May 27, 1969 C. DAMRON ET AL 3,446,502

MODEL AIRPLANE CONTROL DEVICE

Filed July 6, 1967 Sheet 1 of 2

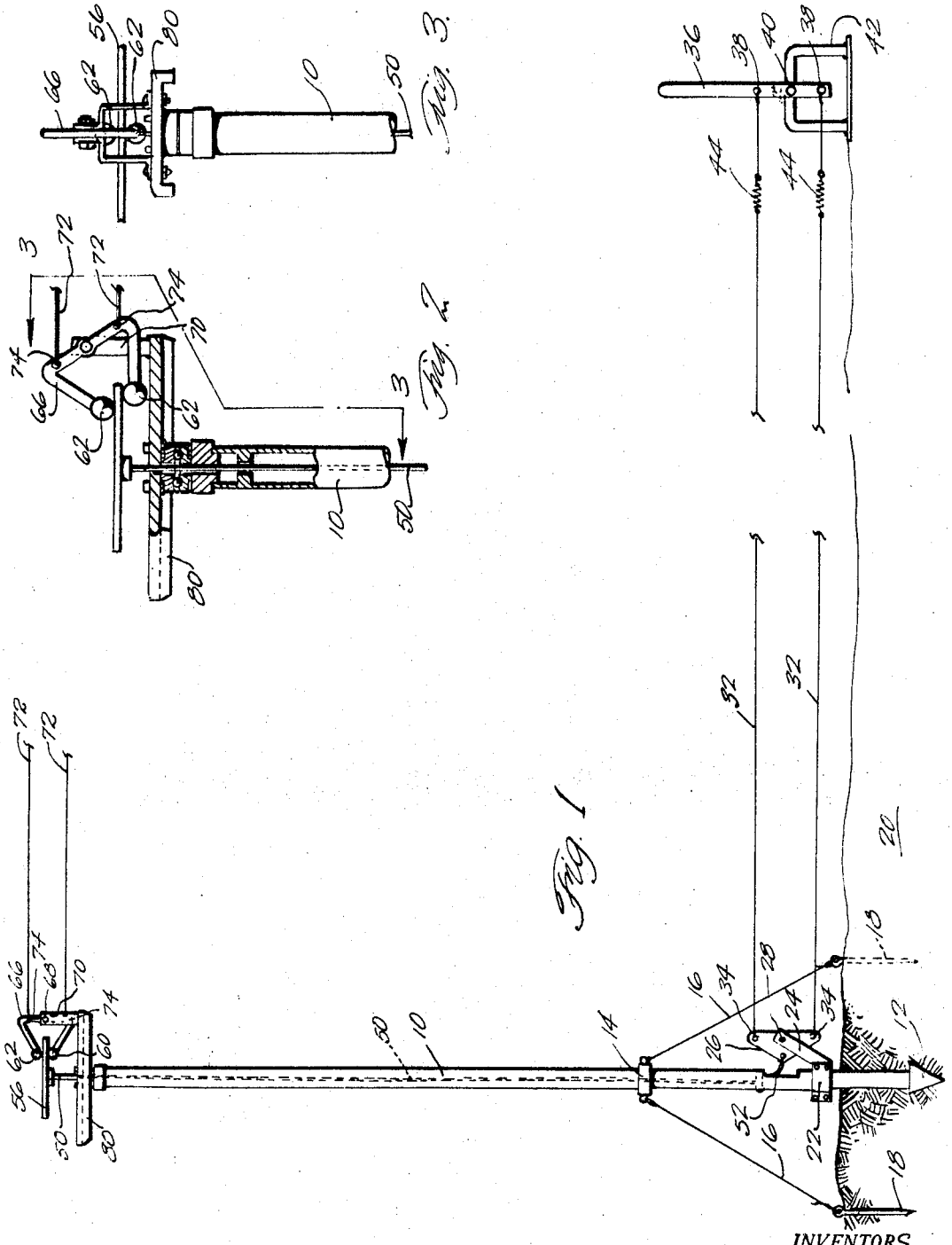


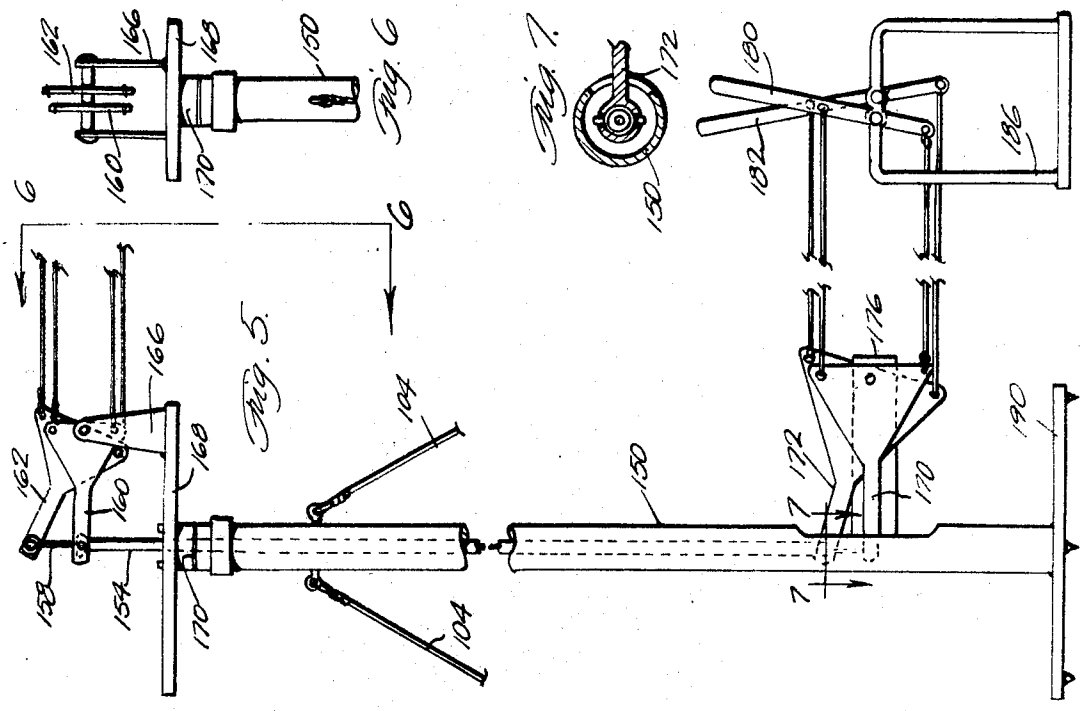
Fig. 1

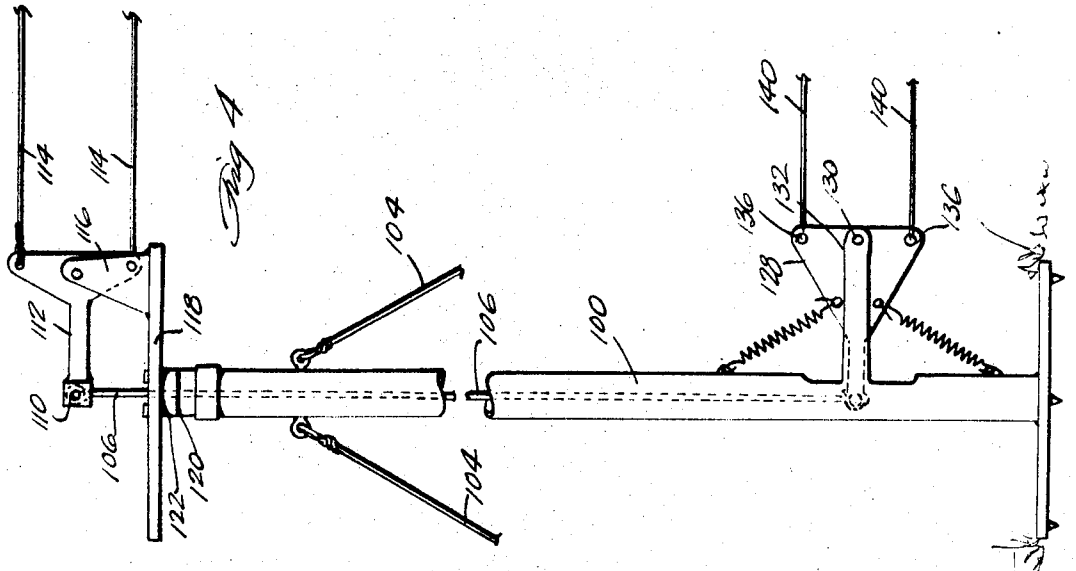
INVENTORS
CORDELL DAMRON &
BY THURMAN J. BORDERS
Victor J. Evans & Co.
ATTORNEYS

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MODEL AIRPLANE CONTROL DEVICE

Cordell Damron, R.F.D. 2, Box 755, and Thurman J. Borders, City 4, Box 14A, both of Pikeville, Ky. 41501

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U.S. Cl. 272—31 5 Claims

ABSTRACT OF THE DISCLOSURE

A model airplane control device providing remote flying control of a model airplane without having to stand at the center of a flying circle and turn around with each revolution of the airplane, by means of a firmly mounted pole having a hollow shaft, a control rod actuable therein by linkages so that the attitude of the model aircraft is directly controlled, as well as any other parameter desired, by the linkage mechanism driving the control rod either upwardly or downwardly, as desired for controlling the airplane.

The present invention relates to a model airplane control device so that a novice or generally inexperienced operator of flying gas driven or jet driven model airplanes may amply control the attitude, flight and other parameter of the airplane by sitting outside of the flying circle in a uniform or fixed position and maintain control of the model airplane without turning around upon each revolution of the flying aircraft, and by means of a single master control station.

It is a further object of the present invention, therefore, to provide a simple set of controls including an upright hollow tubing or shaft with a central control rod axially disposed therein, and having linkage mechanisms between the model aircraft and the upper end of the control rod, and a remote mechanical linkage system affixed to the lower end of the control rod for achieving the objects and advantages of the present invention.

The above and other objects and advantages of the present invention will become apparent upon full consideration of the following detailed decsription and accompanying drawings in which:

FIGURE 1 is a side elevation view of the essential structural components of the present invention, including the stationary parameter rod and axially disposed control rod therein with the attending control linkage mechanisms in accordance with the preferred embodiment of the present invention;

FIGURE 2 is an enlarged cross-sectional view of the structures disposed at the upper end of the upstanding pole, showing the linkage mechanisms attached thereto;

FIGURE 3 is a front elevation view seen along lines 3—3 of FIGURE 2;

FIGURE 4 is a further embodiment of the invention;

FIGURE 5 is an additional embodiment showing further control rods used in conjunction with the practice of the present invention;

FIGURE 6 is a side elevation view taken along lines 6—6 of FIGURE 5; and

FIGURE 7 is a cross-sectional view taken along lines 7—7 of FIGURE 5.

Referring now to the drawings, there is shown in FIGURE 1 an upstanding hollow mounting pole **10** which has a peaked pipe cap **12** to facilitate installation and mounting of the mounting pole **10** in the earth, the mounting pole having a guy wire ring **14** about which are mounted a plurality of guy wires **16, 16** secured at their lower ends by a spike **18** into the earth or ground **20**. There is a lever mounting bracket **22** at the lower end

of the mounting pole **10**, having an arm **24**, to which is mounted a triangular plate lever mechanism **26** by a pivot or rivet arrangement **28**. The triangular lever mechanism **26** is essentially a portion of a two wire toggle arrangement including lines **32** which extend from holes **34, 34** of the triangular lever mechanism **26** to a pivot mounted level arm **36** having holes **38, 38** for terminating the links of the lines **32, 32**. The lever **36** is mounted by a pivot **40** in a base frame **42**, and compensating springs **44, 44** may be provided to maintain the lines **32, 32** in a tensioned condition.

Within the hollow mounting pole **10**, there is a control or actuator rod **50** which extends upwardly from the top of the mounting pole **10**, and having its lower end connected mechanically to point **52** of the triangular lever mechanism **26** as shown in FIGURE 1. On the upper end of the actuator rod **50**, there is mounted a fixed or stationary disc which is hub-mounted on the steel control rod **50**. The disc **56** is adapted to be moved upwardly and downwardly along the distance that the rod **50** may move, and follower balls **60, 62** on a pivoted bracket assembly **66** which is mounted by a pivot **68** on a mounting **70** provide a repeat arrangement of the toggle arrangement seen in the triangular lever mechanism **26**. Thus, lines **72, 72** are coupled or connected at their ends to **74, 74** in the bracket arrangement **66**, and the other ends of lines **72, 72** control the attitude or other control parameter of the model airplane at the end of the lines **72, 72** as it rotates about the revolving disc **80** which is mounted for free rotation with respect to the mounting pole **10**.

As is shown in FIGURE 2, the rotating disc **80** is mounted for free rotation with respect to the mounting pole **10**, and the control rod **50** is seen to be disposed coaxially within the mounting pole **10**, as illustrated in FIGURE 2.

In FIGURE 4 there is seen a similar arrangement of mounting pole **100** having supporting guide wires **104** and an actuator control rod **106** which terminates at the upper end in a ball or U-swivel joint **110** to actuate a bell crank **112** to control the actuation of toggle lines **114, 114**. The bell crank **112** is mounted from a bracket **116** on a rotating disc **118** that turns about a mating interface **120** between the revolving disc hub **122** and the upper end of the pole **100**. Similarly, at the lower end of the control rod **106**, there is a clevis or ball-swivel equivalent type connection to a toggle arm **128** pivotally mounted by pivot **130** on a bracket **132**. In the toggle plate **128**, there are holes **136, 136** to which are mounted the toggle lines **140, 140** which terminate at their ends to the master station, as is similarly described in connection with the right-hand portion of FIGURE 1.

FIGURES 5, 6 and 7 show a further arrangement by which more than two control lines are adapted to be tensioned and released for controlling any of four various parameters of the model aircraft in flight. The mounting pole **150** has an intermediate hollow actuator rod **154** and an inner control rod **158** for actuating bell crank arms **160, 162**, respectively, at the upper end of the mounting pole **150**, which are mounted from a supporting bracket **166** supported from a revolving disc **168** having frictionally engaging interface **170** with the top of the pole **150**.

The lower end of the mounting pole **150** is provided with bell crank arms **170, 172** supported from a mounting bracket **176**, and in which each of the toggle plates extending from the bell arms **170, 172** control lines terminating in a control handle lever **180, 182**, as shown. The control levers **180, 182** are pivotally mounted from a mounting main control station **186**. The base of the mounting pole **150** terminates in a supporting disc **190**.

What is claimed is:

1. A model airplane control device comprising an upstanding hollow mounting pole, an axially disposed con-

trol actuator rod within said hollow mounting pole for moving along the axis thereof, means mounted at the upper end of the control rod, a revolving disc mounted in rotatable relation to the upper end of the hollow mounting pole including means on the revolving disc to wire mount a model airplane including a triangular lever mechanism mounted at the periphery of the revolving disc, and having a toggle connection to the means mounted on the control rod, a toggle arrangement lever mechanism mounted at the lower end of the hollow mounting pole to actuate the control rod in a desired direction for correspondingly controlling the model airplane mounted from the wires connected to said upper triangular toggle mechanism.

2. The invention according to claim 1, wherein guy wires are used to support the hollow mounting pole, and on which the lower toggle mechanism is mounted from a support bracket.

3. The invention according to claim 2, in which a further hollow control tube is coaxially mounted within the hollow mounting pole for providing further control between a position remote from the lower end of the hollow mounting pole to a model airplane suspended in revolvable relation to the upper end of the rotating disc,

and in which an additional toggle mechanism is used to correlate the movement from the displacement of the further hollow control rod from said remote position to the model airplane.

4. The invention according to claim 3, wherein said toggle mechanisms comprise bell crank brackets to achieve transfer of movement from the control rod and control tube to the model airplane.

5. The invention according to claim 3, wherein said toggle mechanisms include ball and socket mechanisms to relay and transfer motion from the control rod means to the toggle mechanisms.

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MILTON KAUFMAN, *Primary Examiner.*

U.S. Cl. X.R.

46—77; 74—469, 471, 479