

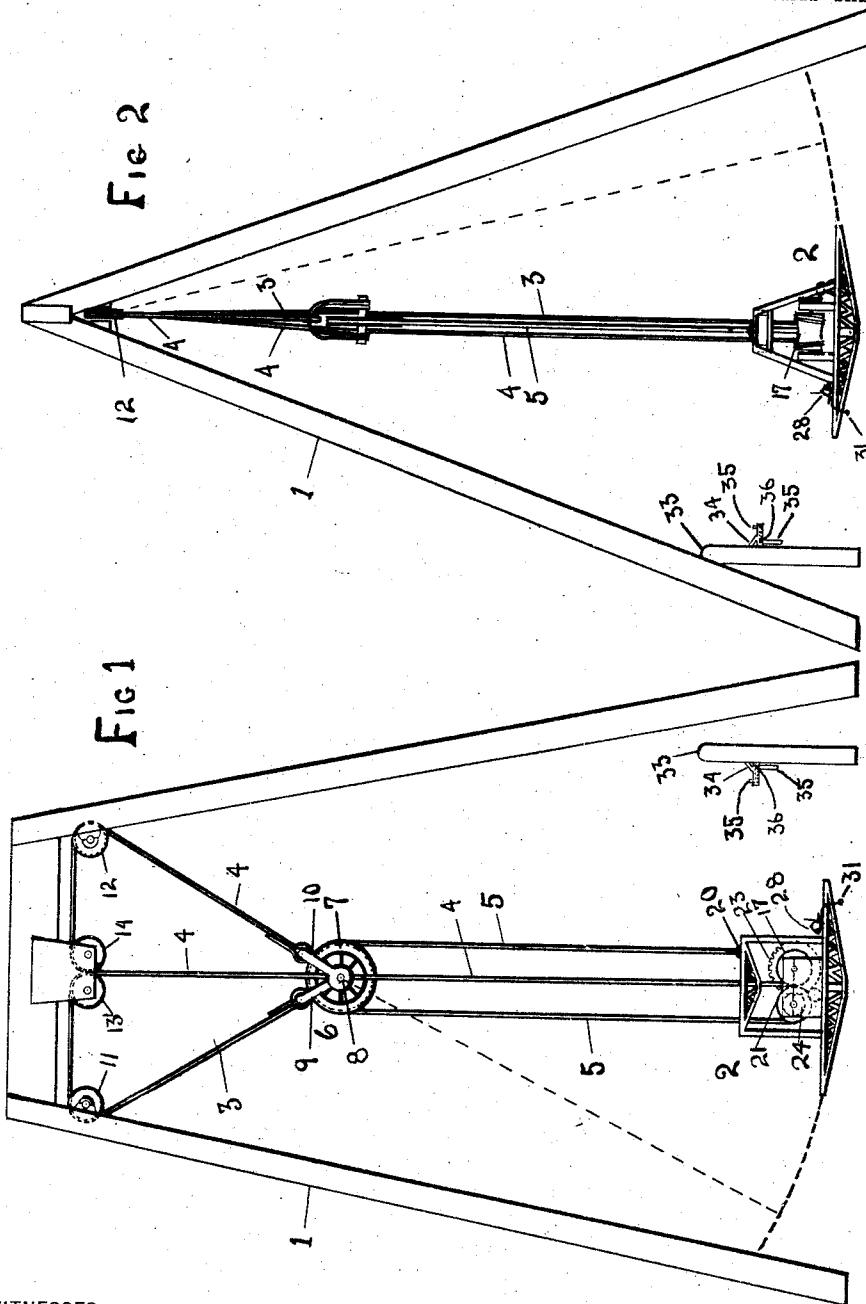
No. 854,183.

PATENTED MAY 21, 1907.

A. SPICE.  
SWING.

APPLICATION FILED JULY 14, 1905.

6 SHEETS—SHEET 1.



WITNESSES:

*S. C. Hicks*  
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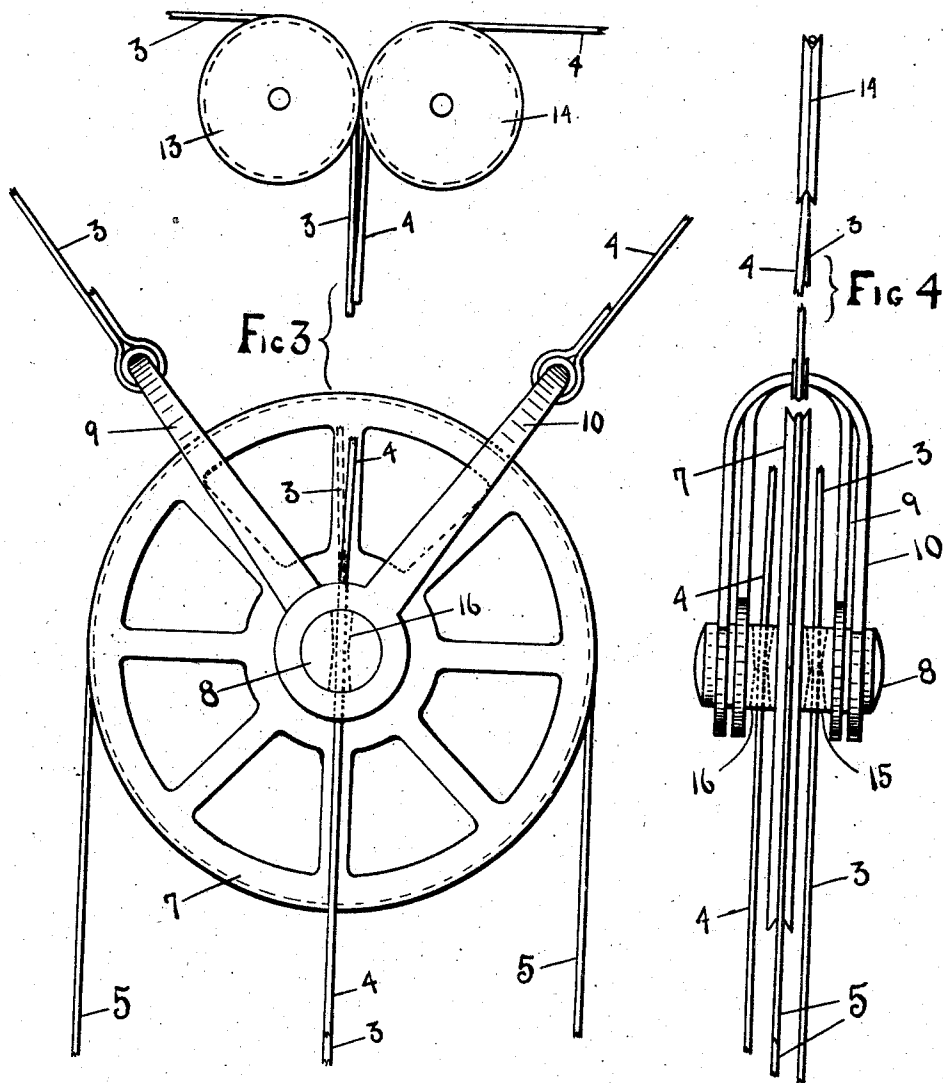
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6 SHEETS—SHEET 2.



Witnesses  
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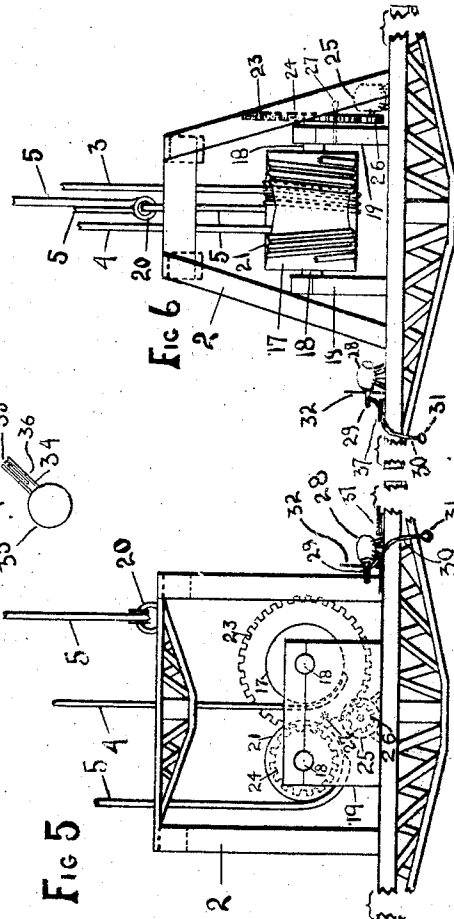
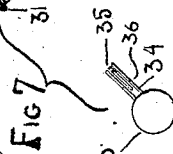
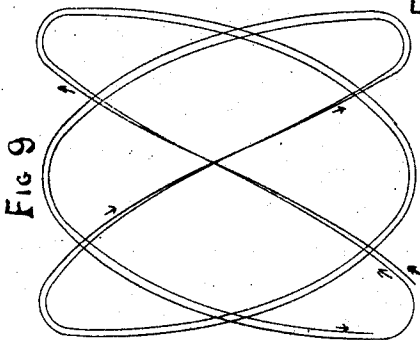
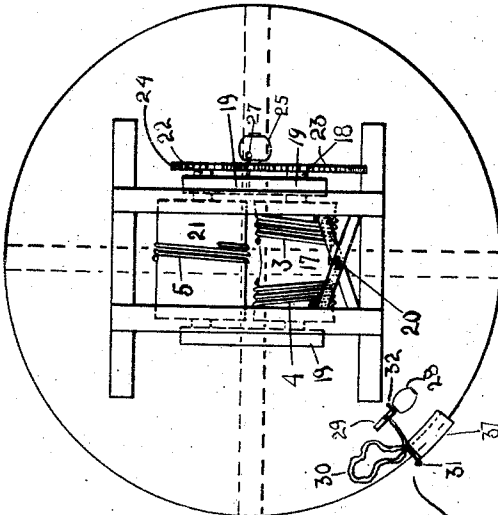
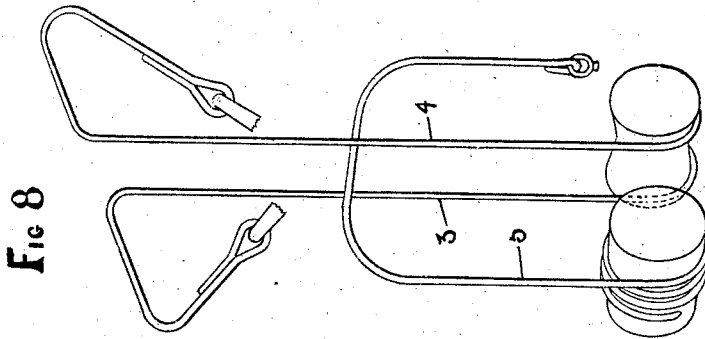
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6 SHEETS—SHEET 3.



Witnesses  
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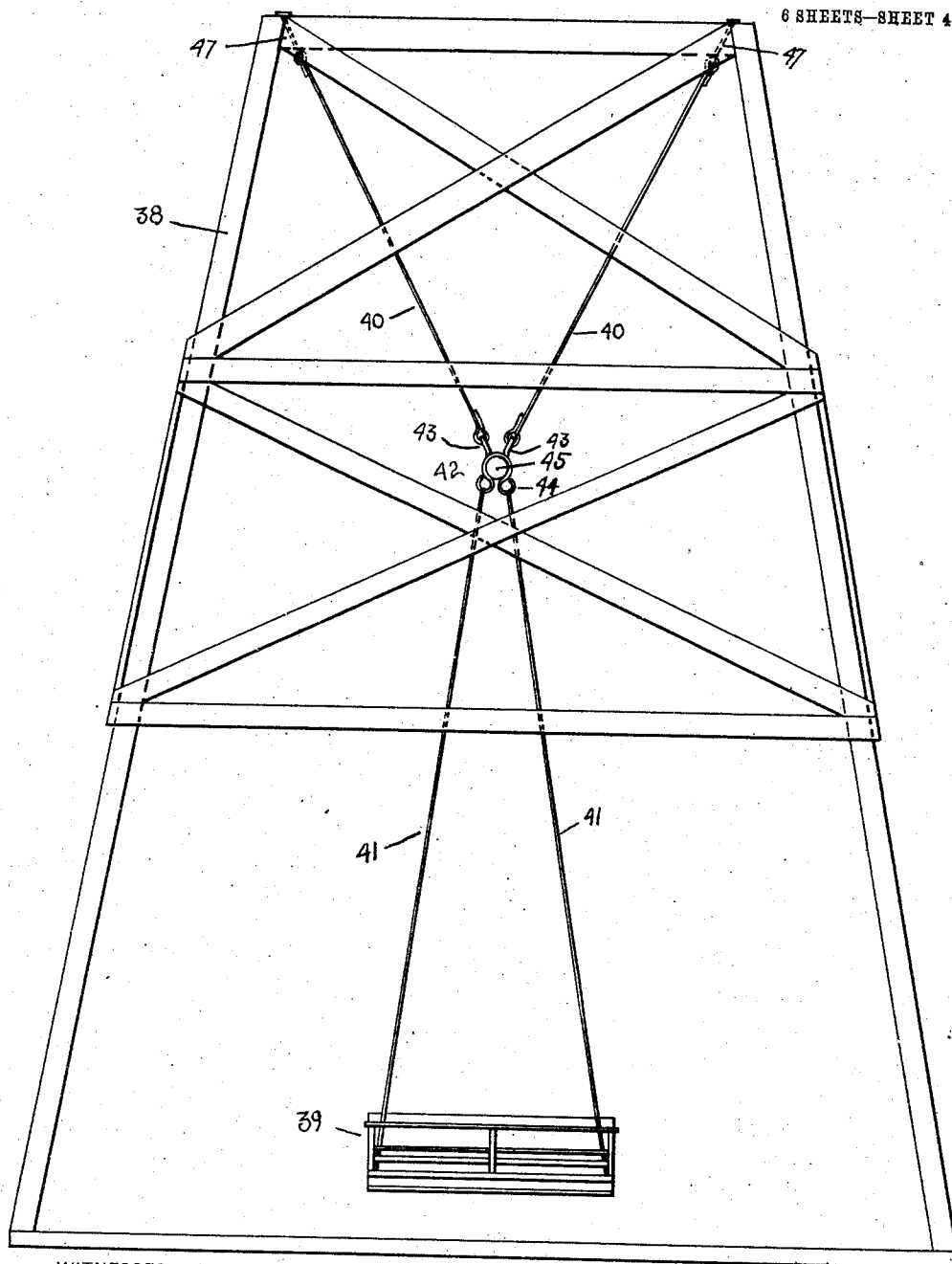
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6 SHEETS—SHEET 4.



WITNESSES:

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FIG 10

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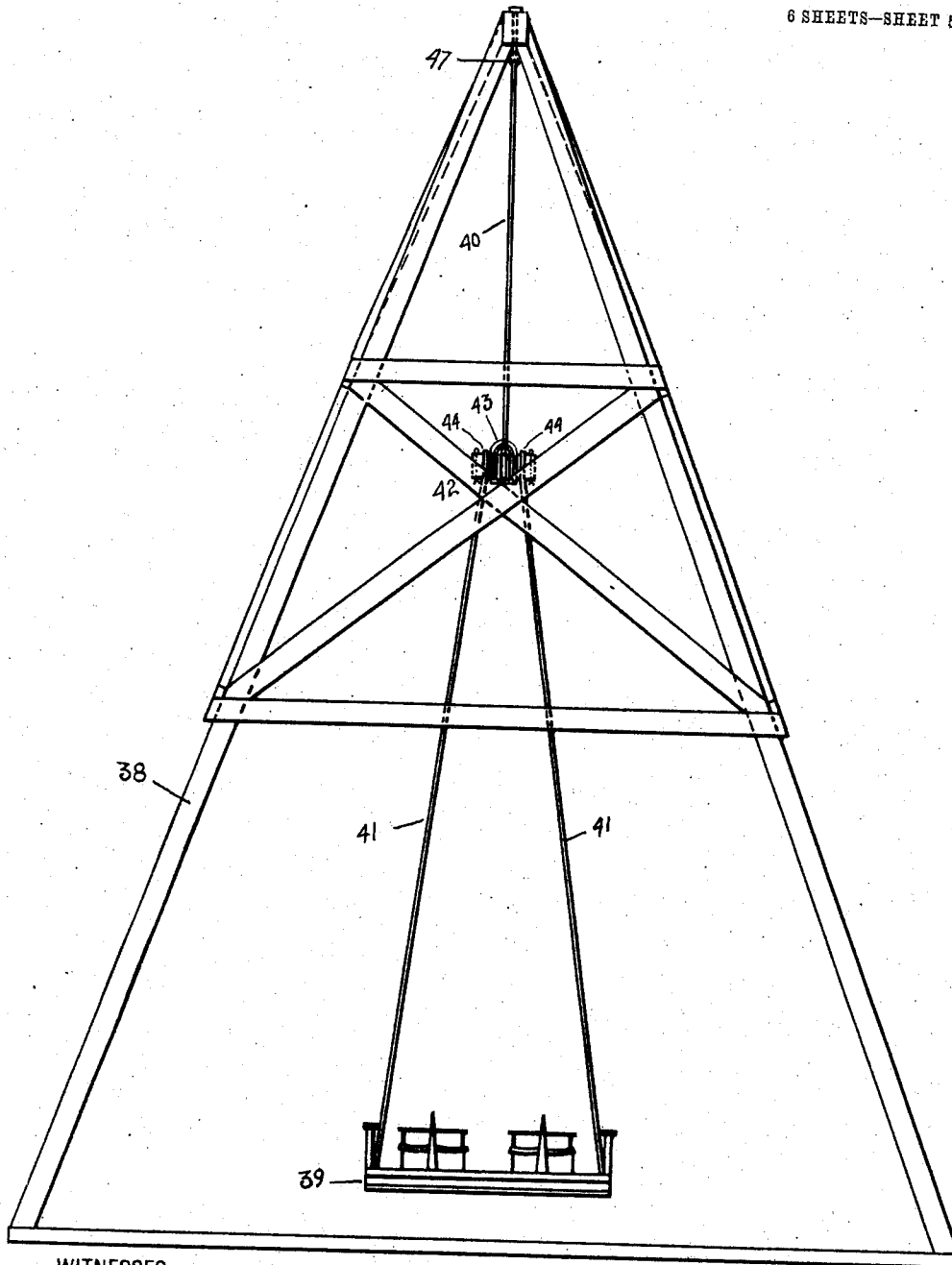
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APPLICATION FILED JULY 14, 1906.

6 SHEETS—SHEET 5.



WITNESSES:

FIG 11

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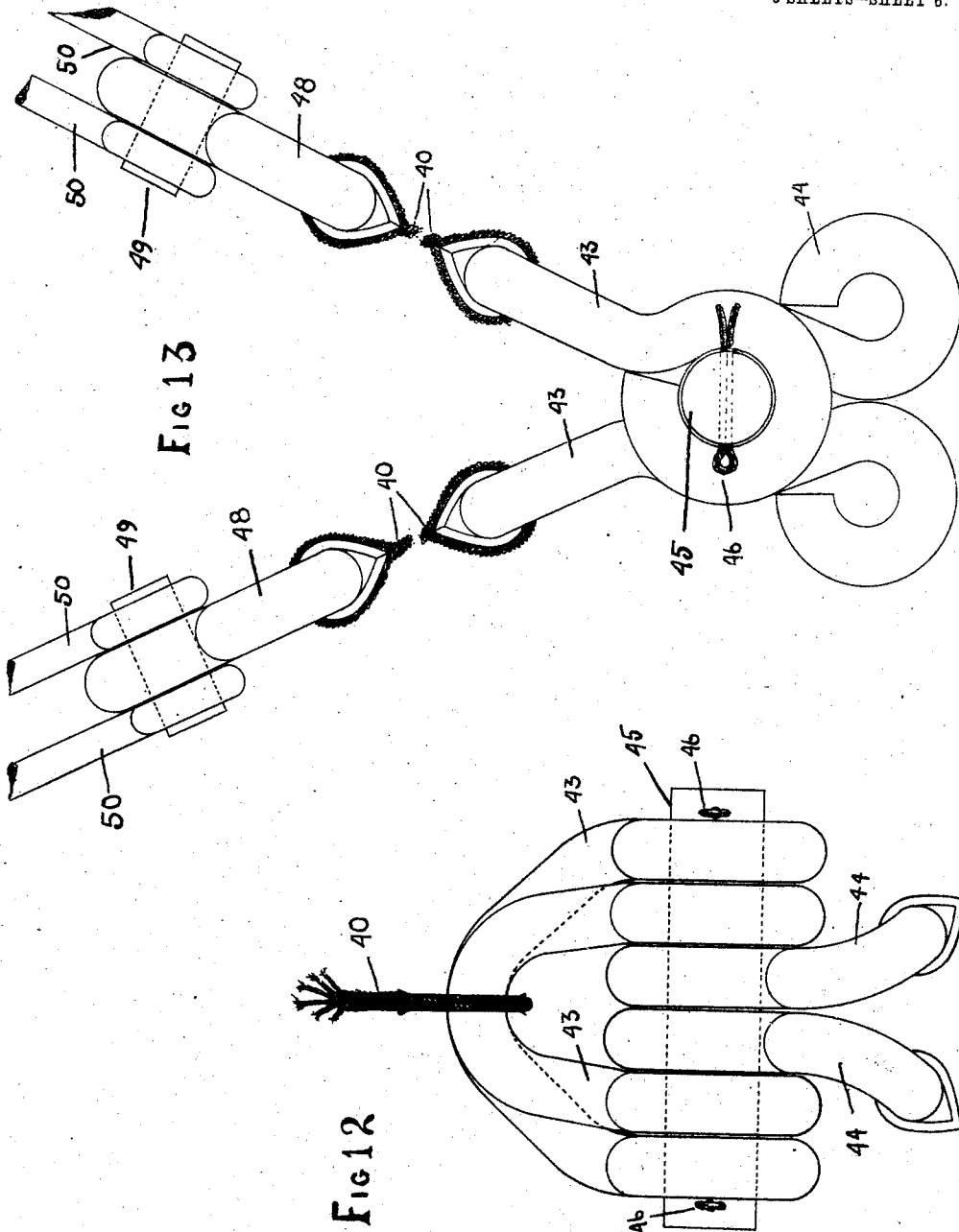
No. 854,183.

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A. SPICE.  
SWING.

APPLICATION FILED JULY 14, 1905.

6 SHEETS—SHEET 6.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

ALFRED SPICE, OF NEW YORK, N. Y.

## SWING.

No. 854,183.

Specification of Letters Patent.

Patented May 21, 1907.

Application filed July 14, 1906. Serial No. 269,665.

*To, all whom it may concern:*

Be it known that I, ALFRED SPICE, a citizen of the United States of America, and a resident of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Swings, of which the following is a specification.

This invention relates in general to amusement devices, and particularly to that class of amusement devices in which passengers are subjected to complex or unusual motions, and comes more specifically under the designation of swings.

The object is to produce a simple and comparatively inexpensive contrivance by which passengers are carried through novel and surprising movements.

The principle made use of is that illustrated by the Blackburn double pendulum, also by the oscillograph, both well known to physicists; and, in addition to the rise and fall due to the arc of the swing, the path over which the passengers are carried is that of a Lassajous's figure, sometimes called acoustic figures, and also well known.

Defined in a general way, the invention consists of a supporting frame, a car for carrying passengers, and a Blackburn's double pendulum by which the car is suspended to freely swing from the frame.

More specifically, the invention consists of a tower-like frame of a suitable height, a car for the passengers, a Blackburn's double pendulum by which the car is suspended from the top of the frame, means for adjusting the Blackburn's pendulum to vary the relative relation to each other of its two different isochronous periods, a device for pulling the car aside from its position of equilibrium and then releasing it, allowing it to swing freely, and a braking arrangement for bringing the car to a stationary condition at will. The car, of course, is pulled aside in a direction diagonal to a line joining the points of suspension of the pendulum from the frame, in order to obtain by gravity the resultant motion necessary to cause the car to describe the Lassajous's figure. Of course in the present device the pendulum and consequently the figures described by the car, are of giant size. The height of the supporting frame is determined according to the amplitude and the absolute periods in which it is desired that the car shall swing.

For further and more minute details of construction reference will be had to the accompanying drawings.

Figure 1 is a side elevation of the complete device. Fig. 2 is an end elevation of what is shown in Fig. 1, as viewed from the right of Fig. 1. The dotted lines in Figs. 1 and 2 show the radii and the arcs of the swing of the car. Fig. 3 is an enlarged view in elevation of the pulley wheel and its adjuncts as seen in Fig. 1, portions of the cables being broken away. Fig. 4 is an elevation of what is shown in Fig. 3 at right angles thereto and from the right, the parts being in the same position as seen in Fig. 2. Fig. 5 is an enlarged and detached view in elevation of the car and its appurtenances as seen in Fig. 1, portions being broken away. Fig. 6 is an enlarged detached elevation of the car and its appurtenances, as viewed from the right of Fig. 5, with portions broken away. Fig. 7 is a plan of what is seen in Figs. 5 and 6, with the addition of a plan view of the post and catch seen in elevation in Figs. 1 and 2. Fig. 8 is a perspective diagram of the three adjusting cables and the two drums upon which they wind, all else being omitted, so as to clearly show the number and positions of the cables. The cables are as they would appear when viewed diagonally from the front and left of Fig. 1. Fig. 9 shows one of the Lassajous's figures which the car may be made to describe, the oscillations required to produce this figure being in the ratio of 2 to 3. Fig. 10 is a side elevation of a modification of the device, the starting motor and its adjuncts being omitted from the drawing. In this modified form of the invention no adjusting means is provided for the pendulum. Fig. 11 is an end elevation of what is shown in Fig. 10. Fig. 12 is an enlarged view of the connecting block for the pendulum, the view being the same as in Fig. 11, but the construction being slightly modified over that shown in Fig. 11 by having the two eyes for the lower cables placed between the two clevises for the upper cables, instead of outside thereof, on the common pin. Fig. 13 is a view from the left of Fig. 12, with the addition of a modified construction over that shown in Figs. 10 and 11 for attaching the ends of the upper cables to the supporting frame, the said cables being broken away.

Referring to Figs. 1 to 9 inclusive, 1 is a supporting frame, of any suitable material, such as wood or steel, and from which is suspended the car 2 by the cables 3, 4 and 5.

The height of the frame 1 may be anything desired, according to the time it is desired shall be consumed by the car 2 in making a swing, for example, a height of fifty feet would give a period of about four seconds to the major oscillation. The base of the frame is sufficiently wide to allow ample clearance for the swinging car in all directions. Means is provided for adjusting the said cables so as to vary the path described by the car 2, also mechanism for starting and stopping the swinging of the said car, all of which will now be described in detail. 6 is a pulley block carrying the pulley wheel 7 mounted loosely upon the shaft 8 which forms a pin for the two clevises 9 and 10 to which are attached respectively ends of the cables 3 and 4 which diverge from each other in an upward direction and pass respectively over the pulleys 11 and 12 and then over the pulleys 13 and 14, all of the said four pulleys being carried by the frame 1 and arranged in horizontal alignment with each other, the pulleys 13 and 14 being directly above the pulley block 6 and the pulleys 11 and 12 at opposite sides of the top of the frame 1, as shown. After leaving the pulleys 13 and 14 respectively the cables 3 and 4 pass downward through the guiding apertures 15 and 16 respectively in the shaft 8 to the car 2, where both are attached to and wind upon the same side of a double coned drum 17 fixed upon a shaft 18 supported in a framework 19 carried by the said car. Why the drum 17 is coned will presently appear. A third cable 5 is attached to the car 2 at 20, passes upward over the pulley wheel 7, and then back to the car 2, where it is secured to and winds upon a cylindrical drum 21 in the same direction that the cables 3 and 4 wind upon the drum 17, the drum 21 being fixed upon a shaft 22 which is mounted in the framework 19. On the shafts 18 and 22 respectively are fixed two intermeshing gears 23 and 24; from which it is obvious that the two drums 17 and 21 must always rotate together but in opposite directions; and it also follows, from the details of construction already given, that if the said drums be rotated the cables 3 and 4 will be wound up on the coned drum 17 while the cable 5 will be unwound from the cylindrical drum 21, or vice versa, according to the directions of rotation of the drums. The drums may be rotated by the motor 25, having a pinion 26 which meshes with the gear 23, and may be locked in a stationary position by inserting the removable pin 27 through the gear 23 into the framework 19. When the cables 3 and 4 are caused to be wound upon the coned drum 17 it is clear that the pulley block 6 will be raised and the distance shortened between a line joining the pulleys 11, 12, 13 and 14, and the axis of the shaft 8, and at the same time, if no way of compensation were provided, the car 2 would be raised equally with the block 6; but while the cables 3 and 4 are winding upon the drum 17 the cable 5 is unwinding from the drum 21, and it is apparent that the effect of the unwinding of the cable 5 will be to increase the distance between the block 6 and the car 2; the final result being that the car 2 remains practically at the same height while the pulley block 6 moves up or down as the drums 17 and 21 are rotated in the one direction or the other, the various coacting parts being relatively so proportioned as to produce this effect. As the cable 5 does not attach directly to the block 6, but passes over the pulley wheel 7, it is evident that in order to move the block 6 the same distance, twice the length of the cable 5 must be wound or unwound as of the cables 3 and 4, and this is brought about, as shown, by making the gear 24 with half the number of teeth, and of half the size, of gear 23, the two drums 17 and 21 being of substantially the same size; but it is obvious that the same result could equally well be accomplished by making the two drums of different sizes and the gear wheels of the same size. Owing to the convergence of the cables 3 and 4 from the pulleys 11 and 12 respectively to the block 6, it is apparent that the resultant motion of the block 6 will be slightly greater than the distance traveled by the cables 3 and 4 in winding on the drum 17, also that this discrepancy increases as the cables 3 and 4 are wound up. To compensate for the increasing angle of the cables 3 and 4 to each other from the block 6, the drum 17 is doubly coned and the cables 3 and 4 wound from the larger toward the smaller portions, so that in winding constantly less and less of the cables 3 and 4 is taken up. This compensation, while not precisely exact, is sufficient for all practical purposes. Mounted upon the car 2 is a second motor 28 which carries a third drum 29 upon which winds a fourth cable 30 having at its free end a loop 31, and a hand brake 32 is provided for the drum 29. Located in a stationary position just outside of the limit of swing of the car 2, and at about a midway position within one of the angles which would be formed by planes extended downwardly from a line joining the pulleys 11, 12, 13 and 14, and from the axis of the shaft 8, as shown in Figs. 1, 2 and 7, is a post 33 carrying a bracket 34 in which is pivoted a catch 35 by the pivot pin 36, the catch 35 being for receiving the loop 31 of the cable 30. Fastened at the edge of the car 2 adjacent to the motor 28 is a trip plate 37, for contacting with the lower end of the catch 35 and thus causing its upper end to be withdrawn below the upper surface of the bracket 34 and at the same time from the loop 31 of the cable 30 for releasing the same when the said cable is sufficiently wound upon the drum 29 by the motor 28, which is

called the starting motor because it is used for drawing the car to one side from its position of equilibrium, after which the car is automatically released, by the plate 37 coming in contact with the lower end of the catch 35, and is left free to swing. The car 2 may be stopped from swinging at will by throwing the loop 31 of the cable 30, which is already mostly wound upon the drum 29, over the catch 35, at one of the positions of momentary rest of the car and when it is near by, and applying the brake 32 to the drum 29 just sufficiently to let the car 2 gradually lower to its position of equilibrium. The car 2 is free to swing in one direction from the pulleys 11, 12, 13 and 14 as a fulcrum, and also in a direction at right angles thereto from the shaft 8 as a fulcrum.

In the modified form of the invention shown in Figs. 10 to 13 inclusive, 38 is a supporting frame, similar to the frame 1, from which is suspended the car 39 by the two cables 40 and the four cables 41, one of the cables 41 being concealed behind the others. 42 is an intermediate block consisting of the two clevises 43, the two eyes 44, and the shaft 45 which forms a pin for the said clevises and also passes through the said eyes and is held in place by cotter pins 46. The two cables 40 attach to the clevises 43 respectively and then diverging from each other upwardly are attached at their other ends to the two eye bolts 47 respectively carried by the frame 38. The four cables 41 are attached to the car 39, and at their other ends two to each of the eyes 44. It is seen that in one direction the car 39 is free to swing from the points of suspension at the eye bolts 47, and in the other direction, at right angles to the first named direction, the car is free to swing from the shaft 45 of the block 42.

The starting motor and the braking device for stopping the car are omitted from the drawing, but would be the same as shown in Figs. 1 to 9 inclusive. It is obvious also that the device could be operated directly by hand if desired.

A modified manner of securing the upper ends of the cables 40 is shown in Fig. 13; the cables 40, instead of attaching directly to eye bolts 47, are secured to eyes 48 which pivot on the pins 49 each held by two eye bolts 50, shown as partly broken away. The suspending ropes, being widely spaced from one another, form means for preventing the car from rotating on a vertical axis. The various forces acting on the car will be insufficient to twist these ropes.

In operating the device, the passengers are permitted to come aboard the car while it is resting at the position of equilibrium; the starting motor is then operated to wind up its cable, the free end of said cable having previously been connected to the hereinbefore

described catch for holding it, and as the cable is wound upon the drum of the starting motor the car is drawn aside from its position of equilibrium in a direction diagonal to a line joining the points of suspension of the car from the frame, and when the extreme of the desired limit of movement of the car is neared, the said catch is tripped by the further movement of the car and automatically releases the end of the cable, and the car, now being released and not in a state of equilibrium, will start to swing by its own weight and will continue to freely swing as a result of gravity and the acquired momentum due thereto, and, owing to the direction in which it was drawn aside, the course followed by the swinging car will be the resultant of the two different periodic pendular motions, constituting what is known as a Lissajous's figure, which is described over and over again in gradually decreasing sizes, and, if left to itself, the car would eventually regain its original position of equilibrium; however, the motion of the car is not allowed to die out, as that would take too long, as well as its movements be too slight toward the last, but when the desired number of swings have been executed, or when the desired length of time has elapsed, the car is brought to a stop by throwing the loop at the free end of the starting cable over the beforementioned catch for receiving it, the cable being mostly wound upon its drum at the time and the car at one of its positions of momentary rest, then the brake is applied to the drum upon which the cable is wound and the cable gradually paid out till the car reaches its position of equilibrium, when the passengers may disembark and be replaced by others, and the performance be repeated *ad infinitum*. When it is desired to change the form of the path over which the swinging car travels, the lock pin 27, holding the two intergeared adjusting rollers 17 and 21 from revolving, is removed and the said drums rotated in the one direction or the other as desired, thus, by the mechanism previously described, causing the intermediate pulley block 6, whose shaft 8 is the fulcrum of the shorter component of the pendulum, to travel up or down, as already explained, thus lengthening or shortening the shorter of the two parts of the pendulum and changing their relative lengths to each other, as the longer component, whose fulcrum is the line joining the pulleys 11, 12, 13 and 14, remains unchanged in length, and therefore, by causing a different ratio of the two periodic motions, cause a different figure to be described by the car. In this way the ratios may be made anything desired, as 1 to 2, 2 to 3, 3 to 4, etc., or anywhere intermediate.

I claim as my invention:

1. In an amusement device, the combination of a car for passengers, a supporting frame, a Blackburn's double pendulum sus-

pending said car from said frame, a motor for starting said car to swinging, after which it is propelled by gravity and its own momentum, and a braking device for stopping said car.

2. In an amusement device, the combination of a Blackburn's double pendulum, a car for carrying passengers, said car constituting a bob weight for said pendulum, and an arrangement for preventing said car from rotating upon a vertical axis.

3. In a swing, the combination of a car for passengers, a supporting frame, a Blackburn's double pendulum suspending said car from said frame, and an arrangement for preventing said car from rotating upon a vertical axis.

4. In an amusement device, the combination of a car for passengers, a supporting frame, a Blackburn's double pendulum suspending said car from said frame, a motor for starting said car to swinging, after which it is propelled by gravity and its own momentum, a braking device for stopping said car, and an arrangement for preventing said car from rotating upon a vertical axis.

5. In an amusement device, the combination of a supporting frame, a car for passengers, a Blackburn's double pendulum suspending said car from said frame, a motor, a drum for said motor, a cable for winding on said drum, and a catch for receiving and holding the free end of the cable, the said motor and the said catch being relatively located one on the said car and the other in a stationary position extraneous to said car and in the angle between what would be the paths of the two component parts of the said double pendulum considered individually.

6. In an amusement device, the combination of a supporting frame, a car for passengers, a Blackburn's double pendulum suspending said car from said frame, means for preventing said car from rotating upon a vertical axis, a motor, a drum for said motor, a cable for winding on said drum, and a catch for receiving and holding the free end of the cable, the said motor and the said catch being relatively located one on the said car and the other in a stationary position extraneous to said car and in the angle between what would be the paths of the two component parts of the double pendulum considered individually.

7. In an amusement device, the combination of a supporting frame, a car for passengers, a Blackburn's double pendulum suspending said car from said frame, means for preventing said car from rotating upon a vertical axis, a motor, a drum for said motor, a cable for winding on said drum, a catch for receiving and holding the free end of the cable, the said motor and the said catch being relatively located one on the said car and the other in a stationary position extraneous

to said car and in the angle between what would be the paths of the two component parts of the double pendulum considered individually, and a brake for said drum.

8. In an amusement device, the combination of a supporting frame, a car for passengers, a Blackburn's double pendulum suspending said car from said frame, means for preventing said car from rotating upon a vertical axis, a motor, a drum for said motor, a cable for winding on said drum, and a catch for receiving and holding the free end of the cable, the said motor and the said catch being relatively located one on the said car and the other in a stationary position extraneous to said car and in the angle between what would be the paths of the two component parts of the double pendulum considered individually, said catch being adapted to release said cable automatically when the said cable is wound to its fullest extent upon the said drum.

9. In an amusement device, the combination of a supporting frame, a car for passengers, a Blackburn's double pendulum suspending said car from said frame, means for preventing said car from rotating on a vertical axis, a motor for moving said car away from its position of equilibrium, a drum for said motor, a cable for winding on said drum, a catch for receiving and holding the free end of the cable, the said motor and the said catch being relatively located one on the said car and the other in a stationary position extraneous to said car and in the angle between what would be the paths of the component parts of the double pendulum considered individually, said catch being adapted to release said cable automatically when the said cable is wound to its fullest extent upon the said drum, the car being left free to be set in motion by gravity, and a brake for said drum for bringing the said car to rest after the free end of the cable is again caused to be engaged by said catch.

10. In an amusement device, the combination of a supporting frame, a passenger car, a block intermediate to said car and said frame, members connecting and suspending said block from two relatively horizontally disposed points on said frame, other members connecting and suspending said car from said block, a motor for starting said car to swinging, after which it is propelled by gravity and its own momentum, and a brake for stopping the said car.

11. In an amusement device, the combination of a car for passengers, a supporting frame, a Blackburn's double pendulum suspending said car from said frame, a motor for starting said car to swinging, a brake for stopping said car, and means for varying the relative lengths of the component parts of said double pendulum.

12. In an amusement device, the combination of a supporting frame, a car for passengers, a Blackburn's double pendulum suspending said car from said frame, means for preventing said car from rotating upon a vertical axis, a motor, a drum for said motor, a cable for winding on said drum, and a catch for receiving and holding the free end of the cable, the said motor and the said catch being relatively located one on the said car and the other in a stationary position extraneous

nation of a supporting frame, a car for passengers, a Blackburn's double pendulum suspending said car from said frame, means for preventing said car from rotating upon a vertical axis, a motor, a drum for said motor, a cable for winding on said drum, a catch for receiving and holding the free end of the cable, the said motor and the said catch being relatively located one on the said car and the other in a stationary position extraneous to said car and in the angle between what would be the paths of the two component parts of the double pendulum considered individually, and mechanism for adjusting the relative lengths of the component parts of said pendulum.

13. In an amusement device, the combination of a supporting frame, a car for passengers, a Blackburn's double pendulum suspending said car from said frame, means for preventing said car from rotating upon a vertical axis, a motor for moving said car away from its position of equilibrium, a drum for said motor, a cable for winding on said drum, a catch for receiving and holding the free end of the cable, the said motor and the said catch being relatively located one on the said car and the other in a stationary position extraneous to said car and in the angle between what would be the paths of the two component parts of the double pendulum considered individually, said catch being adapted to automatically release said cable when the said cable is wound to its fullest extent upon said drum, the said car being left free to be set in motion by gravity, a brake for said drum for bringing the said car to rest after the free end of the cable is again caused to be engaged by said catch, and mechanism for adjusting the relative lengths of the component parts of said pendulum.

14. In an amusement device, the combination of a supporting frame, a passenger car, a block intermediate to said car and said frame, cables connecting and suspending said block from two relatively horizontally disposed points on said frame, other cables connecting and suspending said car from said block, a motor for starting said car to swinging, a brake for stopping said car, and means for lengthening and shortening the said two sets of cables relatively to each other, whereby the relative distance of said block from a line joining the two above mentioned points of suspension and from said car is changed.

15. In an amusement device, the combination of a supporting frame, a passenger car suspended from said frame, an intermediate block above said car, two pulleys side by side on said frame above said block, two more pulleys on said frame alined with the first two and disposed horizontally to each other at opposite sides of the said first named pulleys, two cables attached to said block and passing respectively first over the last named

pulleys then over the first named pulleys then down to the car, a pulley wheel carried by said block, a third cable attached to said car and passing over said pulley wheel and then back to said car, and two drums carried by said car and geared with each other to revolve together, the two first named cables winding upon one of the said drums and the last named cable upon the other in such manner that as the first named cables are wound up on the one drum the last named cable is unwound from the other drum and vice versa, the said block having guiding surfaces for the two first named cables, the drum upon which the single cable winds rotating with substantially twice the peripheral speed of the other drum.

16. In an amusement device, the combination of a supporting frame, a passenger car suspended from said frame, an intermediate block above said car, two pulleys side by side on said frame above said block, two more pulleys on said frame alined with the first two and disposed horizontally to each other at opposite sides of the said first named pulleys, two cables attached to said block and passing respectively first over the last named pulleys then over the first named pulleys then down to the car, a pulley wheel carried by said block, a third cable attached to said car and passing over said pulley wheel and then back to said car, and two drums carried by said car and geared with each other to revolve together, the two first named cables winding upon one of the said drums and the last named cable upon the other in such manner that as the first named cables are wound up on the one drum the last named cable is unwound from the other drum and vice versa, the said block having guiding surfaces for the two first named cables, the said block consisting of a shaft for said pulley wheel, and clevises to which the ends of the two first named cables are attached, the said shaft constituting a pin for said clevises and being at an angle horizontally to a line joining the above named alined pulleys.

17. In an amusement device, the combination of a supporting frame, a passenger car suspended from said frame, an intermediate block above said car, two pulleys side by side on said frame above said block, two more pulleys in line with the first two in a horizontal direction and at opposite sides thereof, two cables attached to said block and passing respectively first over the last named pulleys then over the first named pulleys then down to the car, a pulley wheel carried by said block, a third cable attached to said car and passing over said pulley wheel and then back to said car, two drums carried by said car and geared with each other to revolve together, the two first named cables winding upon one of the said drums and the last named cable upon the other in such manner that as the two first

named cables are wound up on the one drum the last named cable is unwound from the other drum and vice versa, the said block having guiding surfaces for the two first named cables, the said block consisting of a shaft for said pulley wheel, and clevises to which the ends of the two first named cables are attached, the said shaft constituting a pin for said clevises and being at an angle horizontally to a line joining the above named horizontally disposed pulleys, a motor for rotating said drums, the drum upon which the single cable winds rotating with substantially twice the peripheral speed of the other drum, and means for locking said drums against rotation.

18. In an amusement device, the combination of a supporting frame, a passenger car suspended from said frame, an intermediate block above said car, two pulleys side by side on said frame above said block, two more pulleys at opposite sides of the first two and horizontally in line therewith, two cables attached to said block and passing respectively first over the last named pulleys then over the first named pulleys then down to the car, a pulley wheel carried by said block, a third cable attached to said car and passing over said pulley wheel and then back to said car, two drums carried by said car and geared with each other to revolve together, the two first named cables winding upon the same side of one of the said drums and the last named cable winding upon the other drum, the cables being wound in such manner that as the two first named cables are wound up on the one drum the last named cable is unwound from the other drum and vice versa, the said block having guiding surfaces for the two first named cables, the said block consisting of a shaft for said pulley wheel, and clevises to which the ends of the two first named cables are attached, the said shaft constituting a pin for said clevises and being at an angle horizontally to a line joining the above named horizontally aligned pulleys, a motor for rotating said drums, means for locking said drums against rotation, a motor for starting said car to swinging in a direction diagonal to the said line joining the aligned pulleys, the said car, after being started, being propelled by its own momentum and by gravity, and a brake for stopping the said car from swinging.

19. In an amusement device, the combination of a supporting frame, a passenger car suspended from said frame, an intermediate block above said car, two pulleys side by side on said frame above said block, two more pulleys at opposite sides of the first two and horizontally in line therewith, two cables attached to said block and passing respectively first over the last named pulleys then over the first named pulleys then down to the car, a pulley wheel carried by the said

block, a third cable attached to said car and passing over said pulley wheel and then back to said car, two drums carried by said car and geared with each other to revolve together, one of said drums being cylindrical and the other of the shape of the joined frustums of a double cone, the last named cable winding upon the cylindrical drum and the two first named cables winding respectively upon the two coned portions of the other drum and each in winding passing from the larger toward the smaller portions of the said double coned drum, the cables being disposed in such manner that as the one cable is wound up on the cylindrical drum the other two cables are unwound from the double coned drum and vice versa, the said block having guiding surfaces for the two first named cables, the cylindrical drum rotating with substantially twice the peripheral speed of the coned drum.

20. In an amusement device, the combination of a supporting frame, a passenger car suspended from said frame, an intermediate block above said car, two pulleys side by side on said frame above said block, two more pulleys at opposite sides of the first two and horizontally in line therewith, two cables attached to said block and passing respectively first over the last named pulleys then over the first named pulleys then down to the car, a pulley wheel carried by said block, a third cable attached to said car and passing over said pulley wheel and then back to said car, and two drums carried by said car and geared with each other to revolve together, the two first named cables winding upon the same side of one of the said drums and the last named cable winding upon the other drum, the said drum upon which the two cables wind having the shape of the joined frustums of a double cone, each of the said two cables winding respectively upon one of the coned portions, the said two cables in winding passing from the larger toward the smaller portions of the said double coned drum, and the other drum, upon which the last named cable winds, being cylindrical, the relative directions of the winding of the cables upon the two said drums being such that as the two first named cables are wound up on the coned drum the last named cable is unwound from the cylindrical drum and vice versa, the said block consisting of a shaft for said pulley wheel, and two clevises to which the ends of the two first named cables are attached respectively, the said shaft constituting a pin for said clevises and being disposed at an angle horizontally to a line joining the above named horizontally aligned pulleys, the said shaft having apertures for guiding the two first named cables.

21. In an amusement device, the combination of a supporting frame, a passenger car suspended from said frame, an intermediate

block above said car, two pulleys side by side on said frame above said block, two more pulleys at opposite sides of the first two and horizontally in line therewith, two cables attached to said block and passing respectively first over the last named pulleys then over the first named pulleys then down to the car, a pulley wheel carried by said block, a third cable attached to said car and passing over said pulley wheel and then back to said car, two drums carried by said car and geared with each other to revolve together, the two first named cables winding upon the same side of one of the said drums and the last named cable winding upon the other drum, the said drum upon which the two cables wind having the shape of the joined frustums of a double cone, each of the said two cables winding respectively upon one of the coned portions, the said two cables in winding passing from the larger toward the smaller portions of the said double coned drum, and the other drum, upon which the last named cable winds, being cylindrical, the relative directions of the winding of the cables upon the two said drums being such that as the two first named cables are wound up on the coned drum the last named cable is unwound from the cylindrical drum and vice versa, the said block consisting of a shaft for said pulley wheel, and two clevises to which the ends of the two first named cables are attached respectively, the said shaft constituting a pin for said clevises and being disposed at an angle horizontally to a line joining the above named horizontally alined pulleys, the said shaft having apertures for guiding the two first named cables, a third drum, a fourth cable, for winding on said third drum for drawing the said car to one side away from its position of equilibrium, and a catch for receiving and holding the free end of said fourth cable, the said third drum and the said catch being relatively located one on the said car and the other in a stationary position extraneous to said car and within the angle which would be formed by two vertical planes one extended downward from the said line joining the above named horizontally alined pulleys and the other extended downward from the axis of said shaft, said catch being so constructed as to automatically release said fourth cable when the car is fully drawn to one side by the winding of said fourth cable upon said third drum, the car being left free to begin to swing by gravity and to continue to swing by its acquired momentum and by gravity.

22. In an amusement device, the combination of a supporting frame, a passenger car suspended from said frame, an intermediate block above said car, two pulleys side by side on said frame above said block, two more pulleys at opposite sides of the first two and horizontally in line therewith, two cables at-

tached to said block and passing respectively first over the last named pulleys then over the first named pulleys then down to the car, a pulley wheel carried by said block, a third cable attached to said car and passing over said pulley wheel and then back to said car, two drums carried by said car and geared with each other to revolve together, the two first named cables winding upon the same side of one of the said drums and the last named cable winding upon the other drum, the said drum upon which the two cables wind having the shape of the joined frustums of a double cone, each of the said two cables winding respectively upon one of the coned portions, the said two cables in winding passing from the larger toward the smaller portions of said double coned drum, and the other drum, upon which the last named cable winds, being cylindrical, the relative directions of the winding of the cables upon the two said drums being such that as the two first named cables are wound up on the coned drum the last named cable is unwound from the cylindrical drum and vice versa, the said block consisting of a shaft for said pulley wheel, and two clevises to which the ends of the two first named cables are attached respectively, the said shaft constituting a pin for said clevises and being disposed at an angle horizontally to a line joining the above named horizontally alined pulleys, the said shaft having apertures for guiding the two first named cables, a third drum, a fourth cable winding on said third drum for drawing said car to one side away from its position of equilibrium, a catch for receiving and holding the free end of said fourth cable, the said third drum and the said catch being relatively located one on the said car and the other in a stationary position extraneous to said car and within the angle which would be formed by two vertical planes one extended downward from the said line joining the above named horizontally alined pulleys and the other extended downward from the axis of said shaft, said catch being so constructed as to automatically release said fourth cable when the car is fully drawn to one side by the winding of said fourth cable upon said third drum, the car being left free to begin to swing by gravity and to continue to swing by its acquired momentum and by gravity, and a brake for said third drum for stopping the car from swinging when the free end of said fourth cable is again caused to be engaged by said catch, at one of the momentary positions of rest of said car.

23. In an amusement device, the combination of a supporting frame, a passenger car suspended from said frame, an intermediate block above said car, two pulleys side by side on said frame above said block, two more pulleys at opposite sides of the first two and horizontally in line therewith, two

cables attached to said block and passing respectively first over the last named pulleys then over the first named pulleys then down to the car, a pulley wheel carried by said block, a third cable attached to said car and passing over said pulley wheel and then back to said car, two drums carried by said car and geared with each other to revolve together, the two first named cables winding upon the same side of one of the said drums and the last named cable winding upon the other drum, the said drum upon which the two cables wind having the shape of the joined frustums of a double cone, each of the said two cables winding respectively upon one of the coned portions, the said two cables in winding passing from the larger toward the smaller portions of said double coned drum, and the other drum, upon which the last named cable winds, being cylindrical, the relative directions of the winding of the cables upon the two said drums being such that as the two first named cables are wound up on the coned drum the last named cable is unwound from the cylindrical drum and vice versa; the said block consisting of a shaft for said pulley wheel, and two clevises to which the ends of the two first named cables are attached respectively, the said shaft constituting a pin for said clevises and being disposed at an angle horizontally to a line joining the two above named horizontally alined pulleys, the said shaft having apertures for guiding the two first named cables, a motor for rotating said drums, means for locking said drums against rotation, a second motor, for drawing the said car to one side away from its position of equilibrium, a third drum, operated by the said second motor, a fourth cable, for winding on said third drum, a catch for receiving and holding the free end of said fourth cable, the said third drum and the said catch being relatively located one on the said car and the other in a stationary position extraneous to said car and within the angle which would be formed by two vertical planes one extended downward from the said line joining the above named horizontally alined pulleys and the other extended downward from the axis of said shaft, said catch being so constructed as to automatically release said fourth cable when the car is fully drawn to one side by the winding of said fourth cable upon said third drum, the car being left free to begin to swing by gravity and to continue to swing by its acquired momentum and by gravity, and a brake for said third drum for stopping the car from swinging when the free end of said fourth cable is again, at one of the momentary positions of rest of the car, caused to be engaged by said catch.

24. In an amusement device, the combination of a supporting frame, a passenger car, a

block intermediate to said car and said frame, members connecting and suspending said block from two horizontally disposed points on said frame, other members connecting and suspending said car from said block, said car being free to swing in one direction from its points of suspension on said frame as a fulcrum and in another direction from said block as a fulcrum, and a motor for starting said car to swinging in a direction diagonal to the axes of both of said fulcrums, after which the car is propelled by gravity and its own momentum.

25. In an amusement device, the combination of a supporting frame, a passenger car, a block intermediate to said car and said frame, members connecting and suspending said block from two horizontally disposed points on said frame, other members connecting and suspending said car from said block, said car being free to swing in one direction from its points of suspension on said frame as a fulcrum and in another direction from said block as a fulcrum, a motor for starting said car to swinging in a direction diagonal to the axes of both of said fulcrums, after which the car is propelled by gravity and its own momentum, and a manually controlled brake for stopping the said car from swinging at will.

26. In an amusement device, the combination of a supporting frame, a passenger car, a block intermediate to said car and said frame, cables connecting and suspending said block from two relatively horizontally disposed points on said frame, other cables connecting and suspending said car from said block, said car being free to swing in one direction from said horizontally disposed points on said frame as a fulcrum and in another direction from said block as a fulcrum, a motor for starting said car to swinging in a direction diagonal to the axes of both of said fulcrums, after which the car is propelled by gravity and its own momentum, and a manually controlled brake for stopping the said car from swinging at will.

27. In an amusement device, the combination of a supporting frame, a passenger car, a horizontal shaft, members connecting and suspending said shaft from two horizontally disposed points on said frame, said points and the axis of said shaft lying in different vertical planes, and other members connecting and suspending said car from said shaft, said car being free to swing in one direction from its points of suspension on said frame as a fulcrum and in another direction at an angle to the first named direction from said shaft as a fulcrum.

28. In an amusement device, the combination of a supporting frame, a passenger car, a horizontal shaft, clevises for which the said shaft forms a pin, cables secured to said clev-

ises and suspending said clevises and said shaft from two horizontally disposed points on said frame, said points and the axis of said shaft lying in different vertical planes, and other cables suspending said car from said shaft, said car being free to swing in one direction from its points of suspension on said frame and also free to swing in another direction from its points of suspension on said shaft.

29. In an amusement device, the combination of a stationary supporting frame, a passenger car, an intermediate block above said car, four pulleys in horizontal alinement with each other on said frame, the middle two of said pulleys being side by side and directly above said block, two cables attached to said block and passing respectively first over the end pulleys then over the middle two pulleys and then down to the car, a third cable passing from the said block to the said car, and two drums carried by said car and geared with each other to revolve together, the two first named cables winding upon the same side of one of the said drums and the last named cable winding upon the other drum, the relative directions of the winding of the cables upon the two said drums being such that as the two first named cables are wound up on the one drum the last named cable is unwound from the other drum and

vice versa, the said block having guiding surfaces for the two first named cables.

30. In an amusement device, the combination of a stationary supporting frame, a passenger car, a block intermediate to said car and said frame, cables connecting and suspending said block from two relatively horizontally disposed points on said frame, other cables connecting and suspending said car from said block, said car being free to swing in one direction from said horizontally disposed points on said frame as a fulcrum and in another direction from said block as a fulcrum, a motor for starting said car to swinging in a direction diagonal to the axes of both of said fulcrums, after which the car is propelled by gravity and its own momentum, a manually controlled brake for stopping said car from swinging at will, and means for moving said block nearer to said car and farther from a line joining the above named horizontally disposed points of suspension on said frame, and vice versa.

In testimony whereof I have hereunto signed my name in the presence of two subscribing witnesses this 12th day of June, 1905.

ALFRED SPICE. [L. s.]

Witnesses:

GEORGE L. COURTENAY,  
W. COURTENAY.