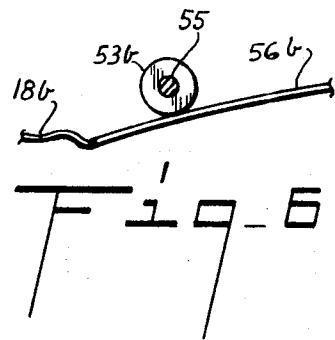
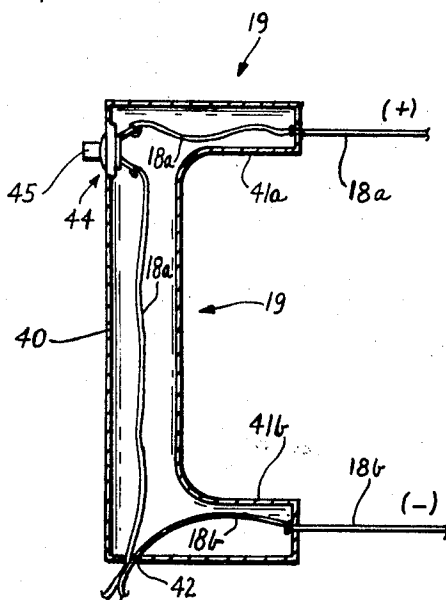
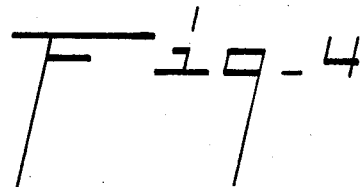




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AIRCRAFT, BATTERY AND BATTERY-CARRYING MEANS, WHEREIN THE CONDUCTIVE WIRES SERVE AS MANIPULATING WIRES

The invention relates to a toy aircraft controllable by a single operator to actuate fractional horsepower electric motor drive of the aircraft and to manipulate a bellcrank for elevator actuation to control flight elevation; conductive wires from the motor extending with slack to the bellcrank crossarm ends and thence to a handle with switch; the operator carrying the power (battery) to drive the motor; pressing the handle switch to close the motor circuit, and manipulating the wires to control flight elevation.

It is thus a primary object of this invention to provide a safe toy aircraft of this class which is electrically powered and easily remotely controllable to comprise a light training craft for operators in advancing to flying more complex and dangerous types powered by other means.

It is also an important object of the invention to provide a toy aircraft of this class which is more readily started and landed than the heavier, more complex and dangerous types which offer less accessible restrictions on flight time.

It is another important object of the invention to provide an easily manipulated, self-propelled toy aircraft of this class which eliminates the necessity of the assistant required in flying the heavier, more complex, and dangerous types of toy craft.

It is still another object of the invention to provide a toy aircraft of this type having exclusive starting, elevation control, and landing control features not encountered in heavier, more complex, and conventional types.

It is a further object of the invention to provide a toy aircraft of this type which is adapted to operate at a nonobjectionable low noise level.

It is also a further object of the invention to provide a toy aircraft of this type that is positive in operation and not susceptible to uncontrolled stoppage.

It is still a further object of the invention to provide a toy aircraft of this type which is powered from a remote source of electric power controllable at the handle which also permits unrestricted flight control manipulation.

Other and further objects will be apparent when the specification is considered in connection with the drawings in which:

FIG. 1 is a perspective view showing a toy aircraft comprising an embodiment of the invention in self-propelled flight as the conductive wires or bridle lines thereto are held by an operator;

FIG. 2 is a side elevational view of the toy aircraft shown in FIG. 1, to a larger scale, and shown part in section to illustrate operative features;

FIG. 3 is a plan view of the toy aircraft shown in FIGS. 1 and 2, and also shown part-in-section better to illustrate operative features;

FIG. 4 is a side sectional elevational view of the manipulating handle shown in FIG. 1;

FIG. 5 is a modification of the handle shown in FIGS. 1 and 4; and

FIG. 6 is a sectional view taken along line 6-6 of FIG. 5 to show a structure for maintaining electrical connection.

Referring now in detail to the drawings in which like reference numerals are assigned to like elements in the various views, a toy aircraft 10 is shown in FIG. 1 of conventional construction as to fuselage 11, wings 12a, 12b, dome 13, tail 14 including vertical stabilizer 15, horizontal stabilizer 16a, 16b, and elevator 38a, 38b. Also, from the nose 17 of the fuselage there extends the propeller shaft on which the propeller blade means is mounted, as indicated by the diagrammatic circle of revolution. Two insulated electrical conductor wires 18a, 18b extend outwardly from beneath the left wing 12a to a handle 19 held by an operator 20, the wires 18a, 18b extending with slack to a storage battery, not shown in FIG. 1, but carried in a case 21 suspended from the left shoulder of the operator by a strap 22.

As shown in greater detail in FIGS. 2 and 3, the propeller shaft 23 extends outwardly through a bearing or journal 24 in

the nose 17, and has the propeller blade 25 mounted on the outer end thereof. The rear end of the shaft 23 passes through a journal or bearing 26 mounted in a crossmember or plate 27 across the fuselage 11. A spur gear 28 is mounted on the rear end of the shaft 23 to mesh with the rear or pinion forming end of a motor shaft 29 provided by a fractional horsepower motor 30 mounted on a frame 31 within the fuselage 11 below the propeller or drive shaft 23. Thus the motor shaft 29 has spur teeth formed therein whereby it has status as a pinion.

A bellcrank 32 comprising a crossarm 33a, 33b and an intersecting central or short arm 34, is mounted on a pivot pin 35 which upstands from the fuselage centrally thereof and intersects the bellcrank along the axis of its short arm 34. The bellcrank 32 has the forward end of a stiff wire, rigid rod, or bar 36 pivotally connected to the short arm end opposite the crossarm 34, while the bar or rod 36 extends through an opening 36a in the port side fuselage 11, as best shown in FIG. 2, and also as indicated in FIG. 3, the rear end of the bar 36 is pivotally connected to a bracket 37 which extends downwardly from the elevator 38a. The elevator 38a, 38b is hingedly connected to the horizontal stabilizer 16a, 16b, by means of a hinge pin 39 as indicated diagrammatically in FIG. 2.

Conductor means are provided from the motor to a battery, which include wires 18a, 18b, and connections in the handle such as shown in FIGS. 4-6. The insulated, conductive wires 18a, 18b which carry current to the opposite sides of the motor 30, are provided with enough slack in extending for connection to the opposite ends of the crossarm 38a, 38b that not all slack is taken up in the wire 18a when the bellcrank 32 is pivoted to farthest leftward travel, and so that not all slack is taken up in the wire 18b when the bellcrank 32 is pivoted to farthest rightward travel, as visualized in FIG. 3, and as will be understood from the context hereinbelow.

From the connections to the crossarm 33a, 33b the conductive wires 18a, 18b extend to the handle 19, preferably of plastic. The wires 18a, 18b to the craft are connected or anchored in the projections 41a, 41b, which extend substantially normal to, or perpendicularly from, the opposed ends of the hand grasp 40. From its anchorage with the projection 41b the negative wire 18b extends within such projection on and outwardly through a hole 42 in the handle 17 to a storage battery 43 therein; such battery being indicated as located within the case 21 by the use of the reference numeral 43 with a dotted line lead line thereto.

The positive conductor wire 18a is connected into the handle projection 41a and anchored therein, and continues from the point of anchorage with slack to a normally open switch 44, which includes a pushbutton 45, which may be pushed inwardly against spring pressure, as by thumb contact, to close circuit with the initial part of the positive conductor wire 18a, which extends with slack through the hole or opening 42 to the positive terminal of the storage battery 43.

An alternative, plastic handle construction 50 is shown in FIGS. 5 and 6, which includes a cylindrical handle 46 with closed ends 47, and with guide lugs 48a, 48b being provided at the opposite ends of the handle cylinder or body 46 having guide bores 44a, 49b therethrough to guidably receive the insulated conductor wires 18a, 18b which extend to the aircraft 10. These wires 18a, 18b are wound on respective reels 51a, 51b with ends of the wires passing inwardly through the drums 52a, 52b of the reels to be affixed or anchored to metallic sleeves 53a, 53b to which the reel flanges 54a, 54b of reel 51a, and the reel flanges 54c, 54d of reel 51b, are respectively anchored. A nonconductive shaft 55, as of plastic, is inserted through the sleeves 53a, 53b in manner to connect the reels 51a and 51b to rotate together.

Wire springs 56a, 56b have fixed ends 57a, 57b anchored to the body or cylinder 46, and such springs are so tensioned that they bear with some pressure upon the respective sleeves 53a, 53b so that the arrangement of sleeves and wire springs is tantamount to a slip ring construction. As shown in FIG. 6, the

wire spring 56b has a conductor wire 18b connected to the free end thereof which extends with slack through a hole 61 in the wall of the handle cylinder 46 and with slack to the negative terminal of the battery 43.

The wire spring 53a has a conductor wire 18a connected to the free end thereof which extends with slack to a fixedly positioned contact 58 anchored or moulded into the wall of the handle body or cylinder 46. A leaf spring 59 has its base 60 anchored in the cylinder wall at a spaced distance from the contact 58 and outwardly of the cylinder the leaf spring 59 extends oppositely of the contact 58 and is tensioned normally to extend free thereof. A button 62 is provided on the outer surface of the free end of the leaf spring 59 to be pressed, as by the thumb of the operator, to move the leaf spring 59 into circuit closing contact with the contact 58. Circuit from the battery 43 is completed to the leaf spring 59 by an insulated conductor wire 18a which extends from the positive terminal of the battery 43, with slack, to the opening 61 into the handle 50, and thence with slack to the inner end of the leaf spring base 60, to which it is affixed. Thus, when the button 62 is pressed, circuit is closed to the motor 30, whether the reels 51a, 51b are rotated or whether a lever handle 63 on the reel flange 54 of the reel 51b is rotated, or whether the reels 51a, 51b are not moved.

The invention combines two functions in providing wires 18a, 18b to conduct electromotive power from the vicinity of the operator who has complete control of motor movement through the handle switch, and full control of elevation of flight through manipulating the wires 18a, 18b to actuate bellcrank movement. The wires 18a, 18b are enabled to carry out these two functions by the ingenuity involved in anchoring the wires to the ends of the bellcrank crossarm and then carrying them on, with slack, to the motor.

We claim:

1. A controllable toy aircraft self-propelled by a fractional horsepower electric motor disposed forwardly in the fuselage of the aircraft and including bow blade means, transmission means interposed between the motor and said blade means to transmit motor drive thereto, transversely extending elevator means parallel with, and rearwardly of, the aircraft horizontal stabilizer and hingedly connected thereto, a single central short arm bellcrank rearwardly of said motor and substantially amidship the fuselage, pivot means upstanding from the fuselage to mount said bellcrank at its axes intersection to extend normally in horizontal plane and with the short arm axis normally transverse the fuselage, a rigid member with ends pivotally connected, respectively, to the free end of said short arm and passing through an opening in the fuselage outwardly to the elevator at a spaced distance from the hinge connec-

tions, conductor means including a pair of flexible electrical conductive wires extending continuously within the fuselage from said motor with slack and connected to the respective longitudinally spaced apart ends of the bellcrank crossarm, and thence extending outwardly from the aircraft to be manipulated by an operator, a storage battery as the source of electrical power to which said conductor means are connected, a case therefor, a shoulder strap on the case for carriage by the operator, a handle to which said wires extending from said aircraft are mechanically connected and to which at least one of same is electrically connected, said conductor means including electric wires extending sufficiently between said handle and battery to provide slack therebetween when the device is in use, said short arm axis swinging back and forth, fore and aft of a substantially amidship transverse axis to move said rigid member in elevator adjustment responsive to operator manipulation of said conductive wires.

2. A toy aircraft as claimed in claim 1 in which said handle includes a hand grasp and projections transversely from the ends of the hand grasp at which said wires extending from said aircraft are connected, respectively, as aforesaid.

3. A toy aircraft as claimed in claim 1 in which said handle mounts a reel at each end thereof on which the respective wires extending from said aircraft and connected to said handle may be wound, said reels including a lever handle and means connecting said reels to be turned together, thus to roll up the wires to facilitate taking up the aircraft for transport, and storage.

4. A toy aircraft as claimed in claim 1 in which the slack in the respective wires between said motor and bellcrank is of greater lengths than the respective changes in distance between the points of connection to crossarm in furthest left and furthest right positions.

5. A toy aircraft as claimed in claim 1 in which said connection between bellcrank and elevator comprises a rigid rod, the rear pivotal connection thereof being to a bracket provided on the underside of the horizontal stabilizer.

6. A toy aircraft as claimed in claim 1 in which said transmission means includes a drive shaft which is journaled forwardly in the nose of the craft and having the blade means mounted on the outer end thereof, and in which said drive shaft is journaled rearwardly in journal means mounted on a fuselage crossmember and has a gear on the rear end of the drive shaft to the rear of said crossmember, said motor having a pinion mounted on the shaft thereof and meshing with said gear.

7. A toy aircraft as claimed in claim 1 in which said handle includes a pushbutton type switch therein as a part of said conductor means, to close circuit from said storage battery.

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