F. J. H. HAZARD.

AMUSEMENT DEVICE.

APPLICATION FILED SEPT. 12, 1910.

1,022,674.

Patented Apr. 9, 1912.

3 SHEETS—SHEET 1.

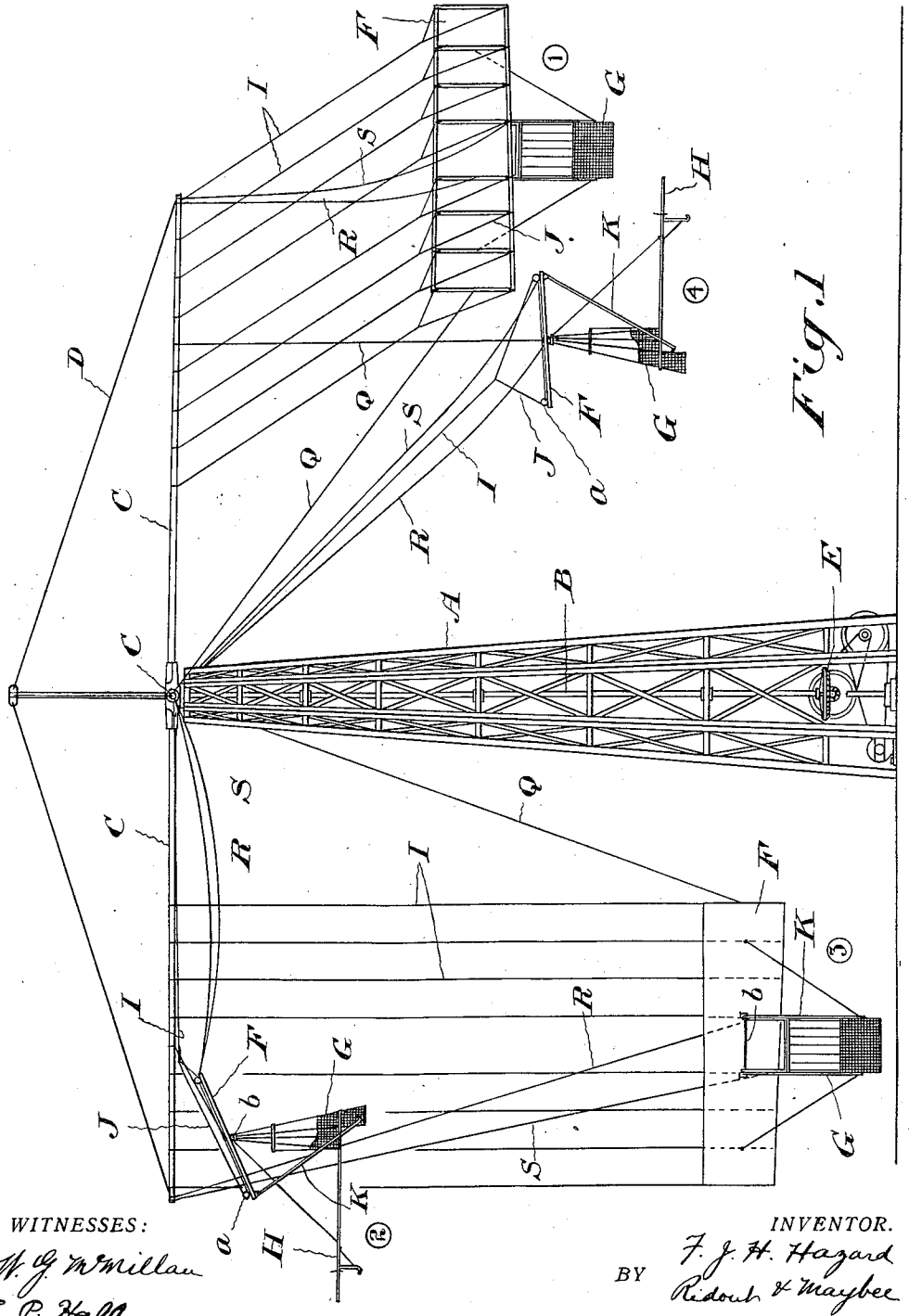

Fig. 1

WITNESSES:

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E. P. Hall.

INVENTOR.

BY F. J. H. Hazard

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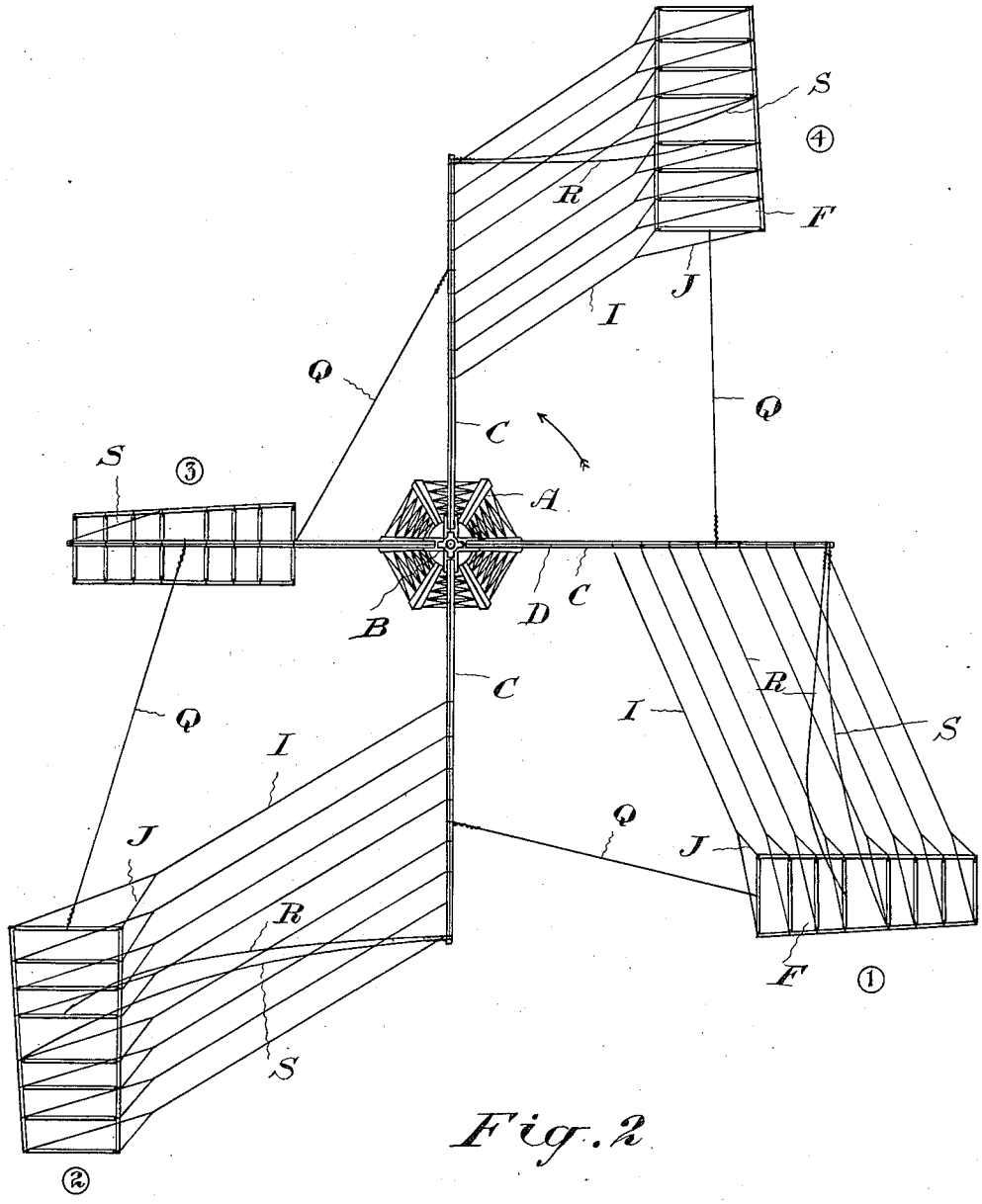

Fig. 2.

WITNESSES:

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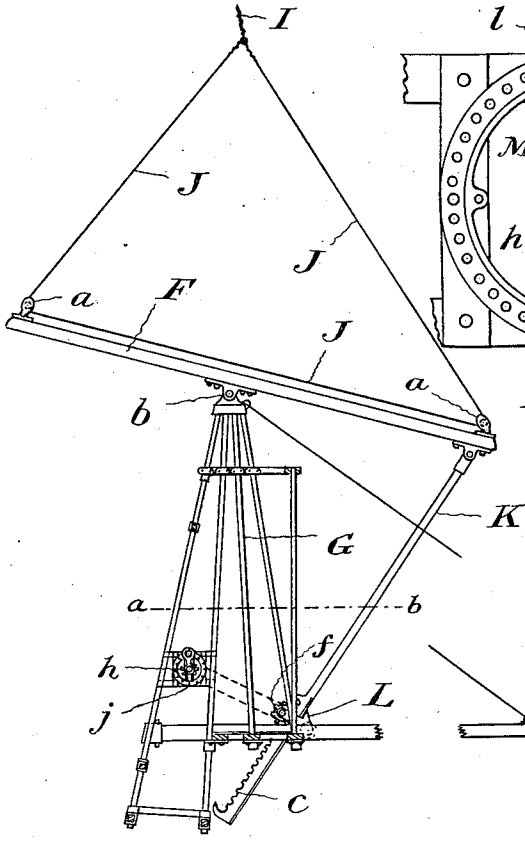


Fig. 3

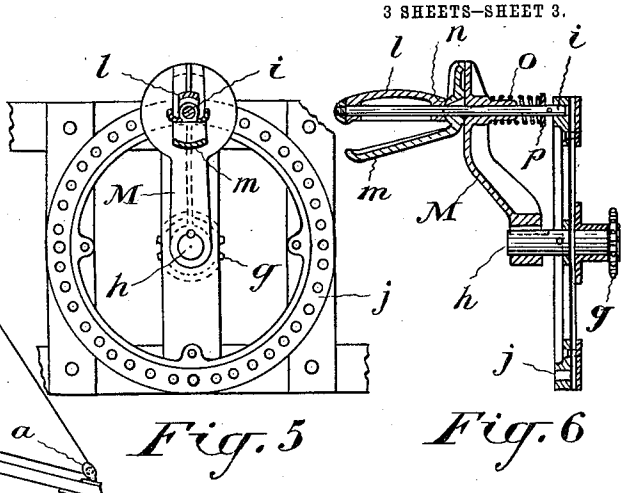
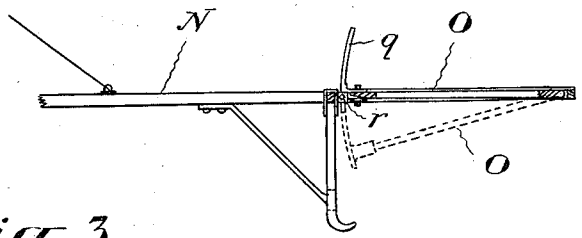


Fig. 5

Fig. 6



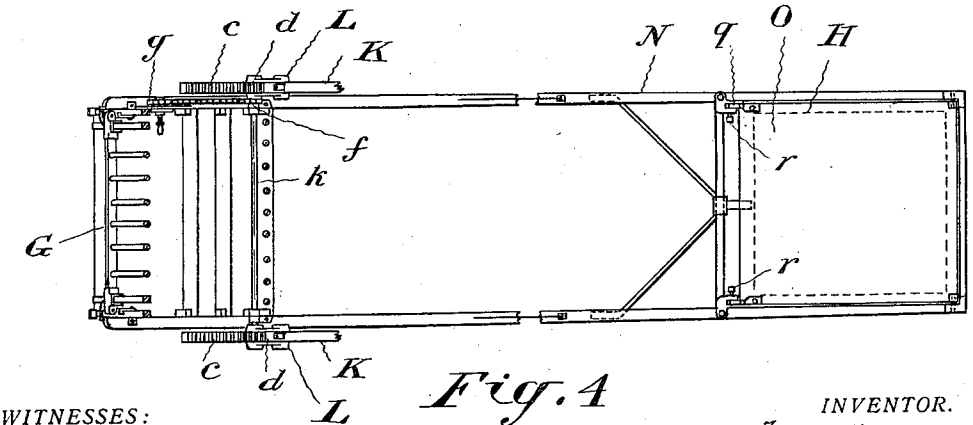


Fig. 4

WITNESSES:

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UNITED STATES PATENT OFFICE.

FREDERICK J. H. HAZARD, OF TORONTO, ONTARIO, CANADA.

AMUSEMENT DEVICE.

1,022,674. Specification of Letters Patent. Patented Apr. 9, 1912.

Application filed September 12, 1910. Serial No. 581,624.

To all whom it may concern:

Be it known that I, FREDERICK J. H. HAZARD, of the city of Toronto, Province of Ontario, Canada, have invented certain new and useful Improvements in Amusement Devices, of which the following is a specification.

My object is to devise amusement apparatus in which the sensations of aviation may be experienced with perfect safety and I attain this object by means of aeroplanes suitably tethered to the ends of horizontal arms rotating about a vertical spindle.

In practice the connections with the horizontal arms are each formed of a plurality of parallel cables connected to the plane beneath which the passenger's seat is hung. Means are provided for altering the angle of the plane to the horizontal, for preventing erratic dipping or lifting, for resisting the centrifugal tendency of the individual planes, and for preventing them falling in to the center.

Various other details of construction possess considerable importance as will hereinafter appear.

Figure 1 is an elevation of my device. Fig. 2 is a plan view of the same. Fig. 3 is an enlarged side elevation of one of the car bodies and its lifting plane. Fig. 4 is a section on the line *a*—*b* in Fig. 3. Fig. 5 is a front elevation of the retaining means for the lifting plane adjusting mechanism. Fig. 6 is a vertical section through the center of Fig. 5.

In the drawings like letters of reference indicate corresponding parts in the different figures.

A is a tower in which is journaled a vertical shaft B. A plurality of substantially horizontal arms C are secured to this vertical shaft and are braced thereon by the diagonal braces D. The vertical shaft B is provided with any suitable driving mechanism such as E whereby it may be rotated to cause the arms C to rotate at a relatively high rate of speed. To each arm is connected an aeroplane and these aeroplanes in the construction shown being four in number are denominated 1, 2, 3 and 4 respectively. These aeroplanes for the purpose of illustration are shown in the drawings in four different positions, but it will be understood, of course, that all the aeroplanes will occupy similar positions relative to the arm and tower under similar conditions. Each aeroplane comprises a lifting plane F, a body G suspended therefrom and a horizontal tail H suitably connected with the body.

The aeroplanes are connected with the arms C in the following manner. A plurality of parallel traction connections I are flexibly connected with one of the arms at one end and with one of the aeroplanes at the other. These traction connections might be rods, though they are preferably wire cables. When wire cables are employed any ordinary connections with the arms and aeroplanes will answer as the cables themselves supply the necessary flexibility. These traction connections are preferably connected directly to the lifting planes and in the following manner:—For each traction connection a bridle J, is provided, the bridle passing around pulleys *a* at both back and front of the plane while the traction connection is connected with the bight thereof between the pulleys. These bridles it will be seen form self-adjusting connections between the traction connections I, and the lifting planes, the bridle adjusting itself automatically to suit the angle between the lifting plane and the arm to which it is connected.

As the object of the device is to cause the plane to rise by the pressure of air engendered as the arms rotate a suitable traction connection between the arm and the aeroplane is of the utmost importance, and I find that the plurality of parallel traction connections combined with the bridles satisfactorily answers the purpose.

In order that the rising and the falling of the aeroplanes may be under control I find it desirable to provide means whereby the angle of the plane relative to the body may be altered. For this purpose I form a hinged connection *b* between the body G and the lifting plane F and provide the following adjusting mechanism. Arms K are pivotally connected at their upper ends with the lifting plane. These arms slide through guide brackets L on the car body, and each is provided with a rack *c*. This rack is engaged by a pinion *d* secured to the spindle *k*, transversely journaled on the car body. Secured to the spindle *k* is a sprocket wheel *f* actuated by a sprocket chain from the sprocket wheel *g* secured to a spindle *h* journaled on the frame of the body. It will be noted that the body is shaped as a seat to accommodate one or two passengers and the

sprocket wheel *g* is located at a position close to the hand of one of the passengers. The crank arm M is secured to the spindle *h* and is provided with a sliding latch *i* adapted to engage any one of a series of holes in the adjusting circle *j*. The latch *i* has formed thereon the grip *l*. A bent lever *m* has a hole formed therein through which the latch *i* loosely passes. At this point the bent lever is preferably provided with a rounded projection *n* engaging the grip *l*. One part of the bent lever engages the crank arm M and the other is opposed to the grip *l* so that the two may be gripped together and the bent lever rocked to withdraw the sliding latch *i*. A coil spring *o* engages the crank arm and also a collar *p* on the latch. This spring tends to force the latch *i* into engagement with one of the holes of the circle *j*. From this arrangement it will be seen that the latch may be easily released and the crank arm rotated to adjust the lifting plane to the desired angle with the body. On releasing the handle the latch will be thrown forward to engage one of the holes in the adjusting circle. The lifting plane will then be located at the desired angle to the body.

As a tendency exists for the car to pitch in a backward and forward direction I provide a horizontal steadying tail. That is preferably arranged in the following manner—N is a rearwardly extending open frame suitably braced. To the rear end of this frame is hinged a suitably constructed tail O. The forward end of this tail is preferably provided with the arc-shaped adjusting rods *q* passing through suitable guides on the frame N and adapted to be clamped therein by means of set screws *r*. Thus the angle of the tail may be adjusted to produce the desired steadying effect.

I find that some means must be employed to check centrifugal action so as to prevent the aeroplane flying out too far past the ends of the arms C. For this purpose I provide the guys Q, each of which is connected at one end with one of the lifting planes F substantially at the center of one end and is connected at the other end with the adjacent arm C. There also exists the possibility of an aeroplane coming down rapidly and swinging in to the center sufficiently to strike the tower. To restrain this movement I provide the guys R. Each guy R is connected with a lifting plane so that it lies substantially in a vertical plane which includes the supporting arm when the aeroplane is at rest and each guy is inclined outwardly and secured to the supporting arm outside its point of connection with the lifting plane. These guys are of such a length that they are substantially taut when an aeroplane is in the position shown at the left hand lower side of Fig. 1. Owing to the angle at which the guy lies relative to the traction connections I, the aeroplane can only swing farther inward by lifting bodily and its weight combined with that of its passengers is sufficient to prevent this.

When a plane is at rest I find that it will have a tendency to tilt backward. I restrain this tendency by means of the guys S. Each of these guys is arranged in a very similar manner to the guys R, but is connected with the back of the lifting plane as shown so as to support the same when the aeroplane is at rest. These guys R and S slacken up when the aeroplane is in motion as indicated.

When the vertical spindle is located each aeroplane will lift and fly steadily reaching substantially the level of the arms C. A rise and fall of the aeroplane, while the apparatus is in motion, may be obtained by adjusting the lifting plane relative to the body, as hereinbefore set forth, and any aeroplane may thus be caused to descend while the apparatus is in full motion, the various restraining guys already described preventing any abnormal movements as set forth.

With this device a very successful imitation of free aviation can be obtained.

What I claim as my invention is:—

1. The combination of a movable arm; means for moving the arm; an aeroplane; a body suspended therefrom; and a plurality of parallel traction connections flexibly connected with said arm and the lifting plane of said aeroplane, said connections lying in a plane transverse to the direction of motion and intersecting the said plane intermediate its front and rear edges.

2. The combination of a movable arm; means for moving the arm; an aeroplane; a traction connection flexibly connected with said arm; and a flexible self-adjusting bridle forming a connection between the traction connection and the lifting plane of said aeroplane.

3. The combination of a movable arm; means for moving the arm; an aeroplane; a plurality of parallel traction connections flexibly connected with said arm; and flexible self-adjusting bridles forming connections between the traction connections and the lifting plane of said aeroplane.

4. The combination of a movable arm; means for moving the arm; an aeroplane comprising a lifting plane, a passenger carrying body suspended therefrom, and means for varying the angle of the plane relative to the body; and a plurality of parallel traction connections flexibly connected with said arm and the aeroplane, said connections lying in a plane transverse to the direction of motion and intersecting the said plane intermediate its front and rear edges.

5. The combination of a movable arm; means for moving the arm; an aeroplane comprising a lifting plane, a passenger carrying body suspended therefrom, and a substantially horizontal tail connected to the body; and a plurality of parallel traction connections flexibly connected with said arm and the aeroplane, said connections lying in a plane transverse to the direction of motion and intersecting the said plane intermediate its front and rear edges.

6. The combination of a movable arm; means for moving the arm; an aeroplane; and a plurality of parallel traction connections flexibly connected with said arm and the aeroplane; and a guy connected with the aeroplane substantially in a vertical plane including the arm when the aeroplane is at rest and connected with the arm at a point outside the point of connection of said guy with the aeroplane.

7. The combination with a movable arm; means for moving the arm; an aeroplane; a body suspended therefrom, a plurality of parallel traction connections flexibly connected with said arm and the lifting plane of said aeroplane, said connections lying in a plane transverse to the direction of motion and intersecting the said plane intermediate its front and rear edges and a guy connected to the rear of the lifting plane and to the arm outside the point of connection of said guy with the lifting plane.

8. The combination of a movable arm; means for moving the arm; an aeroplane; a plurality of parallel traction connections flexibly connected with said arm and said aeroplane; a second arm at an angle to the first and rotating therewith; and a guy connected to the aeroplane and to said second arm to limit centrifugal movement.

Toronto this 6th day of Sept. 1910.

FREDERICK J. H. HAZARD.

Signed in the presence of—

J. EDW. MAYBEE,

E. P. HALL.