Nov. 30, 1954 J. L. SERAFIN 2,695,783

SIMULATED AIRCRAFT

Filed July 27, 1953 2 Sheets-Sheet 1

Fig. 1

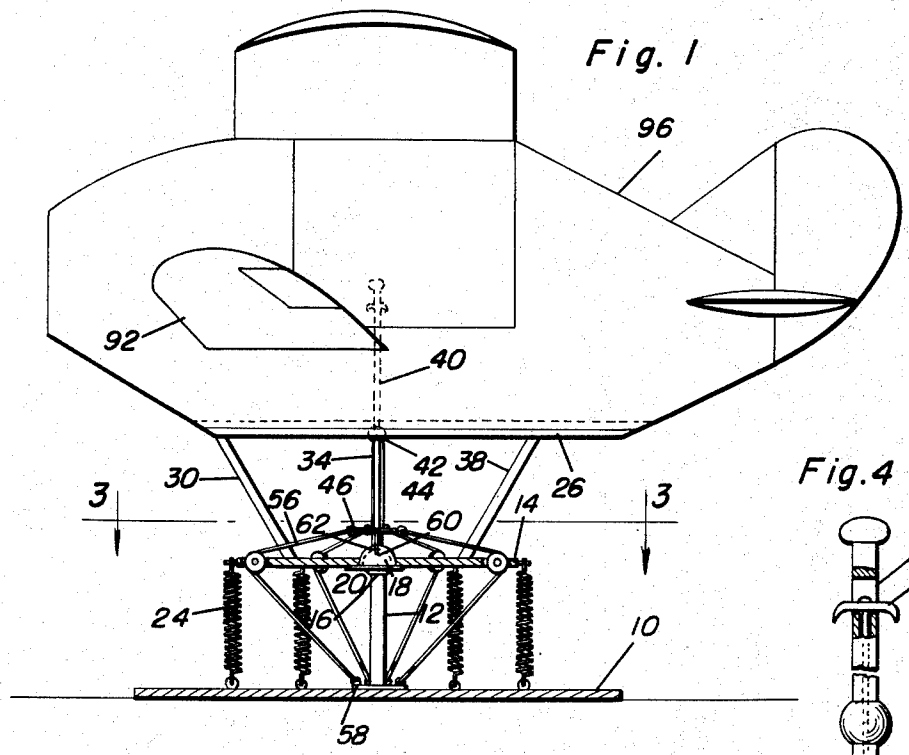


Fig. 4

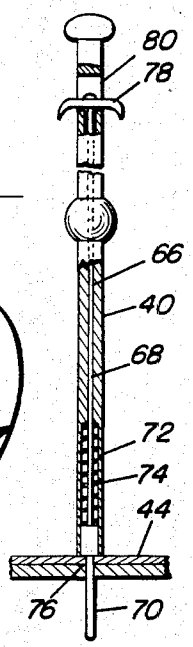
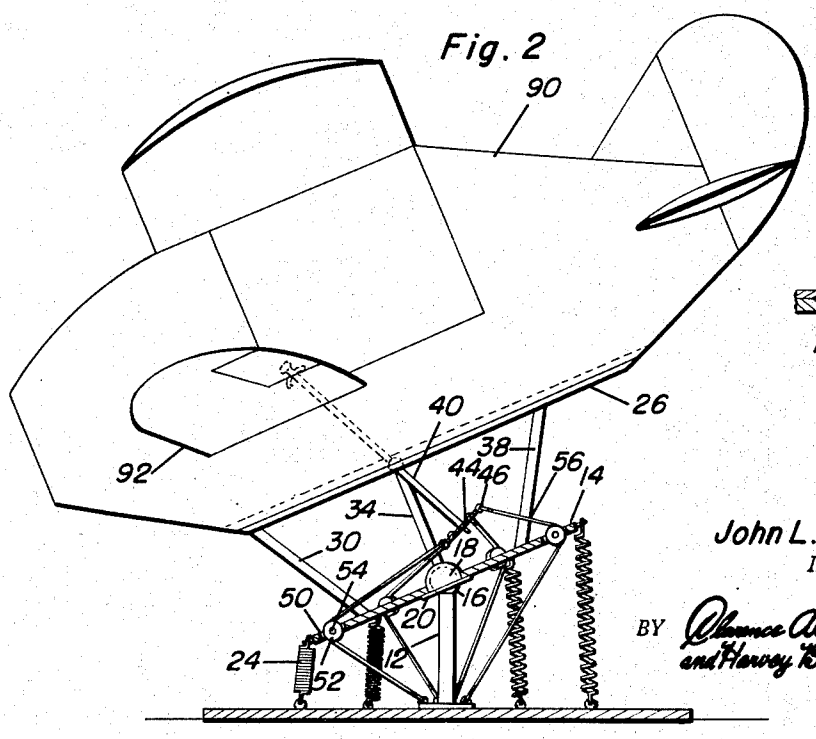


Fig. 2



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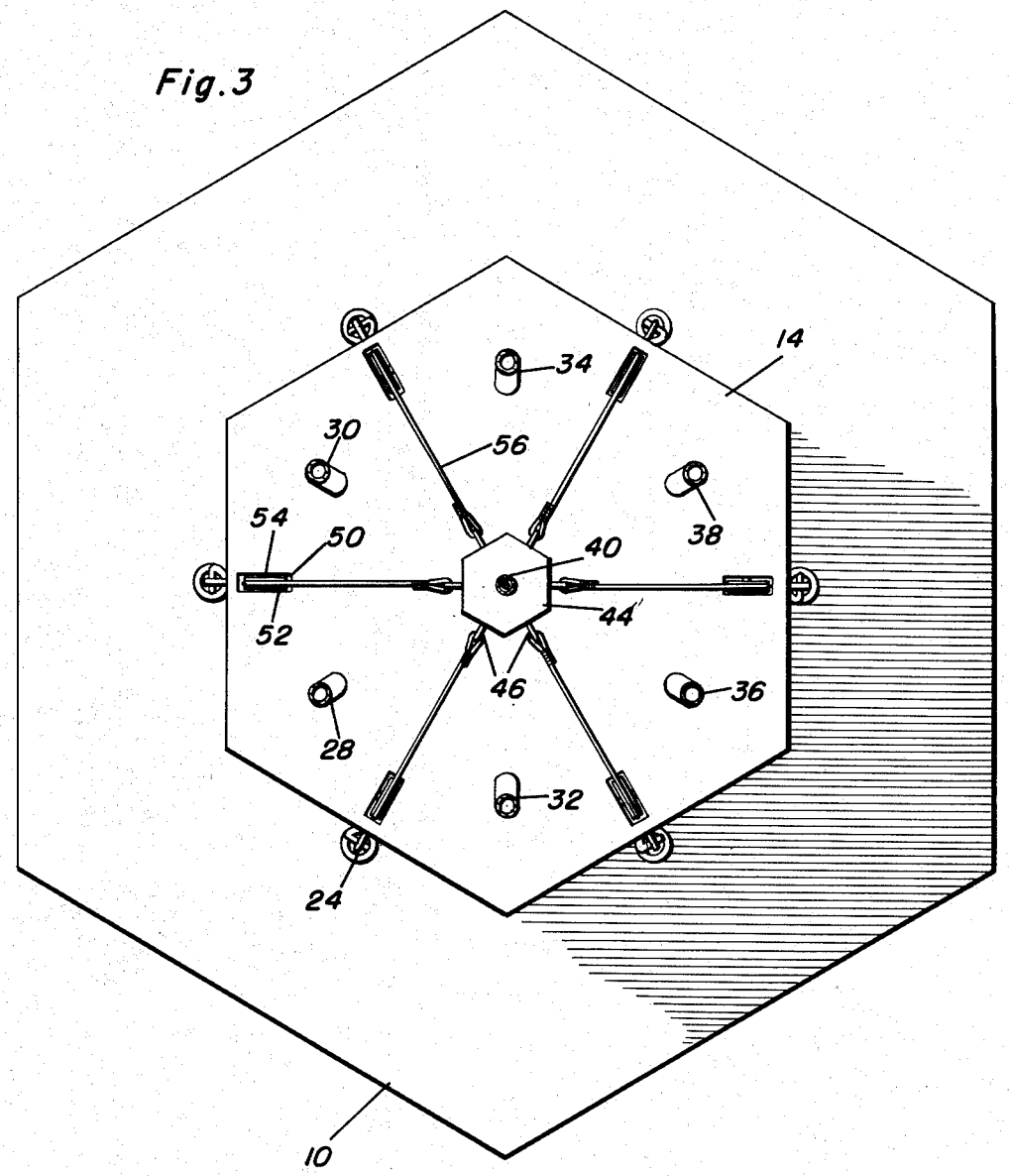
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Fig. 3



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SIMULATED AIRCRAFT

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5 Claims. (Cl. 272—1)

This invention relates to a tilting platform and particularly to a simulated flight trainer in which a platform tilts in response to the operation of a stick by a student.

In the operation of simulated flight trainers it has heretofore been customary to provide a control mechanism operating various controls operating through pressure devices bellows and the like, to move the simulated vehicle in response to the movement of the control stick. The present device relates to a mechanically controlled device in which the position of the simulated trainer is directly responsive to the movement of the stick because of mechanical connection thereto.

In constructing the device according to the present invention, a control platform is mounted for universal movement on a pivot post and secured in yielding predetermined relation thereto by means of a plurality of springs and a tilting platform is rigidly mounted on the control platform and a control stick is universally mounted with respect to the tilting platform and is provided with control cables which pass over cable guides in the control platform so that movement of the stick depresses the edges of the control platform causing tilting motion of the tilting platform in response to movement of the stick.

It is accordingly an object of the invention to provide an improved simulated flight trainer.

It is a further object of the invention to provide a self-operated amusement device.

It is a further object of the invention to provide a platform which may be readily tilted and corrected by means of a student mounted thereon.

It is a further object of the invention to provide a tilting platform having a simulated body mounted thereon.

It is a further object of the invention to provide a simulated body having means for varying the balance or center of gravity thereof.

Other objects and many of the attendant advantages of the present invention will be apparent from the following detailed description taken in conjunction with the accompanying drawing in which:

Figure 1 is a side elevation partially in section of the platform in normal position;

Figure 2 is a similar view of the platform in tilted position;

Figure 3 is an enlarged cross section taken substantially on a plane indicated by the line 3—3 of Figure 1; and

Figure 4 is an enlarged elevation partially in section of the control stick and the locking means mounted therein.

In the exemplification according to the invention a base platform **10** is secured by a desired method in fixed relation to the ground or other position in which it is mounted. A pivot post **12** is rigidly fixed on the base **10** and extends vertically therefrom. A control platform **14** is mounted for universal motion by any suitable type of universal joint herein shown as a ball **16** fixed on the top of a post **12** and a socket **18** engaging the ball **16** and having a flange **20** rigidly secured to the platform **14** so that the platform **14** must necessarily move relative to the ball to move about. The plurality of springs **24** are arranged in annular formation coaxial with the post **12** and are tensioned so that the platform **14** will normally be in parallel relation to the base platform **10**. Obviously the springs **24** may have various tensions so that the control platform **14** does not extend parallel to the base **10** but for purposes of simplified description it will be so described.

Tilting platform **26** is maintained in spaced relation to the control platform **14** by means of a plurality of posts herein indicated as forward posts **28** and **30**, central posts **32** and **34** and rearward posts **36** and **38**, although obviously any suitable arrangement of posts or even a single post could be utilized. A control stick **40** extends through the platform **26** and is connected thereto by means of a ball and socket joint **42** so that the stick **40** has universal movement with respect to platform **26** and may be moved in any direction for a purpose presently to be described.

The stick **40** is preferably hollow for a purpose also presently to be described and extends into proximity with the universal joint between the platform **14** and the post **12** and is provided with a connection plate **44** having a plurality of eyes **46** mounted around the periphery thereof in annular formation coaxial with the control stick **40**.

The control platform **14** is provided with a plurality of cable guides herein illustrated as radially placed slots **50** arranged adjacent to the periphery of the platform **14** and each of the slots **50** is provided with a sheave **52** mounted on an axle **54** so that the sheave may readily turn about the axle **54**. Slots **50** and the sheaves **52** are arranged in radial formation about the universal joint between the platform **14** and the post **12** with the slots **50** arranged in annular formation coaxially over the post **12**.

Control cables **56** are secured to the eyes **46** and are entrained through the guides by means of entrainment over the sheaves **52**. Lower ends of the cables **56** are connected to eyes **58** preferably mounted in the base **10** in proximity to the bottom of the post **12** but obviously may be connected either on the post or in any place adjacent to the junction of the base **10** and the post **12**.

In order to secure the tilting platform so that an operator may descend from or ascend onto the platform, a locking device is provided between the control platform **14** and the post **12** so that the control platform and the tilting platform associated therewith may be held substantially immovable. For this purpose the post **12** or the ball **16** mounted thereon is provided with an axial aperture **60** and the socket **18** is provided with an aperture **62** which may be aligned therewith. The control stick **40** is provided with a longitudinally extending bore **66** in which extends a control rod **68** terminating in a projecting lock pin **70**. The lower end of the stick **40** is counterbored at **72** to provide a seat for compression spring **74** for projecting the lock pin **70** outward through an aperture **76** in the member **44**. A handle **78** is longitudinally slidable in a slot **80** adjacent the top of the control stick **40** so that the handle **78** may be raised to remove the locking pin **70** from operative position. Any suitable arrangement may be provided for maintaining the handle in elevated position during the utilization of the device by a trainee.

For simplicity of illustration the springs **24** have been shown as of equal tension and length so that the platform **14** is maintained substantially parallel to the base platform **10**. However, it is obvious that these springs might be of various lengths for various purposes to give peculiar biases to the operation of the device. Likewise the control cables **56** have been shown as of equal length so that the platform **14** is at horizontal position when the stick **40** is in vertical position. Obviously these cables may be variously adjusted to give set biases to the control stick **40** to simulate side winds and the like.

In order to make the tilting platform more realistic a simulated body **90** is mounted on the platform **26**. The simulated body **90** herein illustrates a trainer type plane and has extending wings **92**.

In the operation of the device the platform **26** will be locked in rigid position by means of the lock pin **70** after which an operator will take his position on the platform **26** and elevate the handle **78** to release the platform for motion. Any motion of the stick, as for example pushing forward, will cause the bottom end of the stick to move backwards and shorten the control ropes **56** in a backward direction and lengthen the control

ropes **56** in a forward direction so that the forward end of the platform **14** will be pressed downwardly while the rearward end of the platform will be elevated causing the plane to extend into a nose dive formation. Thus the stick has a universal motion, obviously the body **90** may be moved into any desired simulated position and may be readily corrected by correcting the stick to its normal central position. Since the center of gravity of the device, including the pilot, is at the universal joint with the control platform and the post **12** movement of the operator in moving the handle forward will move the center of gravity forward and assist in the operation of moving the simulated body to an angular position. This will simultaneously release the tension in the springs **24** of the forward end of the platform and increase the tensions in the springs **24** at the back side of the platform. To correct this situation the pilot will move his weight backwards moving the stick backward so that the cables **56** will again adjust themselves and the tension springs **24** will assist in moving the platform until the springs are substantially evenly tensed. Backward movement of the pilot of course shifts the center of gravity rearwardly as he moves backwards so as to assist in the orientation of the platform.

When the lesson has been completed handle **78** will be released and the control stick moved into proper position to lock the ball and socket joints together to rigidify the structure so that the student may descend in safety from the platform **26**.

For the purpose of exemplification a particular embodiment of the invention has been shown and described according to best present understanding thereof. However, it will be apparent to those skilled in the arts that various changes and modifications in the construction and arrangement of parts thereof may be readily resorted to without departing from the true spirit of the invention.

What is claimed as new is as follows:

1. An amusement device comprising a fixed base, a pivot post fixed on said base, a ball top on said pivot post, a socket secured on said ball top, a control platform fixed on said socket, spring means yieldingly urging said control platform into substantially parallel relation with said base, a tilting platform spaced from and rigidly secured to said control platform, a control stick extending through said tilting platform, a ball and socket connection between said control stick and said tilting platform, a plurality of sheaves mounted on said control platform, said sheaves being arranged in annular formation and having radial position with respect to said socket, a plurality of control cables secured to said control stick and entrained over said sheaves, said cables being secured in proximity to said pivot post.

2. An amusement device comprising a fixed base, a pivot post fixed on said base, a ball top on said pivot post, a socket secured on said ball top, a control platform fixed on said socket, spring means yieldingly urging said control platform into substantially parallel relation with said base, a tilting platform spaced from and rigidly secured to said control platform, a control stick extending through said tilting platform, a ball and socket connection between said control stick and said tilting platform, a plurality of sheaves mounted on said control platform, said sheaves being arranged in annular formation and having radial position with respect to said socket, a plurality of control cables secured to said control stick and entrained over said sheaves, said cables being secured in proximity to said pivot post, a simulated vehicle body mounted on said tilting platform.

3. An amusement device comprising a fixed base, a pivot post fixed on said base, a ball top on said pivot post, a socket secured on said ball top, a control platform fixed on said socket, spring means yieldingly urging said control platform into substantially parallel relation with said base, a tilting platform spaced from and rigidly secured to said control platform, a control stick extending through said tilting platform, a ball and socket connection between said control stick and said tilting platform, a plurality of sheaves mounted on said control platform, said sheaves being arranged in annular formation and having radial positions with respect to said socket, a plurality of control cables secured to said control stick and entrained over said sheaves, said cables being secured in proximity to said pivot post, a bore in said ball coaxial with said pivot post, said socket having an aperture alignable with said bore, a lock pin mounted in said control stick and projectible into engagement with said aperture and said bore.

4. A simulated flight device comprising a fixed pivot post, a control platform, a universal joint connecting said control platform to said pivot post, resilient means yieldingly urging said control platform into a predetermined relation to said pivot post, a tilting platform, fixed in spaced relation to said control platform, a control stick extending through said tilting platform, a universal joint connecting said stick to said tilting platform, a plurality of cable guides mounted in said control platform in annular relation to said pivot post, a plurality of control cables connected to said control stick, said cables extending through the respective guides and being secured in proximity to said pivot post.

5. A simulated flight device comprising a fixed pivot post, a control platform, a universal joint connecting said control platform to said pivot post, resilient means yieldingly urging said control platform into a predetermined relation to said pivot post, a tilting platform, fixed in spaced relation to said control platform, a control stick extending through said tilting platform, a universal joint connecting said stick to said tilting platform, a plurality of cable guides mounted in said control platform in annular relation to said pivot post, a plurality of control cables connected to said control stick, said cables extending through the respective guides and being secured in proximity to said pivot post, means operable from said tilting platform for locking said control platform to said pivot post.

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