April 20, 1954 L. T. SMITH 2,676,014

REMOTELY CONTROLLED AIRCRAFT SIMULATING ROUNDABOUT TOY

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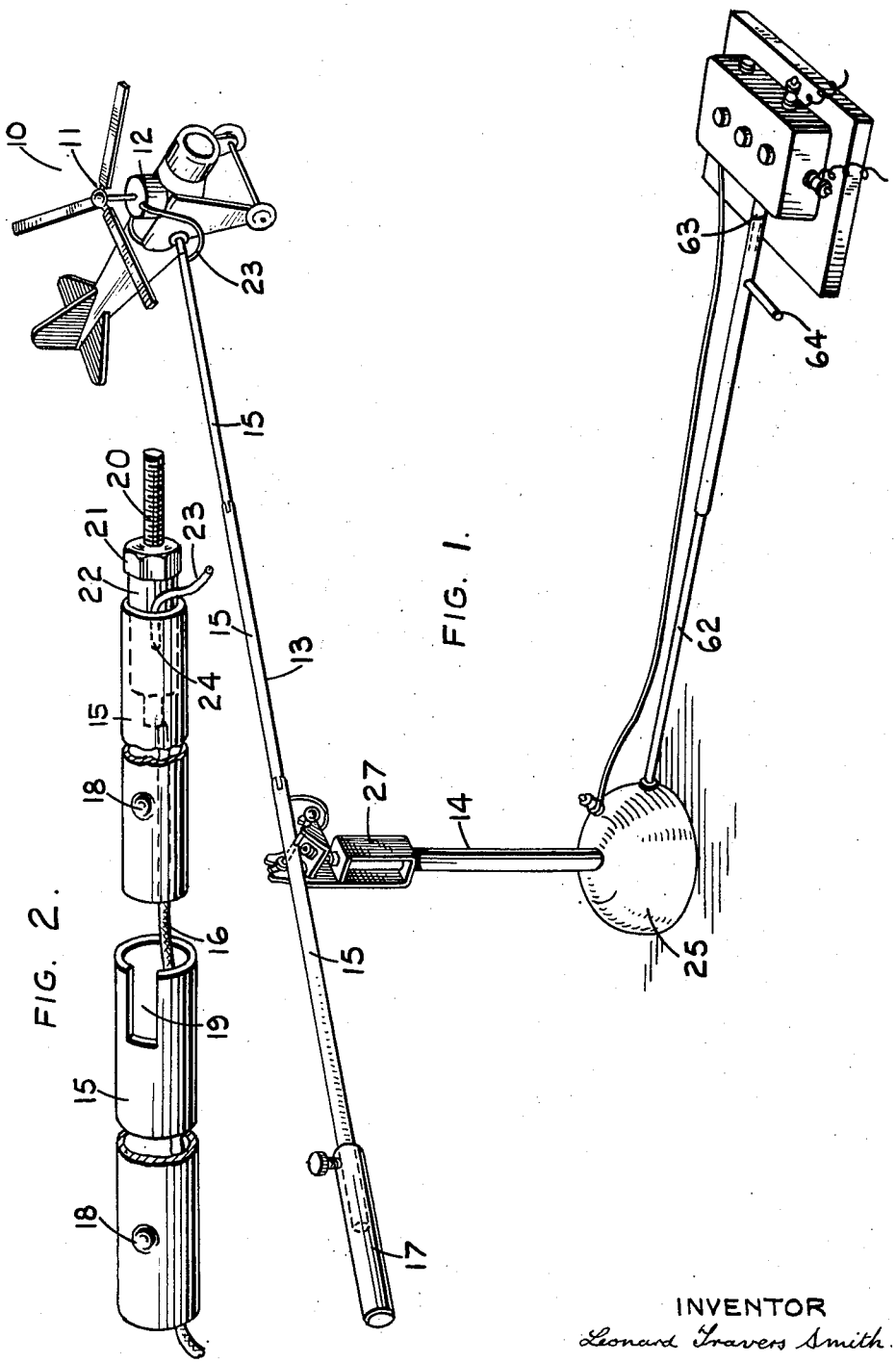


FIG. 1.

FIG. 2.

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FIG. 3.

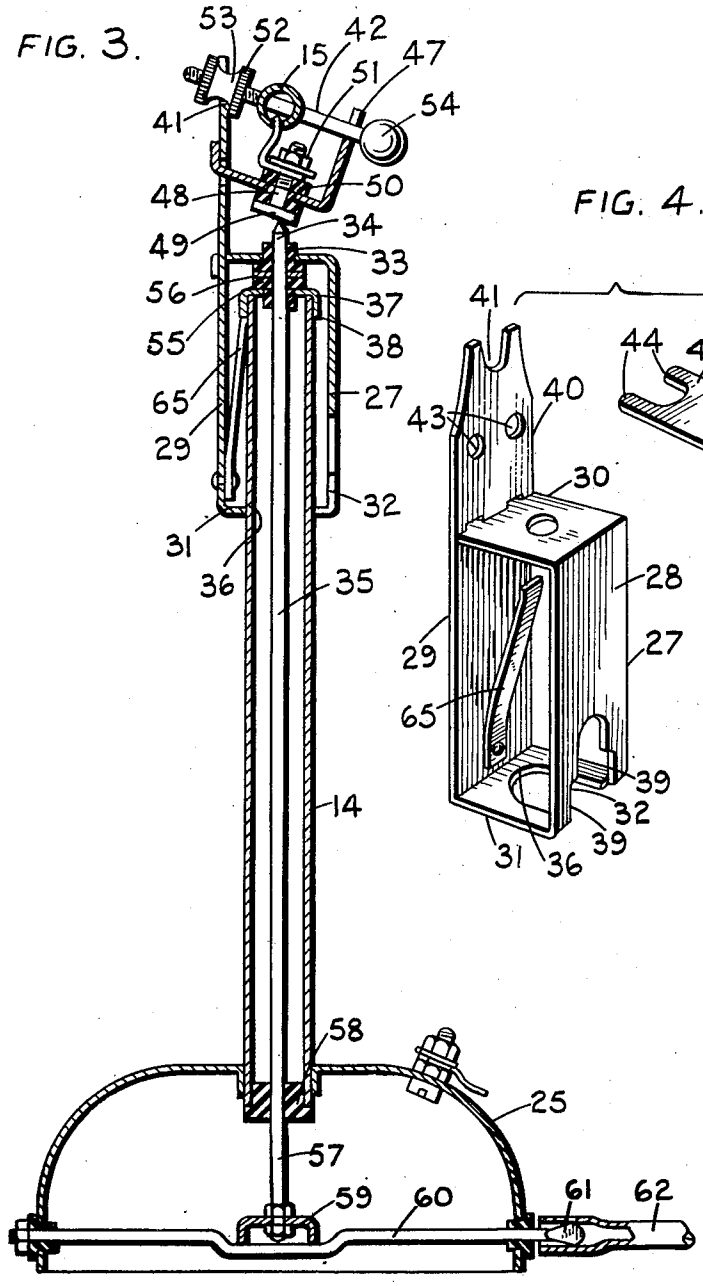


FIG. 4.

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UNITED STATES PATENT OFFICE

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REMOTELY CONTROLLED AIRCRAFT SIMULATING ROUNDABOUT TOY

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Application February 5, 1952, Serial No. 269,942

2 Claims. (Cl. 272—31)

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The present invention relates to toys of the kind which include a captive flying model usually of an aircraft.

More particularly the invention relates to a helicopter toy of the kind in which a model helicopter is supported from the upper end of the pedestal in laterally spaced relation thereto with freedom to move vertically and horizontally around a circular path concentric with the pedestal.

One object of the invention is to provide improved means for connecting the model helicopter to the pedestal whereby the angular relationship existing between an upwardly extending propeller shaft axis and the true vertical direction may be controllably varied by rocking the model helicopter bodily.

A further object of the invention is to provide on the pedestal an improved supporting unit for a radially extending arm which carries the model helicopter at its outer end, such supporting unit including releasable latch means for normally restraining the supporting unit against upward removal from the pedestal during operation of the toy whilst permitting the supporting unit to be removed when desired.

Yet another object of the invention is to provide in a supporting unit of the kind above referred to a hinge plate rockably mounted on a frame for rocking movement about a horizontal axis, the frame itself being rotatable about the vertical axis of the pedestal.

The invention will now be described with reference to the accompanying drawings illustrating by way of example a preferred embodiment thereof.

Referring to the drawings:

Figure 1 is a perspective view of a toy constructed in accordance with the invention;

Figure 2 is a fragmentary view in perspective and on an enlarged scale showing portions of the sectional radial arm supporting the model in the position in which the sections of this arm are disassembled from each other;

Figure 3 is a view in side elevation and in cross section showing in detail the construction of the pedestal and the mechanism for tilting the arm and the axis of rotation of the lifting propeller; and

Figure 4 is an exploded view in perspective showing the construction of the rotatable supporting unit for the arm.

The model itself, indicated generally at 10 (Figure 1) is of an aircraft of the auto-gyro or helicopter type incorporating a lifting propeller 11

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having, for example, three blades of substantial area, for instance each measuring 2 to 3 inches in length and ¼ to ½ an inch wide, and mounted directly on the spindle of a small electric motor 12 secured to the fuselage of the model.

The model is secured to the end of an arm 13 which renders the model captive with respect to the pedestal 14, this arm being preferably formed of a plurality of lengths 15 of aluminium tube, adjacent end portions of which fit telescopically within each other so that when assembled the arm is of considerable length but is capable of disassembly into its component sections, which can then be folded or laid side by side to facilitate packaging of the toy.

That part of the arm which extends between the pedestal and the model has an insulated electric conductor 16 passing through it, and consequently the sections comprising this part of the arm cannot be completely separated, although they are structurally separate, but are, owing to the flexibility of the conductor, foldable side by side. The portion of the arm extending on the side of the pedestal remote from the model which serves to support a counterbalance weight 17, adjustable endwise along the arm, can be detached completely for packaging purposes.

In order to prevent rotation of the various sections of the arm relatively to each other about an axis coincident with the centre line of the arm, these sections may either be formed of tube of non-circular cross section or, as illustrated, at the joint between the various sections means for preventing relative rotation may be incorporated, such as transverse projections 18 on one section engaging in open-ended slots 19 in the companion section extending parallel to the length thereof.

The end portion of the arm has a threaded brass rod 20 entering into it, this rod projecting for a short distance beyond the end of the arm and being provided with a pair of clamping nuts, one of which is seen at 21, and suitable washers, so that it may be passed through an opening in the fuselage of the model and secured thereto.

The threaded rod is electrically insulated from the tubular arm by means of a sleeve or bush 22 of insulating material interposed between the internal walls of the tube and the rod.

The rod forms a terminal or connector for the insulated conductor 16 passing down the tube, and is of course in electrical communication with the fuselage of the model, to which also is connected one of the motor terminals.

Connection between the other motor terminal and the tubular arm itself is effected by a short length of insulated wire 23 extending from the motor terminal to the end of the tubular rod, and having a bared end 24 which is inserted between the outer face of the insulating bush or sleeve and the inner wall of the tube.

Having been inserted in this position the outer face of the end portion of the tube may be crimped by subjecting it to lateral pressure so as to form one or more pairs of ribs (not shown) and generally contract the internal diameter of the tube whereby it is caused to exercise a very tight grip upon the bared end of the wire, the insulating bush or sleeve and the threaded brass rod disposed within it.

The pedestal comprises a hollow base 25 of domed formation in the centre of which is secured an upwardly-extending tubular column upon the upper end of which is carried a supporting unit for the radially-extending arm 13.

This supporting unit comprises a frame 27 (Figure 4) formed of strip metal, the members of the frame being arranged in generally rectangular formation and including opposed parallel side members 28, 29 connected at their ends respectively by an upper member 30 and a base member 31.

The base member is pierced or cut away, as at 32, to permit the frame to be fitted over the upper portion of the upwardly-extending column of the pedestal, the diameter of the opening in the base member of the frame corresponding with that of the external diameter of the column, and the upper member of the frame having fitted therein an insulating bush 33, through which bush extends the upper end 34 of a control rod 35 which projects from the upper end of the column so that the frame is supported at the upper end of the column for rotation about a vertical axis coincident with the centre line of the control rod, alignment of the side members of the frame with this axis being maintained by the engagement of the column with the walls 36 of the opening in the base member of the frame.

The upper end of the column is closed by an inverted brass cap 37, the downwardly-directed peripheral flange 38 of which embraces the outer surface of the column and thus presents at this position a somewhat larger diameter than is presented by the remaining portions of the column.

In order to avoid enlarging the opening in the base member of the frame to an unwanted degree to enable the frame to be fitted over the upper end of the column when the cap is in position, the opening in the base member is of slotted form, one end of the slot terminating with a semicircular wall 36, whilst the other end of the slot extends to the lower portion of the side member 28 of the frame, and is there enlarged in width, as seen at 39, to the diameter of the cap 37, so that the frame may be applied over the upper end of the column by utilising this enlarged portion of the slot.

The side member 29 of the frame is extended upwardly, as at 40, beyond the upper member 30 and its upper edge is provided with an open-ended slot 41 forming the journal bearing for a transverse pivot pin 42 upon which the radially-extending arm is mounted.

At a position spaced vertically below the open slot, the upward extension 40 has a pair of openings 43 spaced horizontally apart for the reception of correspondingly spaced lugs 44 extending from one end of a hinge plate 45.

The other end of the hinge plate has an upturned portion or flange 46, the upper edge of which is also provided with an open-ended slot 47 forming a journal bearing for the other end of said transverse pivot pin.

The base portion of the hinge plate has secured thereto an inverted brass stud 48 the head 49 of which is directed downwardly and the stem of which passes through an opening in the base of the hinge plate, but is electrically insulated therefrom by the provision of a suitable insulating bush 50 carried on the stem. The upper end of the stem is screwthreaded for the reception of a securing nut 51 serving to retain the stud in position and to provide for electrical connection referred to later.

The position which is taken up by the hinge plate is determined by the engagement of head 49 with the upper end of the control rod, the hinge plate pivoting about an axis coincident with the entry of the spaced lugs 44 into the spaced openings 43 of the extension 40. The pivot pin 42 may be secured to the radially-extending arm in any suitable manner, for example it may be a force fit. One end of the pivot pin is provided with a bearing nut 52 having a suitable peripheral groove 53, the base of which engages the edges of the open-ended slot 41, whilst the other end of the pivot pin rests in the slot 47. The hinge pin has a suitable weight 54 for ensuring that the hinge plate always remains pressed downwardly with its stud in contact with the upper end of the control rod.

Referring now to the control rod itself, the upper end of this is supported in an insulating bush 55 extending through the opening provided in the cap at the upper end of the column and, as previously described, that part of the control rod which projects from the upper end of the column passes through a similar bush fitted in an opening in the upper member of the frame, these two bushes being separated by a metal washer 56 on the control rod to reduce the frictional resistance to pivotal movement of the frame about the axis of the control rod which might be occasioned through the direct engagement of the two bushes.

Near its lower end 57 the control rod is guided for endwise movement by passage through an opening in an internal bush 58 at the lower end of the column, and the lower end of the control rod projects downwardly into the base of the pedestal.

The lower end of the control rod is screwthreaded and has secured thereto an inverted brass cap 59, the downwardly-directed flanges of which engage a cranked rotary lifter member 60, the ends of which are journalled in bearing openings formed in the substantially vertical side walls of the base.

Thus, rotation of the lifter member, by virtue of the fact that its crank engages the cap at the lower end of the control rod, causes endwise movement of the latter and consequent relative movement between the frame and the hinge plate of the support unit. As a result one of the journal bearings of the transverse pivot pin is raised or lowered relatively to the other, and the radially-extending arm is tilted about an axis parallel to its length passing through the journal bearing formed by the open-ended slot in the upper extension of the frame.

In order to effect this rocking or tilting move-

ment from a position remote from the base of the pedestal, one end of the cranked control element is arranged to project externally of the base and is flattened into a spade-like formation 61.

Over this flattened spade is fitted detachably a rotatable control rod 62 formed, for example, of an aluminium tube which may be in a number of lengths capable of disassembly, as in the case of the radially-extending arm. The outer end of this rotatable control member being supported in any suitable bearing, for example a bearing formed by a projecting spigot 63 or stud provided on the casing of the voltage control unit.

For rotating this member, a transverse lever 64 or arm is secured thereto adjacent its support bearing on the voltage control unit, so that by moving this lever the radially-extending arm upon which the model aircraft is carried is tilted to an extent depending upon the extent of movement of the lever.

Electrical connection to the driving motor included in the model is effected through a circuit, one side of which comprises the rotatable control rod, the lifter member, which is electrically connected to the former, the endwise movable control rod, the brass stud 48 on the hinge plate, and thence by means of the wire 16 passing through the interior of the radially-extending arm to one terminal of the motor in the model aircraft. The return side of the circuit is through the metal of the radially-extending arm itself, through the transverse pivot pin 42, through the frame, and the metal of which the column is formed to the base of the pedestal upon which a terminal is provided for connection to the other pole of the battery.

Electrical connection between the rotatable frame and the column is effected by means of a brush 65 in the form of a resilient metal tongue riveted or otherwise suitably secured near the lower end of one of the side members of the frame and extending upwardly therefrom towards the column and terminating just below the lower edge of the downwardly-directed flange of the cap on the upper end of the column.

The natural resilience of this metal tongue causes it to be pressed against the exposed surface of the column, which at such position is bared of all insulating coverings, such as enamel, to ensure good electrical contact.

The metal tongue performs in addition to its electrical function the function of a ratchet-like retaining device ensuring that the frame of the support unit cannot be displaced upwardly with respect to the column, either inadvertently or when the control rod 35 is moved upwardly.

What I claim is:

1. In a helicopter toy of the kind in which a model helicopter is supported from the upper end of a pedestal in laterally spaced relation thereto with freedom to move vertically and horizontally around a circular path concentric with the pedestal; a supporting unit comprising a frame having upwardly extending sides arranged adjacent to the upper part of the pedestal and upper and base elements journalled rotatably on the pedestal but separable therefrom in an upward direction to permit of removal of said supporting unit, releasable latch means on said supporting unit for restraining same against upward removal during operation, said means coacting with an abutment on the pedestal, a hinge plate mounted on said supporting unit and rockable relatively thereto about a substantially horizontal axis, a lifter member extending up said pedestal and coacting with said hinge plate to rock same, an arm extending radially from said hinge plate and pivotally mounted thereon about an axis transverse to both the rocking axis of the hinge plate and the pedestal, the helicopter including a lifting and driving propeller and motor therefor being affixed to the arm at one of its ends.

2. In a helicopter toy of the kind in which a model helicopter is supported from the upper end of a pedestal in laterally spaced relation thereto with freedom to move vertically and horizontally around a circular path concentric with the pedestal; a supporting unit comprising a frame having upwardly extending sides arranged adjacent to the upper part of the pedestal and upper and base elements journalled rotatably on the pedestal but separable therefrom in an upward direction to permit of removal of said supporting unit, a current collector brush on said supporting unit engaging with a slip ring portion on the pedestal to convey current through said supporting unit to a drive motor on said helicopter, said brush coacting with an abutment on the pedestal to restrain the supporting unit against upward removal during operation, a hinge plate mounted on said supporting unit and rockable relatively thereto about a substantially horizontal axis, a lifter member extending up said pedestal and coacting with said hinge plate to rock same, an arm extending radially from said hinge plate and pivotally mounted thereon about an axis transverse to both the rocking axis of the hinge plate and the pedestal, the helicopter including lifting and driving propeller and motor therefor being affixed to the arm at one of its ends.

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