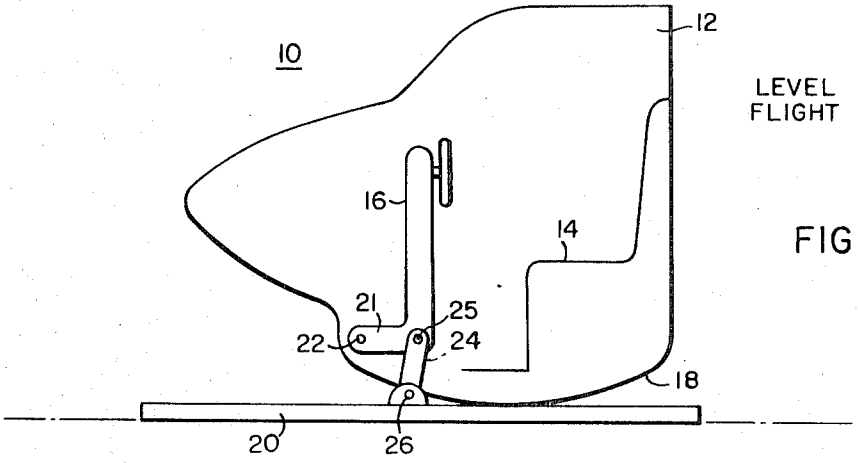
Nov. 9, 1971 F. E. MONKS 3,618,256

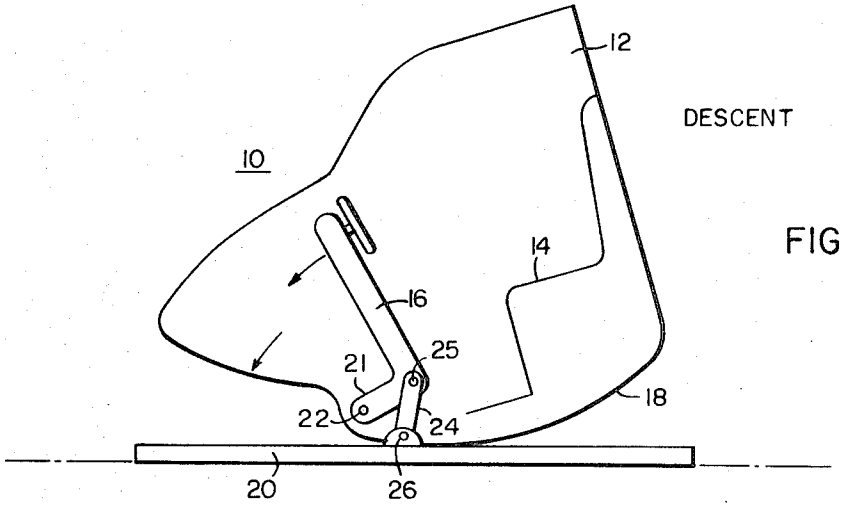
TOY AIRCRAFT DEVICE

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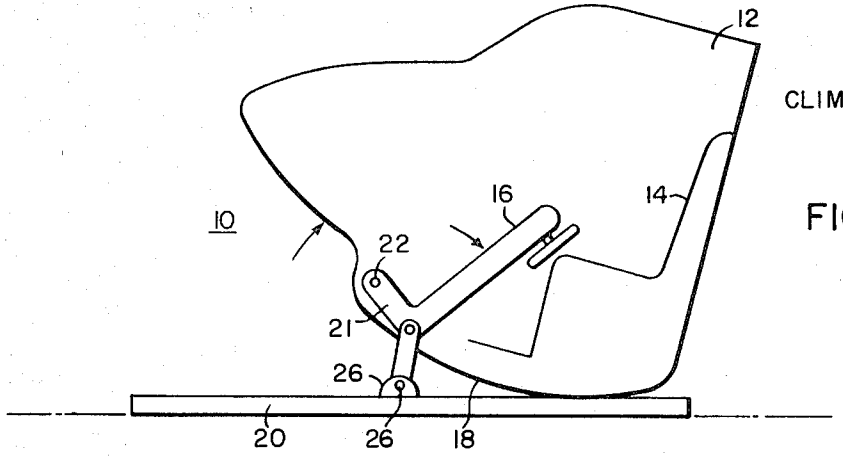
LEVEL FLIGHT

FIG.IA.



DESCENT

FIG.IB.



CLIMBING

FIG.IC.

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TOY AIRCRAFT DEVICE

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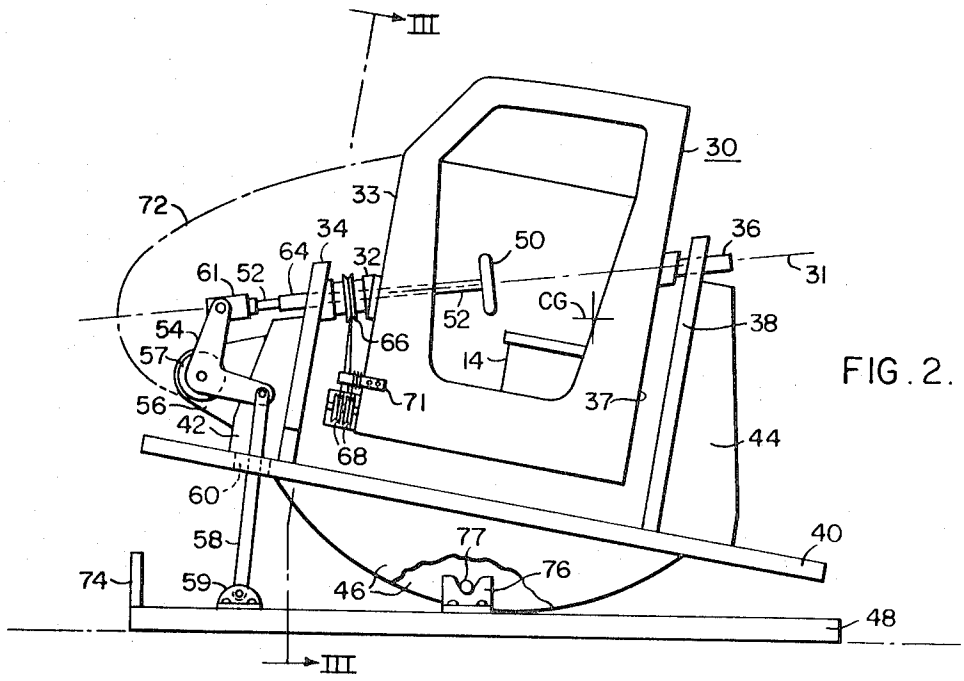


FIG. 2.

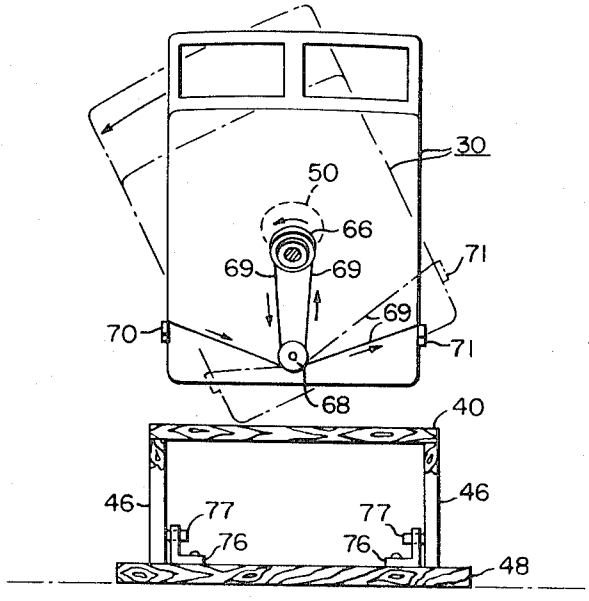


FIG. 3.

INVENTOR
Frank E. Monks
BY E. Strickland
ATTORNEY

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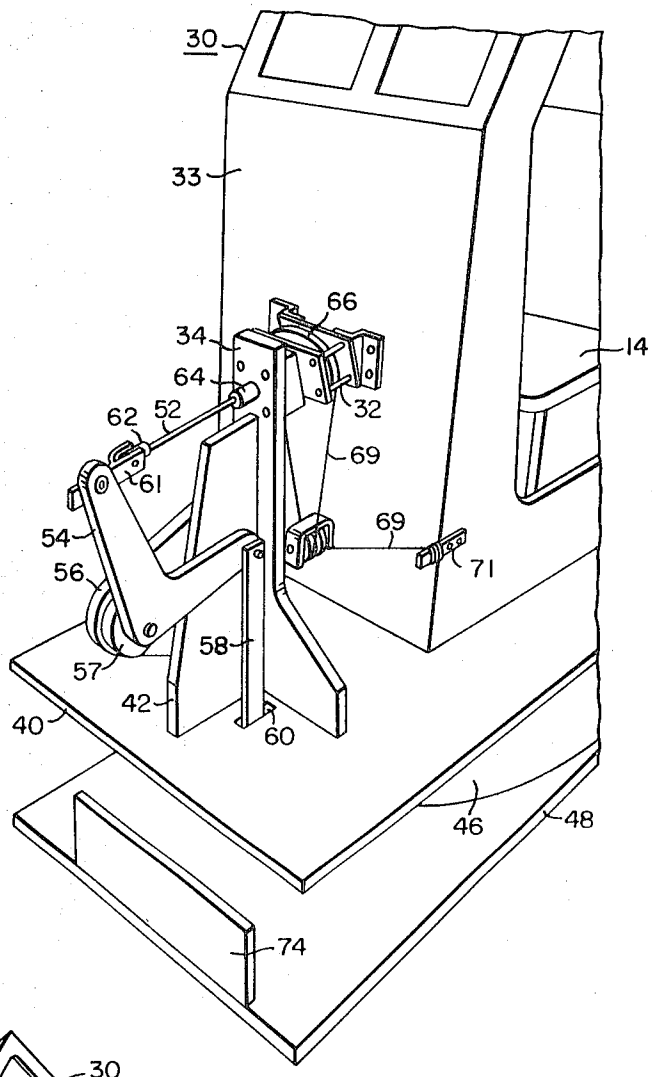


FIG.4.

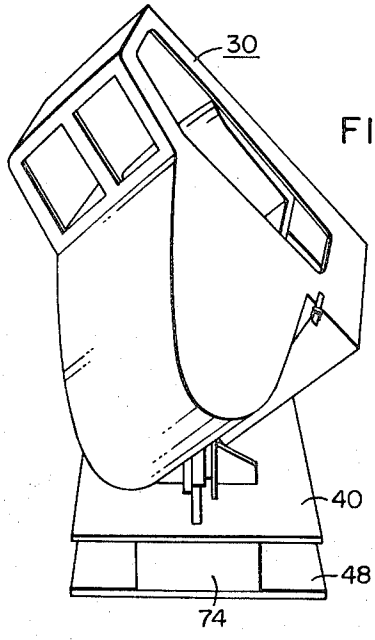


FIG.5.

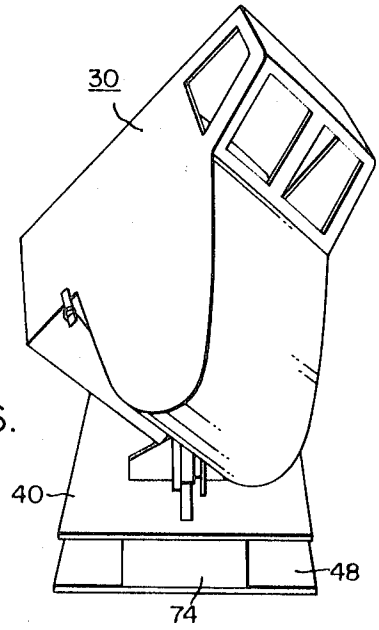


FIG.6.

United States Patent Office 3,618,256 Patented Nov. 9, 1971

3,618,256

TOY AIRCRAFT DEVICE

Frank E. Monks, 1503 Broadview Drive,
Bettendorf, Iowa 52722

Filed July 10, 1970, Ser. No. 53,744
Int. Cl. A63h 3/52
U.S. Cl. 46—15 5 Claims

ABSTRACT OF THE DISCLOSURE

A toy device for simulating the attitudes of a vehicle in flight. The device comprises a cockpit structure for accommodating at least one child, the device employing a base structure having a curved bottom surface which permits the child to position the cockpit in any attitude of elevation (i.e., level flight, ascent or descent) within the limits of the curved bottom surface. A second embodiment of the invention further includes means for suspending the cockpit in a manner to permit rotation thereof about a longitudinal axis of the cockpit that is inclined from the front to the rear of the cockpit. The curved base structure and the rotation about the inclined axis permits the cockpit to assume the three basic attitudes of a vehicle in flight, namely, elevating, turning and banking.

BACKGROUND OF THE INVENTION

The present invention relates generally to a toy vehicle device, and particularly to a toy airplane capable of accommodating at least one child, and in which the child can operate the toy in the manner of an airplane or space vehicle in flight. This is accomplished in a safe, simple and easy manner without the use of arm-foot controls which require arm-foot coordination, without costly power assist means and with a control arrangement that will not permit the toy to turn completely over and dump the child onto the floor. Further, the toy is economical and simple to build and manufacture.

BRIEF SUMMARY OF THE INVENTION

Broadly, the above operation and advantages are accomplished by use of a body structure, including a cockpit for accommodating a child, the body structure having a base portion provided with a curved bottom surface for resting on a smooth horizontal surface of a base plate. A control arm is pivotally attached to the body structure and to the base plate, and extends into the cockpit for operation by the child. By a forward thrust or a rearward pull on the control arm the child can position the body structure and cockpit in any descending or climbing attitude (within the limits of the curved bottom surface of the base portion) as well as a level flight position by intermediate positioning of the control arm.

In a second embodiment of the invention, a cockpit structure is suspended for rotation along a longitudinal axis that is inclined from the front to the rear of the cockpit, the plane of the axis extending above the center of gravity of the cockpit. The control arm is mechanically connected to the cockpit in a manner to effect rotation thereof about the inclined axis. The rotation provides a banking attitude for the cockpit and for the child contained therein. Because of the axis being inclined from front to rear and extending above the center of gravity of cockpit, the cockpit also turns in the direction of the bank thereby providing a third basic attitude of flight (turning) while using the same basic motion for banking, namely, that of rotation. Thus, the structure of the second embodiment provides three basic attitudes of flight using only the two simple motions provided by (1) the curved base structure and by (2) the rotational movement of cockpit about its inclined axis.

THE DRAWINGS

The invention, along with its advantages and objectives, will be more apparent from consideration of the following detailed description and the accompanying drawings in which:

FIGS. 1*a* to 1*c* are side diagrammatic views of a first embodiment of the invention showing a cockpit structure in three positions or attitudes of elevation;

FIG. 2 is a side diagrammatic view of a second embodiment of the invention;

FIG. 3 is a front end view of the embodiment shown in FIG. 2;

FIG. 4 is a perspective view of a control arrangement for the embodiment shown in FIGS. 2 and 3; and

FIGS. 5 and 6 are perspective views of the second embodiment showing simultaneous turning and banking attitudes of flight.

PREFERRED EMBODIMENTS OF THE INVENTION

Specifically, the three FIGS. 1*a* to *c* show diagrammatically a toy airplane or toy space capsule device **10** in which a child can be accommodated to control and position the device in the manner indicated by the three figures. More particularly, the airplane or capsule comprises a cockpit structure **12** shown with a seat **14** (for seating the child therein), and a control arm **16** extending within the cockpit and to a position in front of the seat. The bottom portion of the cockpit is provided with a rocker surface **18** curved in the longitudinal direction of the cockpit. The curved rocker surface rests on the flat horizontal surface of a base plate **20**.

The cockpit structure **12** and seat **14** can be made from any suitable rigid material, for example, plywood, plastic, sheet metal or the like sufficiently durable for toy purposes. The curved bottom **18** need only support the weight of the structure and that of the child or children seated therein, and may be made in any suitable manner, for example, as shown in the succeeding figures presently to be described.

Similarly, the base plate **20** may be any structure capable of providing a substantially smooth, planar surface for the curved or rocker surface **18**.

The lower end of the control arm **16** has a forward extension **21** pivotally attached to the cockpit at **22** while the lower end of the arm is attached to a link means **24** at **25**. The link means is further pivotally attached to the plate **20** at **26**. Any means or hardware suitable for the purposes of the toy can be used to attach the arm and link in the manner shown. A slotted opening (not shown) is provided in the curved bottom **18** of cockpit for accommodating the link **24** and the pivot means **26**.

The cockpit **12** of the embodiment shown in FIGS. 1*a* to *c* can be made to assume any attitude of elevation by a simple forward thrust (FIG. 1*b*) or rearward pull (FIG. 1*c*) of the control arm **16** by the child (not shown) operating the toy. [The term "elevation," as used herein, describes simply the three forward attitudes of flight, namely, descending, ascending (climbing) and level flight.]

Specifically, when the child pushes forward on the control arm **16**, the bottom end of the arm operates about the pivots **22** and **25** to force the cockpit **12** to roll forward on its curved bottom surface **18** so that the cockpit assumes a descending attitude of flight as shown in FIG. 1*b*.

For the cockpit to assume a climbing or ascending position of flight, the child simply pulls back on the control arm **12**, the bottom forward extension **21** of the

arm forcing the cockpit to roll back on its curved bottom portion **18**.

For level flight, the control arm is simply moved to an intermediate position as shown in FIG. 1*a*.

As can be readily appreciated from the diagrammatic views of FIGS. 1*a* to *c*, a simple aircraft or space capsule toy is provided requiring only a minimum number of inexpensive parts. Further, the toy is safe, there being nothing in the way of electrical power or mechanical assists (motors, gears, or hydraulics) to harm the child. Rather, a simple control arm **16** provides the child with all the power and leverage he needs to operate the toy.

FIGS. 2 to 6 are views of a second embodiment of the invention in which banking and turning attitudes of flight can be provided for a toy, or added to the toy described above in connection with FIGS. 1*a* to *c*.

More particularly, in the second embodiment of the invention, a cockpit structure **30** is suspended for rotation about an inclined axis **31** by a bracket **32** located between the front wall **33** of the cockpit and a vertical support structure **34**, and a pivot pin **36** extending between the rear wall of the cockpit and a second vertical support structure **38**, the two vertical structures supporting the cockpit above a platform **40**. The backet **32** is rigidly attached to both the wall **33** and the vertical support **34** and, as best seen in the view of FIG. 2, is lower than the rear pin **34** so that the axis **31** is inclined for the front to the rear of the cockpit.

It will be noted further, from the view of FIG. 2, that the inclined axis **31** extends through the cockpit **30** above its center of gravity CG.

The vertical support structures **34** and **38** are provided respectively with stabilizing ribs **42** and **44** to stablize the support structures and thereby provide longitudinal stability for the cockpit structure **30**.

The platform **40** is supported on and fixed to a pair of rocker members **46** (FIG. 3) curved in the direction of flight and shown resting on the upwardly facing, planar surface of a second platform or plate structure **48** for location on a floor or the ground.

To control the cockpit **30** in a manner similar to that described above in connection with FIGS. 1*a* to *c*, a wheel **50** attached to one end of a control shaft **52** extending into the cockpit is provided, the shaft extending from the cockpit to an L-shape arm **54** pivoted adjacent its center to a support structure **56** attached to the front stabilizing rib **42**. The support structure **56** extends forwardly of the rib **42**, and, as seen in the perspective view of FIG. 4, the L-shaped arm is spaced from its support **56** by a circular spacer or washer **57** so that the lower portion of the arm, which extends to one side of the rib **42**, is clear thereof for movement about the pivot of the arm.

The lower portion of the arm **54** is pivotally connected to one end of an elongated stick or bar **58** extending through the platform **40**, the other end of the bar being pivotally attached to the plate **48** by a suitable bracket **59**. A slotted opening **60** is provided in the platform to accommodate the bar extending therethrough.

The control shaft **52** is pivotally linked to the upper end portion of the L-shaped arm **54** by a Y-shaped bracket **61** and a universal attaching means **62**. The arms of the Y extend along opposite sides of the universal means, and are pivotally connected or linked to a fixed center portion thereof in such a manner that the shaft **52** can rotate about its longitudinal axis while simultaneously being positively attached to the arm **54** which cannot ratates with the shaft.

As best seen in FIG. 4, the shaft **52** extends through the vertical support structure **34** through a bushing **64** supported in a corresponding opening in the support structure.

Between the vertical support **34** and the cockpit **30**, the shaft **52** extends axially through the backet **32** and through the front wall **33** of the cockpit. The portion of the shaft near the center of the bracket has a pulley **66** mounted thereon in such a manner that the pulley is forced to rotate with rotation of the shaft yet the shaft is free to slide through the pulley along the axes of the pulley and shaft. This can be accomplished by a "feathered key," for example, in which a key in the shaft and a mating keyway in the pulley has a clearance suitable to allow easy sliding of the shaft through the pulley. A similar result can be accomplished with a splined shaft.

In order to make the movement of the shaft as easy as possible, flat portions can be provided on opposed sides thereof, and rollers mounted in or on the pulley in engagement with the flat portions. With translation of the shaft through the pulley, the rollers roll on the flat portions. With rotation of the shaft, the pulley and rollers rotate therewith.

Directly beneath the pulley **66** and the bracket **32** are two axially aligned pulleys **68** attached to the wall **33** of the cockpit **30** for rotation about their aligned axes. The center portion of a cable or rope **69** is located on the pulley **66** and properly seated in an accommodating groove in the pulley. From each side of the pulley, the rope extends down to and around the two pulleys **68** as the two ends thereof extend outwardly from the pulleys **68** to two tab means **70** and **71** fixed respectively on the left and right lower sides of the cockpit. In the figures, the bracket **70** is visible only in FIG. 3. The two ends of the rope are respectively suitably tied or otherwise fixed to the two tabs.

To cover the above-described components located forwardly of front wall **33** of the cockpit **30**, a nose cone or cover **72** can be suitably attached to the front of the cockpit as seen in FIGS. 5 and 6, and as shown in phantom outline in FIG. 2.

In the operation of the toy airplane or capsule as described in connection with FIGS. 2 to 6, a child (not shown) is seated in the cockpit **30** behind the wheel **50**. The child, by pulling back on the wheel and the shaft **52**, rotates the L-shaped arm **54** about its pivot which rolls the platform **40** back on its curve rockers **46** by virtue the upper force directed upon the arm support **56**. In this manner, the cockpit assumes a climbing position such as that shown in FIG. 2.

In a similar manner, by thrusting the shaft **52** forward, the L-shaped arm **54** pivots about its center portion in a manner to lower the nose of the airplane to a descending flight position on rockers **46**, the L-shaped arm also pivoting at the point of its attachment to the bar **58**. A stop means **74** (FIG. 2) is shown located between the platforms **40** and **48** to prevent the cockpit from assuming too steep a position. In changing the attitudes of elevation, the platform **40** is free to move along the bar **58** by virtue of the slotted opening **60** in the platform.

For the child to turn and bank the cockpit **30**, he or she merely rotates the wheel **50** which rotates the pulley **66** about its axis. With rotation of the pulley, the cable or rope **69** is translated thereabout and about the pulleys **68** to translate the cockpit about the axes of the bracket **32** and rear pivot pin **36**, and thus about the inclined axis **31**. The rope rotates the cockpit by pulling the lower portion of the cockpit in the direction opposite to the bank, one end of the line shortening as the other end lengthens as shown in dashed outline in FIG. 3. By turning the wheel and shaft, the child can bank the cockpit left or right while the cockpit is simultaneously positioned in any attitude of elevation provided by a rearward pull or a forward thrust of the wheel and shaft as explained above.

However, because of the inclined axis **31** of rotation for the cockpit **30** extending above the center of gravity CG of the cockpit (see FIG. 2), the cockpit (and the child therein) actually turns in the direction of the bank, as seen in FIGS. 5 and 6. Thus, with a single, basic movement (i.e., the movement of rotation about the inclined axis), the air plane device of the present invention provides two basic attitudes of flight, namely, banking and

turning. And, with the provision of the rockers **46** (with the means **54**, **56** and **58** linking the shaft **52** to the platforms **40** and **48**) a third basic attitude of flight is provided using the basic motion provided by the curved surfaces of the rockers on a planar surface.

In order to prevent the cockpit and rockers from "walking" off the platform **20** or **48** with a rocking motion of the toy, two notched, angle plates **76** are shown suitably attached to the platform **48** adjacent the peripheral center of each rocker **46**, and two rollers **77**, respectively attached to the rockers, are disposed to seat respectively in the notches of the angle plates. In this manner, the toy vehicles, as described above, are free to rock about the rollers and angle plates without moving off the platform **20** or **48**. The invention, however, is not limited to such means. Other devices may be used to prevent the toy structure from moving off its platform.

From the foregoing description, it should now be apparent that a new and useful toy structure has been disclosed, the operation of which is simple and safe. Further, the structure is essentially economical to build and manufacture. By use of a minimum number of relatively inexpensive components, the present invention provides an airplane or space capsule toy in which a child can be accommodated to operate the toy to assume attitudes of elevation (in the first embodiment of the invention), or to provide banking, turning and elevating attitudes (in the second embodiment) using only two basic motions of (1) rotation about an inclined longitudinal axis of a cockpit structure, and (2) the motion provided by a curved bottom or rocker surface operatively associated with the cockpit. No third pivoting structure is needed to provide the airplane of the invention with a turning function in a horizontal plane. And, as explained earlier, no costly and possibly unsafe power assists are provided or needed since the user can fully operate the toy with the simple use of his hands.

Though the invention has been described with a certain degree of particularity, changes may be made therein without departing from the spirit and scope thereof.

What is claimed is:

1. A toy device for simulating the attitudes of elevation including level flight, climbing and descending, the device comprising

a cockpit structure for accommodating at least one person to operate the device,

a control arm pivotally attached to said cockpit structure, and extending therein for operation by the person,

a plate structure having a relatively smooth, horizontal upper surface,

a base structure having a bottom surface curved in the direction of simulated flight, and physically associated with said cockpit structure, the curved surface resting on the smooth surface of said plate structure, and

means for pivotally connecting said control arm to said base structure, the movement of said control arm being effective to position the cockpit structure in any desired attitude of elevation within the limits of the curved surface of said bottom structure by moving the curved surface on said plate structure.

2. The device of claim **1** in which the cockpit structure is provided with a seat means facing the control arm for seating a person within cockpit adjacent the control arm.

3. An amusement device comprising

a cockpit structure for accommodating at least one person to operate the device,

means for suspending said cockpit structure along a longitudinal axis thereof that is inclined from the front to the rear of the structure and is above its center of gravity, said mounting means providing a first basic movement of rotation about the inclined axis,

a base structure having a bottom surface curved in the longitudinal direction of said cockpit structure for resting on a substantially flat, horizontal surface, said base structure supporting said cockpit structure on said flat surface, and providing the cockpit with a second basic movement which permits it to assume any attitude of elevation within the limits of said curved bottom surface, and

means for moving said curved bottom structure on said flat surface, and for rotating said cockpit structure about the inclined axis whereby the cockpit can be made to assume elevating, banking and turning attitudes using only the two basic movements.

4. The device of claim **3** in which the means for positioning the body and bottom structures includes a shaft mounted for rotation about its longitudinal axis, and having one end extending into the cockpit,

a pulley mounted on said shaft for rotation therewith, and engaging said shaft to allow movement thereof through said pulley,

cable means attached to opposed sides of the cockpit structure and extending around said pulley for rotating the cockpit about its inclined longitudinal axis when said shaft and pulley are rotated, and

means for pivotally linking the other end of said shaft to the cockpit and to the flat surface on which the rounded bottom surface rests, whereby the cockpit can be positioned in an attitude of elevation by movement of the shaft along its longitudinal axis.

5. The device of claim **4** including a base plate providing the flat surface, and the means pivotally linking the end of shaft to said surface including

universal connecting means fixed to the end of the shaft,

an arm means having one end attached to said base plate, and the other end pivotally attached to said universal connecting means,

said universal connecting means allowing the shaft to simultaneously rotate about its longitudinal axis and to pivot at the location of its attachment to said arm means.

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LOUIS G. MANCENE, Primary Examiner

D. L. WEINHOLD, JR., Assistant Examiner

U.S. Cl. X.R.

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