

- [54] **STARTING SWITCH STRUCTURE IN A MODEL PLANE**
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| Dec. 7, 1970 | Japan | .....45/121030 |
| Dec. 7, 1970 | Japan | .....45/121029 |
- [52] U.S. Cl. ....**46/243 AV, 46/77, 272/31 A**
- [51] Int. Cl. ....**A63h 27/00, A63h 33/26**
- [58] Field of Search ....**46/77, 78, 243 AV; 272/31 A**

- [56] **References Cited**
- UNITED STATES PATENTS**
- |           |        |           |            |
|-----------|--------|-----------|------------|
| 3,375,605 | 4/1968 | Gallagher | .....46/77 |
| 3,579,905 | 5/1971 | Radford   | .....46/78 |
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[57] **ABSTRACT**

A starting switch structure comprising a pair of fixed and movable contact plates adapted to be brought into contact with each other by pulling a control wire, a miniature electric motor for rotating a propeller and a dry cell all of which are mounted on the plane electrically connected to form an electric circuit. Such starting switch structure enables the model plane to be started by a single operator without an aid of an assistant by simply pulling the control wire from the distance. It weighs light, ensures a long period of life, and is simply constructed and manufactured at a low cost.

**4 Claims, 9 Drawing Figures**

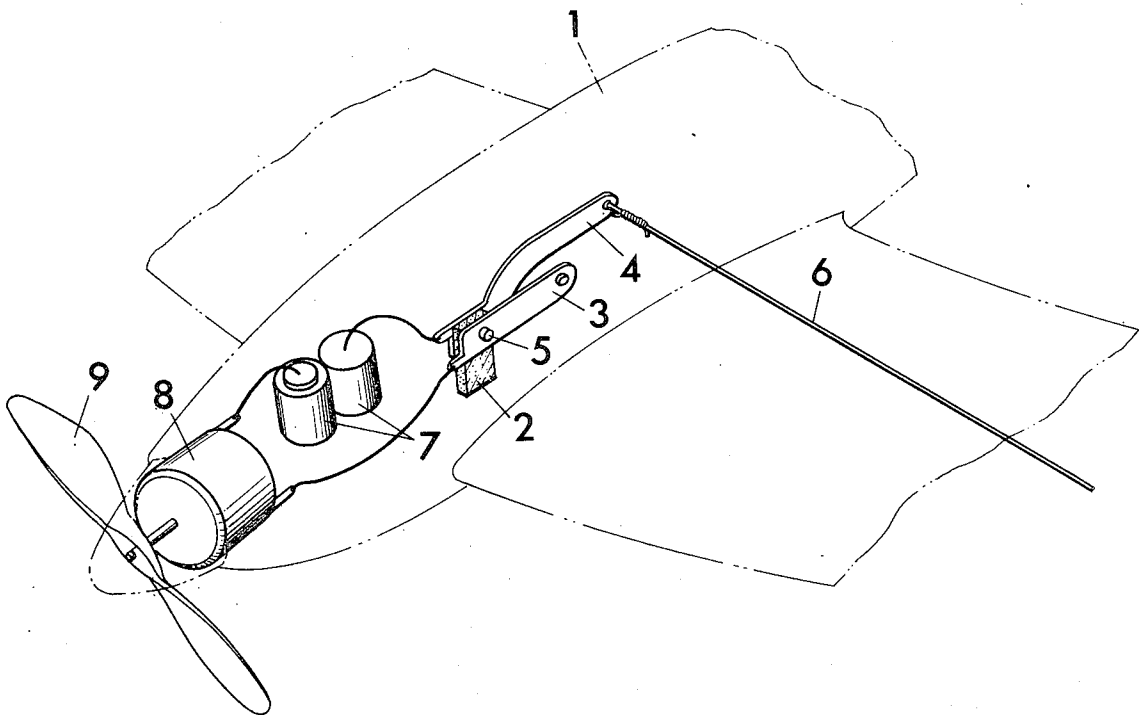


FIG. 1

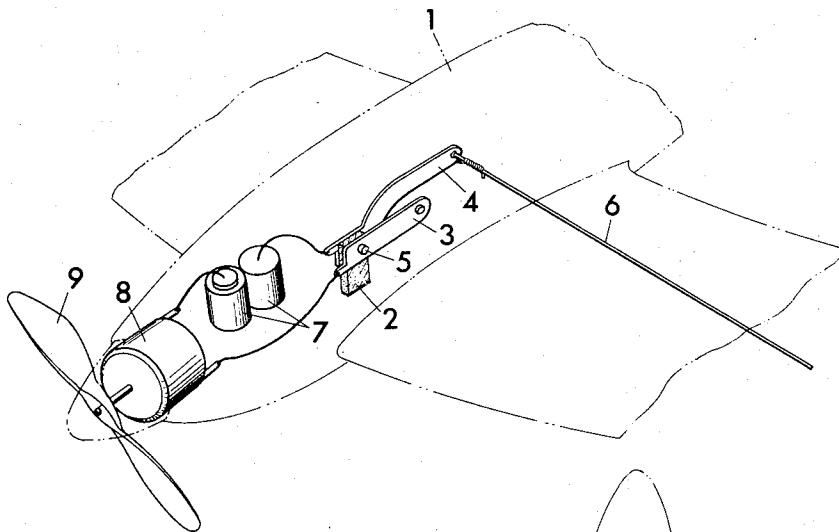


FIG. 4

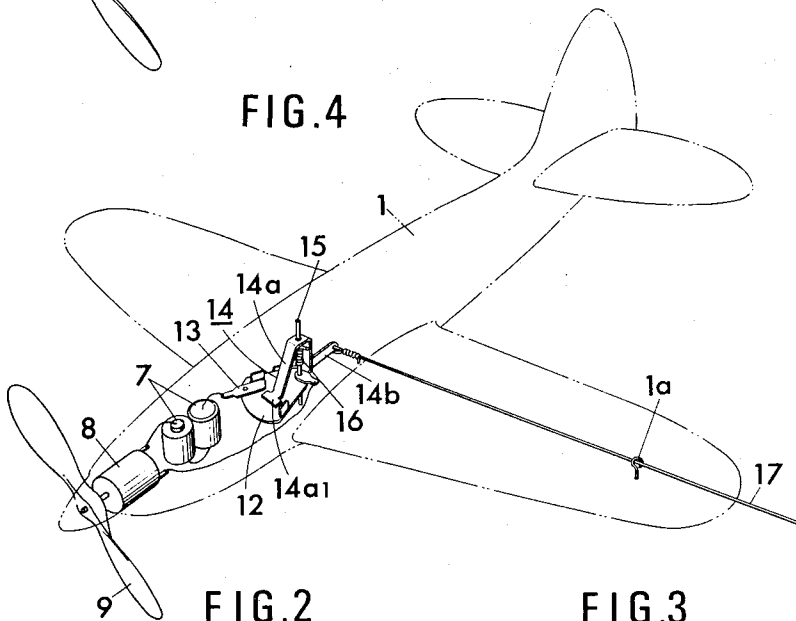


FIG. 2

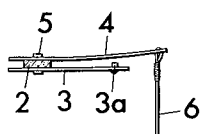


FIG. 3

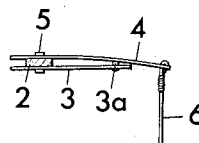


FIG. 6

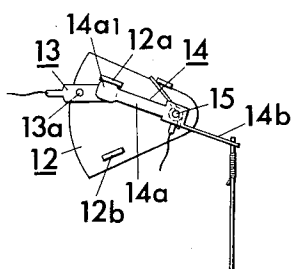


FIG. 7

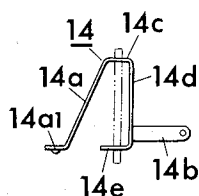


FIG. 5

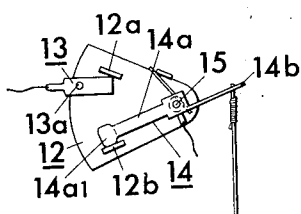


FIG. 9

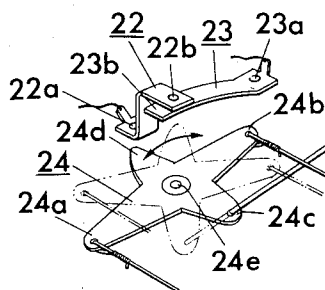
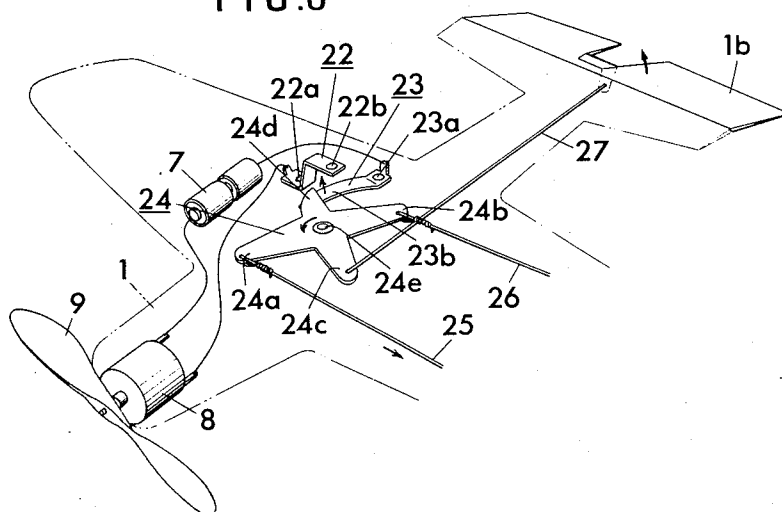


FIG. 8



## STARTING SWITCH STRUCTURE IN A MODEL PLANE

This invention relates to a starting switch structure in a model plane and more particularly to a starting switch structure including a pair of fixed and movable contact plates adapted to be brought into contact with each other by pulling a control wire, a miniature motor for rotating a propeller and a dry cell all of which are mounted on the plane and electrically connected.

At a prior technical level in this field, it has been impossible to mount a miniature electric motor and a dry cell on a model plane designed to fly in the air until an idea of mounting the motor and a dry cell on the plane body was completed for the first time in a copending patent application (Japanese Pat. Application No. 106019/70). Therefore, in a conventional type of a model plane, a starting operation must be made by hand and requires an aid of an assistant besides an operator who controls a flight.

In view of the novel idea of mounting both a motor and a dry cell on a model plane disclosed in said copending patent application, it is an object of the present invention to provide a starting switch structure in a model plane which enables the plane to be started by a single operator without an aid of an assistant.

It is another object of the present invention to provide a starting switch structure in a model plane in which an electric circuit is surely closed by simply pulling a control wire at a distance from the plane.

It is still another object of the present invention to provide a starting switch structure in a model plane which is simply constructed and manufactured at a low cost, weighs light and assures a long period of life.

Essentially, according to the present invention, there is provided a starting switch structure in a model plane comprising a control wire extended from a control grip held by an operator and fitted at the other end to a plane body; a fixed contact plate fixedly mounted on the body; a movable contact plate provided ordinarily apart from said fixed contact plate and adapted to be brought into contact with said fixed contact plate by pulling said control wire; a miniature motor mounted on the body for rotating a propeller; and a dry cell accommodated in the body, said fixed contact plate, movable contact plate, miniature motor and dry cell being electrically connected thereby to form an electric circuit.

Various further and more specific object, features and advantages of this invention will be better understood from the following detailed description, taken in connection with accompanying drawings illustrating by way of example an embodiment, in which:

FIG. 1 is a perspective view of a starting switch structure adaptable for a model plane of G-control grip type which is one embodiment of the present invention;

FIG. 2 is a plan view of contact members in FIG. 1 in an open position;

FIG. 3 is a plan view like FIG. 2 showing a closed position;

FIG. 4 is a perspective view of another starting switch structure adaptable for a model plane of G-control grip type according to this invention;

FIG. 5 is a plan view of contact member in FIG. 4 in an open position;

FIG. 6 is a plan view like FIG. 5 showing a closed position;

FIG. 7 is a side elevational view of a movable contact plate in FIG. 4;

FIG. 8 is a perspective view of a starting switch structure adaptable for a model plane of U-control grip type which is still another embodiment of this invention; and

FIG. 9 is an enlarged perspective view of contact members in FIG. 8 in a closed position.

Referring now to FIGS. 1 - 3, there is illustrated a starting switch structure adapted for a model plane of G-control grip type in which a grip held by an operator for controlling a control wire is G-shaped. Numeral 1 represents a plane body having an insulating plate 2 fixed thereto. To both sides of said insulating plate 2 are a fixed contact plate 3 and a movable contact plate 4 attached keeping an insulation therebetween with their base portions fixed to the insulating plate with a suitable set pin 5. In said fixed contact plate 3, on its one face confronting said movable contact plate 4 is formed a contact point 3a. The movable contact plate 4 is made of a resilient material and to its free end is a control wire 6 fastened. The fixed and movable contact plates 3 and 4 are electrically connected to a dry cell 7, a miniature electric motor 8 and a propeller 9 mounted on the body 1 to form an electric circuit.

When the control wire 6 is pulled by the operator, the movable contact plate 4 is brought into contact with the contact point 3a of the fixed contact plate 3 as shown in FIG. 3 to close the electric circuit, and when the wire 6 is loosened, the movable contact plate 4 is restored by its own resiliency to get apart from the fixed contact plate 3 to open the circuit.

Referring then to FIGS. 4 - 7, there is illustrated another starting switch structure adapted for a model plane of the same G-control grip type as in the former embodiment, and like members, a plane body 1, a dry cell 7, a miniature electric motor 8 and a propeller 9 are represented by the same numerals. An insulating plate 12 is fixed to the body 1. A fixed contact plate 13 is fitted to said insulating plate 12 with a set pin 13a such as a screw or the like. An axis 15 is upstandingly provided on the insulating plate 12.

A movable contact plate generally represented by numeral 14 comprises a forward portion 14a having a contact tip 14a<sub>1</sub>, a backward portion 14b to which a control wire 17 is fastened, an upper support 14c, a connecting portion 14d connecting said portions 14a and 14b through the upper support 14c, and a lower support 14e. In said upper and lower supports 14c and 14e, there are formed respective holes through which the axis 15 is rotatably inserted. A coil spring 16 is windingly provided around the axis 15 for restoring the movable contact plate 14 once brought into contact with the fixed contact plate 13 to an open position thereby to open the electric circuit. The control wire 17 fastened at its one end to the tip of the backward portion 14b of the movable contact plate 14 is extended through a guide ring 1a formed in the body 1 to reach the G-shaped grip held by the operator. The stoppers 12a and 12b are formed on the insulating plate 12 for defining rotation of the movable contact 14. The dry cell 7, miniature motor 8, propeller 9 and fixed and movable contact plates 13 and 14 are electrically connected.

When the control wire 17 is pulled against the coil spring 16, the movable contact plate 14 rotates around the axis 15 to bring the contact tip 14a<sub>1</sub> into contact

with the fixed contact plate 13. Thus, the circuit is completed and the miniature motor starts to rotate accordingly. The movable contact plate 14 rotates reversely when the wire 17 is loosened thereby to open the circuit.

Further referring to FIGS. 8 and 9, there is illustrated a starting switch structure adaptable for a model plane of U-control grip type in which a grip held by an operator for controlling control wires is U-shaped. In the drawings, a plane body, a dry cell, a miniature electric motor and a propeller are represented by the same numerals as in the former embodiments.

The body 1 is equipped with an elevator 1b in its tail. A fixed contact plate 22 and a movable contact plate 23 are fixed to the body 1 through a suitable base board with set pins 22a and 23a respectively. The movable contact plate 23 is made of a resilient material and its free end 23b is adapted to come into contact with a contact point 22b of the fixed contact plate 22 by resiliency of the movable contact plate itself.

A rotary plate 24 comprising three projections 24a, 24b and 24c and a hook portion 24d is axially and rotatably fitted to the body 1 with an axis 24e.

Control wires 25 and 26 extending from the U-shaped grip of the control center are fastened to tip ends of the projections 24a and 24b of the rotary plate respectively. A rod 27 is provided between the projection 24c and the elevator 1b. The hook portion 24d of the rotary plate 24 is so constructed as to engage with the contact end 23b of the movable contact plate 23. The dry cell 7, miniature motor 8, propeller 9 and fixed and movable contact plates 22 and 23 form an electric circuit.

When the control wire 25 is pulled by the operator, the rotary plate 24 rotates around the axis 24e and the hook portion 24d is disengaged from the tip end 23b of the movable contact plate 23 permitting said plate 23 to spring up by its own resiliency thereby to bring the tip end 23b into contact with the contact point 22b of the fixed contact plate 22. Thus the circuit is completed and the motor 8 starts to rotate. In coincidence with the rotation of the rotary plate 24, the rod 27 moves backward and the elevator 1b is lifted upward to effectively float the plane in the air. The elevator can be moved to effect an upward or downward flight of the plane by pulling the control wire 25 or 26 according to case.

In the instant embodiment, the completion of the electric circuit is surely maintained and the upward or downward flight of the model plane can be effected in association with the starting switch structure.

As apparent from the above descriptions, according to the present invention, the electric circuit is closed or

opened by simply pulling or loosening a wire, that is, make and break operation of the circuit is easily and reliably performed by a single operator. Moreover, the entire switch structure is simply constructed, weighs light and ensures a long period of life enough to be mounted on a flying model plane, and therefore, it is manufactured through simple processes at a low cost.

What is claimed is:

1. A starting switch structure in a model plane comprising a control wire extended from control grip held by an operator and fitted at the other end to a plane body; a fixed contact plate fixedly mounted on the body; a movable contact plate provided ordinarily apart from said fixed contact plate and adapted to be brought into contact with said fixed contact plate by pulling said control wire; a miniature motor mounted on the body for rotating a propeller; and a dry cell accommodated in the body, said fixed contact plate, movable contact plate, miniature motor and dry cell being electrically connected thereby to form an electric circuit.

2. A starting switch structure in a model plane as claimed in claim 1 and adapted for a G-control grip type model plane wherein said movable contact plate is made of a resilient material and fixed to the fixed contact plate at their base portions through an insulating plate, said control wire being fastened to a free end of said movable contact plate thereby to bring the movable contact plate into contact with said fixed contact plate.

3. A starting switch structure as claimed in claim 1 and adapted for a G-control grip type model plane wherein said fixed contact plate is fitted to an insulating plate fixed to the body and having an axis upstandingly provided thereon, said movable contact plate being rotatably mounted on the insulating plate around said axis and provided with said control wire to bring the movable contact plate into contact with said fixed contact plate, a coil spring being provided around said axis to keep the electric circuit open.

4. A starting switch structure in a model plane as claimed in claim 1 and adapted for a U-control grip type model plane wherein said movable contact plate is made of a resilient material, a rotary plate having a hook portion and three projections being rotatably fitted to the body, said hook portion being adapted to engage with said movable contact plate to keep the electric circuit open, two control wires being fastened to two of said projections respectively to rotate the rotary plate, a rod being provided connecting the other projection to an elevator thereby to effect an upward or downward movement of said elevator in coincidence with the rotation of the rotary plate.

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