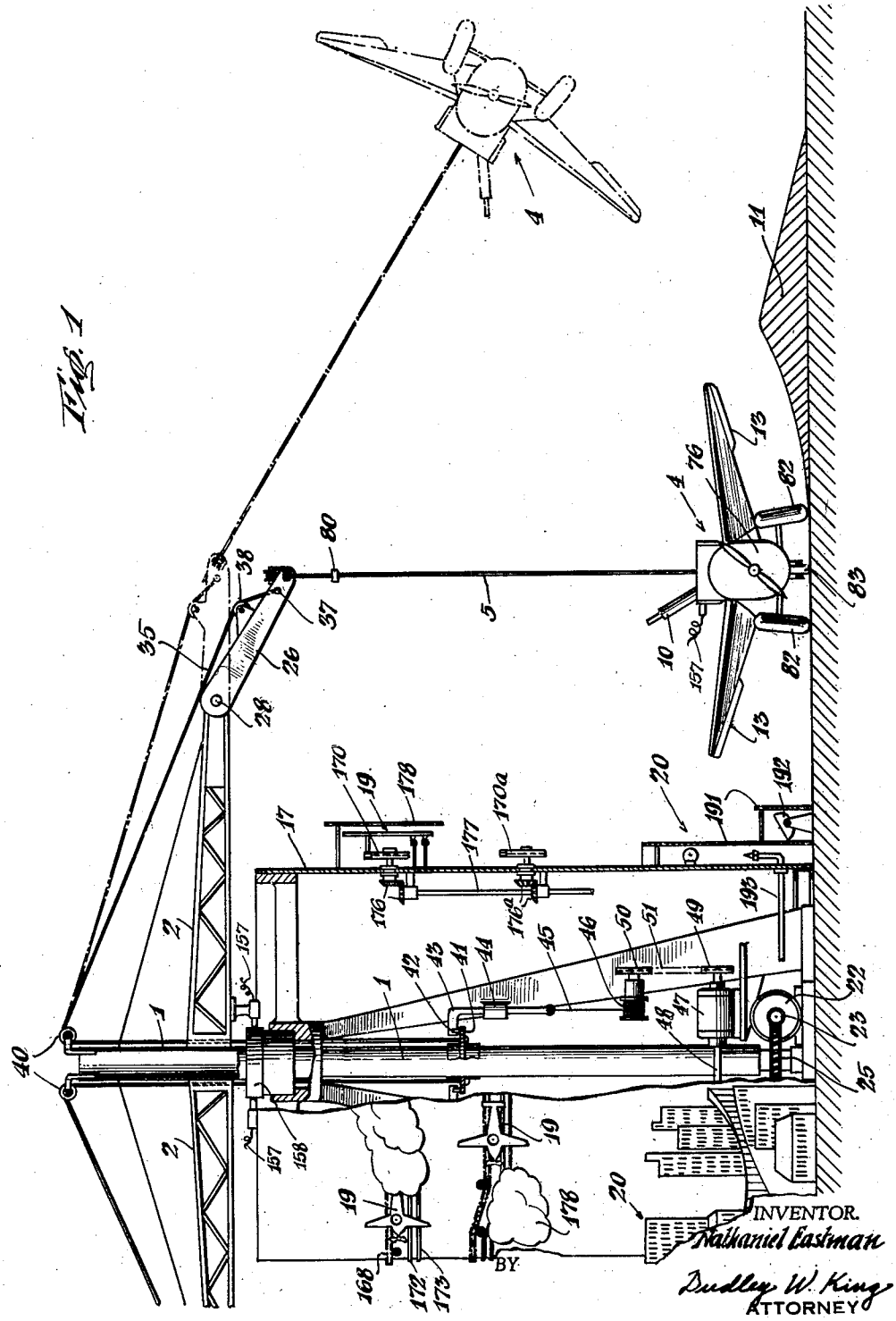
Dec. 12, 1944. N. EASTMAN 2,364,699

AMUSEMENT OR INSTRUCTION DEVICE

Filed June 28, 1941 6 Sheets-Sheet 1



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AMUSEMENT OR INSTRUCTION DEVICE

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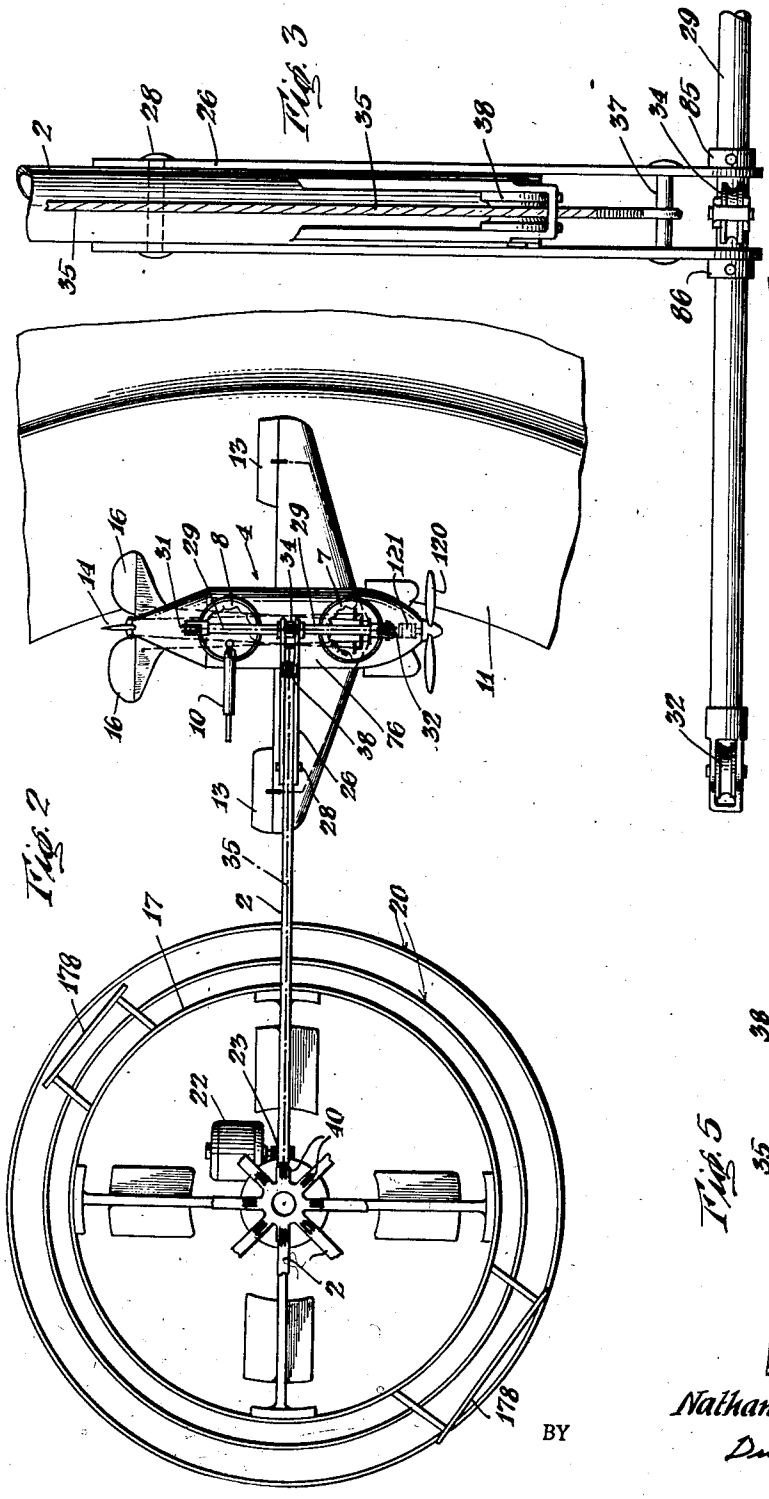

Fig. 2

Fig. 3

Fig. 4

Fig. 5

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Fig. 6

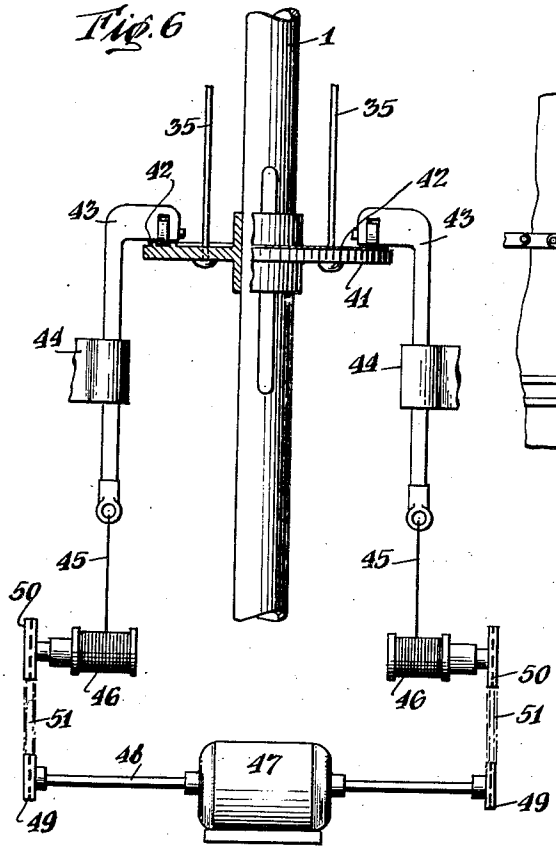


Fig. 14

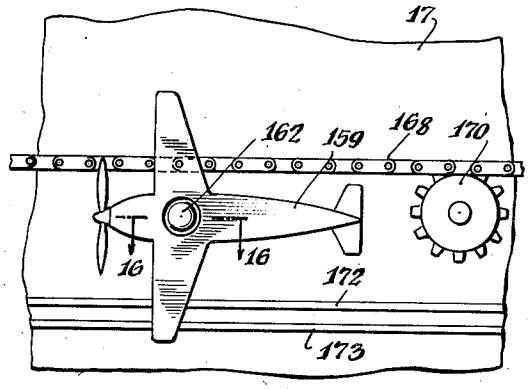


Fig. 15

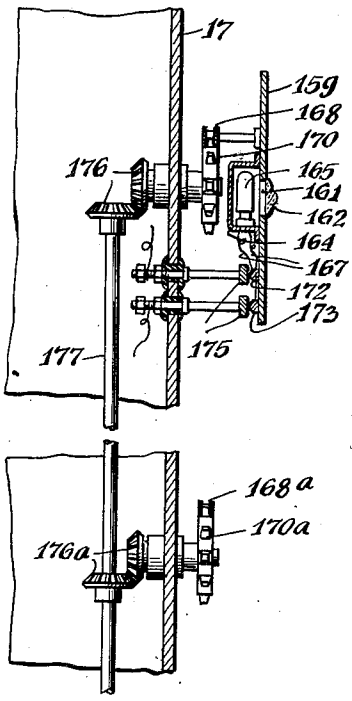
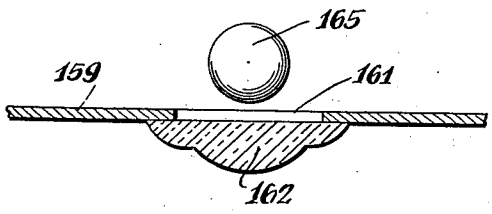


Fig. 16



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AMUSEMENT OR INSTRUCTION DEVICE

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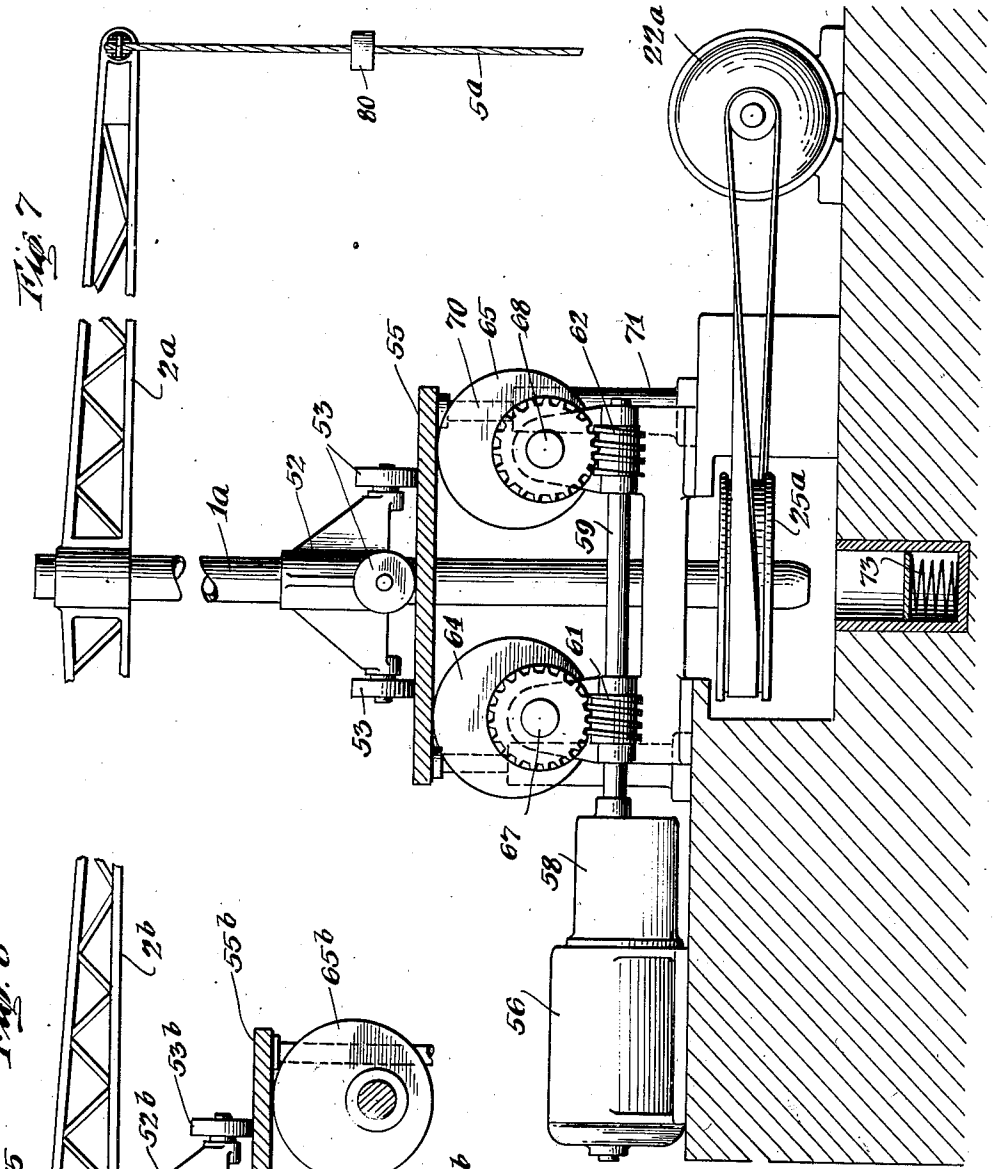

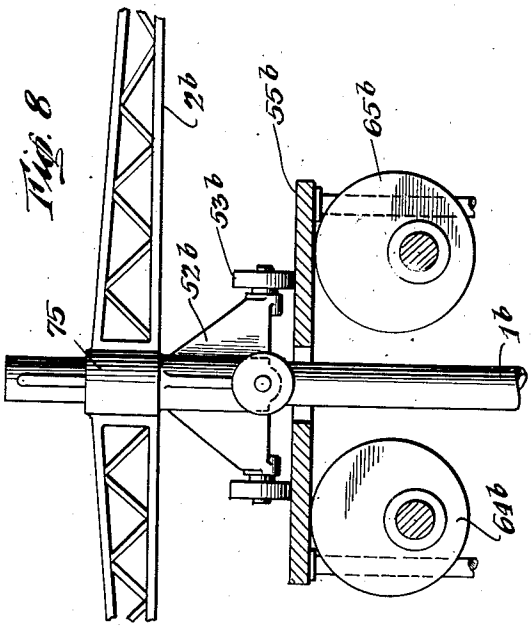

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AMUSEMENT OR INSTRUCTION DEVICE

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Fig. 9

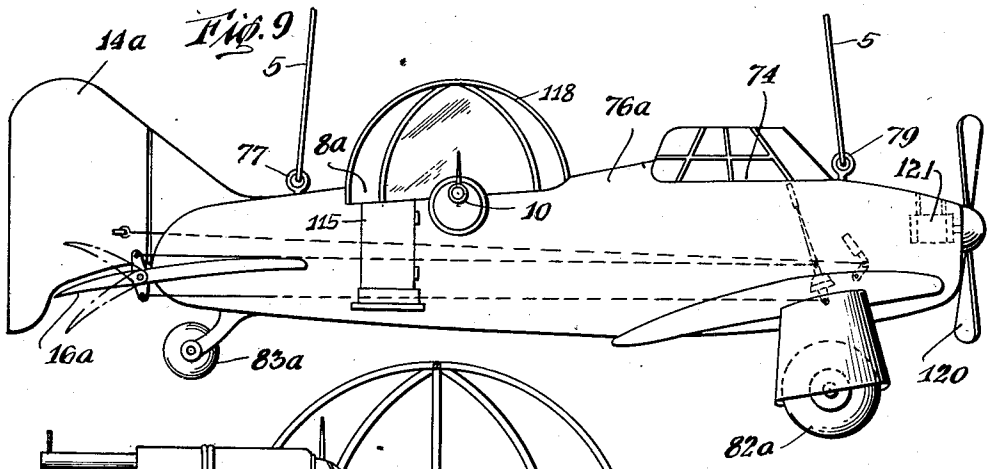


Fig. 11

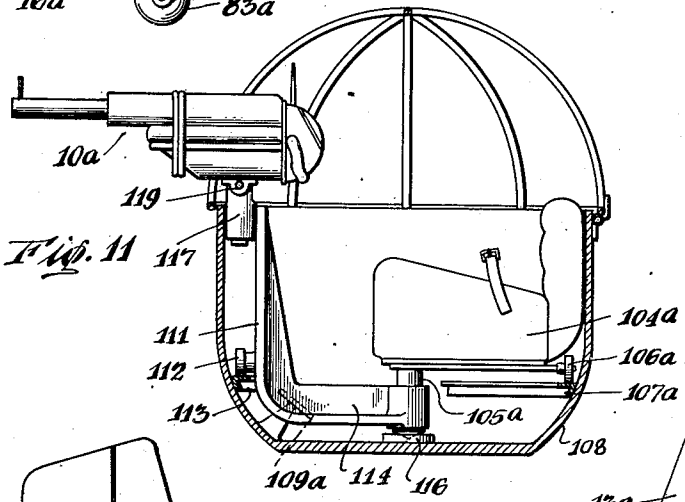
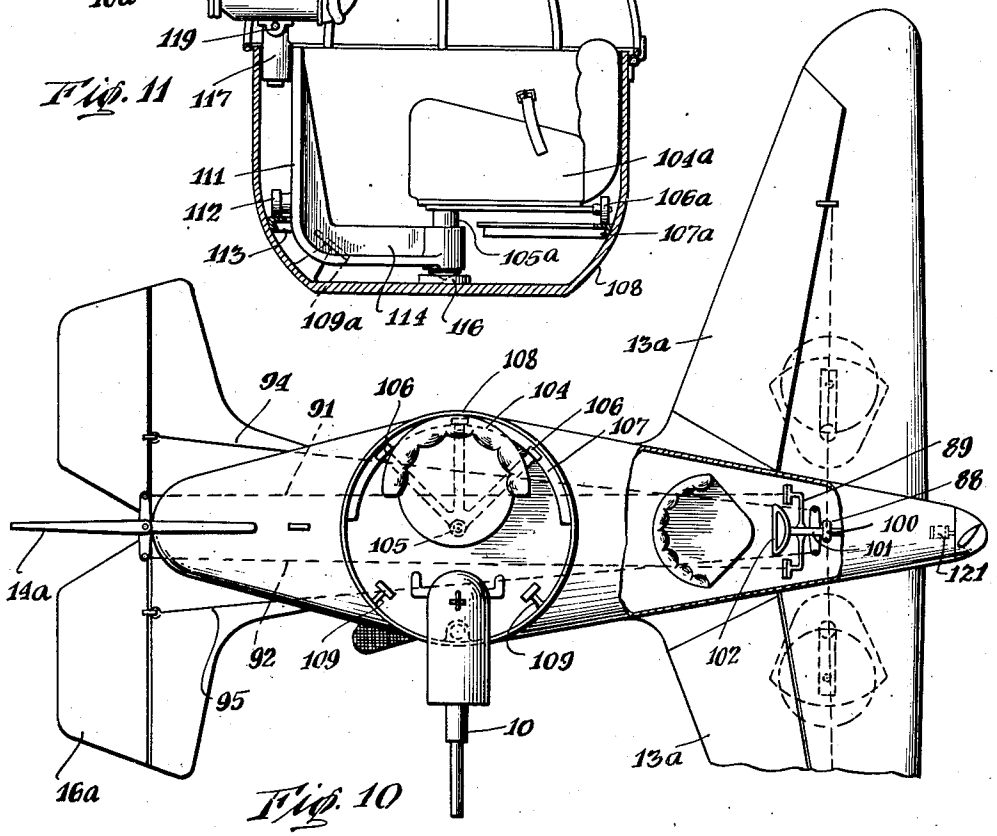


Fig. 10



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AMUSEMENT OR INSTRUCTION DEVICE

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Fig. 12

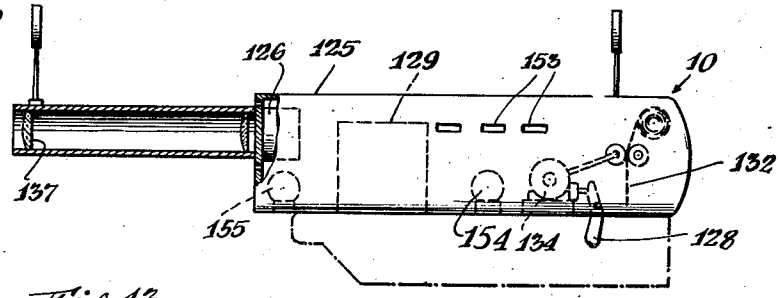


Fig. 13

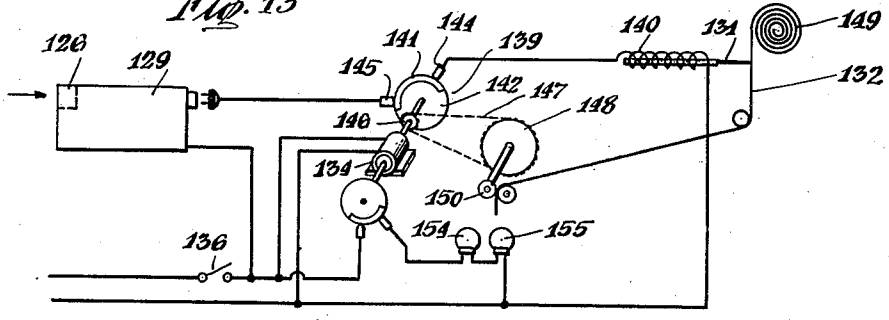
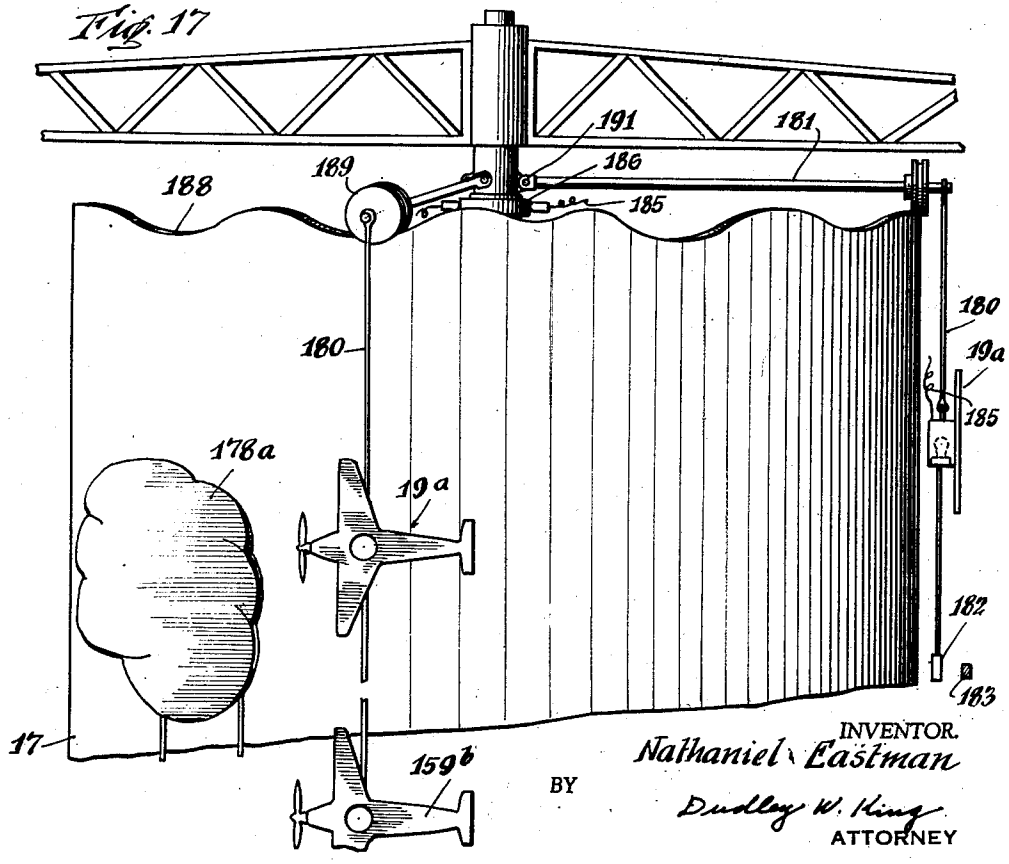


Fig. 17



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Patented Dec. 12, 1944

2,364,699

UNITED STATES PATENT OFFICE

2,364,699

AMUSEMENT OR INSTRUCTION DEVICE

Nathaniel Eastman, New York, N. Y., assignor, by direct and mesne assignments, to Futura Amusement Corporation, New York, N. Y., a corporation of New York

Application June 28, 1941, Serial No. 400,258

26 Claims. (Cl. 272—41)

The present invention relates to amusement or instruction devices of the roundabout type.

Numerous amusement devices of the roundabout type are known. Some of them have been manufactured and put into operation. Such previous devices, however, generally offer passengers merely a ride. Some of these previous roundabout devices have utilized vehicles or cars having surfaces operable by a passenger to obtain swinging of the vehicle. The attention of only a single passenger was thus occupied to a slight extent. If the devices carried more than one passenger, most of them merely sat passively during a ride; their attention was not actively occupied to any extent. Any actual instruction was limited to swinging a vehicle by vanes or otherwise and this was limited to the operator. After a ride or two the novelty generally wore off and passengers had no desire for further rides since their interests had not been sufficiently occupied.

The present invention aims to overcome the above and other objections by providing a new and improved amusement or instruction device of the roundabout type adapted to carry a plurality of passengers and to actively occupy their attentions throughout a ride. The invention further aims to provide an effect or illusion whereby the passengers feel that they are taking active part in an air battle while riding in an aircraft. In addition, the invention contemplates the provision of a device which may be used to educate aviators and gunners in the aiming and use of aircraft armament.

An object of the present invention is to provide a new and improved type of amusement or instruction device.

Another object of the invention is to provide a new and improved type of amusement or instruction device of the roundabout type.

Another object of the invention is to provide an amusement device adapted to actively occupy the attention of passengers during a ride.

Another object of the invention is to provide an amusement or instruction device having an improved passenger carrying vehicle.

Another object of the invention is to provide a device adapted to be used to simulate an air battle.

Another object of the invention is to provide an amusement or instruction device having passenger carrying vehicles with adjustably mounted aim registering devices adapted to similate firearms.

Another object of the invention is to provide a new and improved target means.

Still another object of the invention is to provide a new and improved target means adapted to cooperate with an aim registering device on a vehicle to indicate the correctness of aim.

A still further object of the invention is to provide a new and improved aim registering device.

Other and further objects of the invention will be obvious upon an understanding of the illustrative embodiment about to be described, or will be indicated in the appended claims, and various advantages not referred to herein will occur to one skilled in the art upon employment of the invention in practice.

A preferred embodiment of the invention has been chosen for purposes of illustration and description and is shown in the accompanying drawings, forming a part of the specification, wherein

Fig. 1 is an elevational view, partly broken away, illustrating a preferred embodiment of the present device;

Fig. 2 is a top plan view of the device illustrated in Fig. 1;

Fig. 3 is an enlarged top plan view of an elevating arm shown in Figs. 1 and 2;

Fig. 4 is an end view of the elevating arm shown in Fig. 3;

Fig. 5 is an enlarged fragmentary side view of an elevating arm shown in Figs. 3 and 4;

Fig. 6 is an enlarged view showing means for raising and lowering the elevating arms;

Fig. 7 is an elevational view, partly in section, of a modified form of arm lifting means;

Fig. 8 is a fragmentary elevational view, partly in section, of another modified form of arm lifting means.

Fig. 9 is a side elevational view of a preferred form of aeroplane type passenger vehicle;

Fig. 10 is a top plan view of the passenger vehicle illustrated in Fig. 9.

Fig. 11 is a sectional view showing a modified form of seat and gun mounting construction for a passenger vehicle;

Fig. 12 is a diagrammatic sectional view through a photoelectric cell type of gun or aiming device;

Fig. 13 illustrates a preferred wiring diagram for the photoelectric cell aiming device shown in Fig. 12.

Fig. 14 is a view showing a preferred form of target and target moving means.

Fig. 15 is an enlarged sectional view of the target and target moving means shown in Fig. 14;

Fig. 16 is a sectional view taken along line 16—16 of Fig. 14; and

Fig. 17 is a fragmentary view showing a modified form of target and target moving means.

Referring again to the drawings and more particularly to Figs. 1 and 2 thereof, there is shown an upright central shaft 1 having outwardly or radially extending arms 2 located adjacent the upper part thereof. Rotation of the central shaft 1 turns the outwardly extending arms 2. Passenger carrying vehicles 4 are attached to the outer ends of each of the rotatable arms 2 by cables 5 and are carried around the central shaft 1 by the arms during rotation thereof. Each vehicle 4 has controlling surfaces thereon representing the ailerons, rudder and elevators of an aeroplane and preferably carries two or more passengers in seats 7 and 8 arranged in tandem. Each of the passenger carrying vehicles 4 carries an aim registering device or electric gun 10 simulating a machine gun or other firearm. Rotation of the central shaft 1 turns the arms 2 which carry the vehicles 4. As the arms 2 rotate, the vehicles 4 roll along a runway 11 and are lifted therefrom to fly or revolve about the central shaft 1. The aeroplane type vehicles may have their movements varied during flight by means of controlling surfaces 13, 14 and 16. A substantially cylindrical wall or panorama cylinder 17 extends about the central shaft 1 and carries or guides thereabout a plurality of targets 19. The targets 19 have means thereon adapted to effect actuation of the aim registering devices or electric guns 10 carried by the vehicles 4 when the guns 10 are correctly aimed at the targets 19. At the lower part of the cylinder 17 below the targets 19 is located means 20 simulating a city, factories, or any other bombing objective.

The central shaft 1 which carries the arms 2 is preferably rotated by a suitable motor 22 through speed reduction gears, belts or chains 23, and a gear or pulley 25 secured to the lower part of the shaft 1. Rotation of the central shaft turns the radially extending arms 2 which are operatively secured adjacent the upper end thereof. As the arms 2 rotate, they carry along with them the vehicles 4 which are secured to their outer ends by cables 5. Preferably eight arms are carried by the central shaft 1 and each arm carries a vehicle 4 around the shaft. As the arms are all similar in construction and operation a description of one will suffice for all.

In order closely to simulate the takeoffs and landing of aircraft, means are provided for lifting the vehicles into the air simultaneously with the movement thereof about the central shaft 1. This may be achieved by providing each of the main arms 2 with an auxiliary elevating arm 26 at its outer end (Figs. 1–5). The elevating arm 26 carries a vehicle 4 at its free end by a cable 5 and is pivoted by a pin 28 adjacent its inner end to one of the main arms 2. A transversely extending member or shaft 29 having pulleys or guide wheels 31, 32 and 34 mounted at its respective ends and at the mid-portion thereof is preferably carried by each of the elevating arms 26 adjacent its outer end. The transverse arm 29 and the guide wheels mounted thereon act to guide and support the cables 5 to which are attached the aeroplane vehicles 4, as will be later described. When the central shaft 1 is stationary the elevating arms 26 are inclined downwardly (Fig. 1) so that the vehicle 4 rests on the ground within the circumference of the runway 11. As the central shaft 1 starts to rotate, the elevating arms 26 are pulled upwardly by a cable 35 which is secured at one end to a pin 37 adjacent the free end of the elevating arm, passes over a guiding pulley 38 on the main arm 2, and over a cable guiding means 40 adjacent the upper end of the central shaft 1, and may be attached at its other end to a collar 41 (Fig. 6). The collar 41 is keyed to the central shaft 1 so that it rotates therewith but may move longitudinally along the shaft. A track 42 on the collar serves to guide a pair of roller carrying members 43. The roller-carrying members 43 are movable longitudinally of the central shaft 1 through fixed guideways 44 by cables 45 connected with drums or reels 46 adapted to wind and rewind the cables 45 to move the collar 41 and cables 35 up and down along the central shaft 1 and to thereby effect raising and lowering of the elevating arms 26 and the passenger vehicles 4 connected therewith. The cable drums or reels 46 may be turned by a motor 47 through shafts 48, pulleys 49 and 50, and belts 51. The operation of the motor 47 may be controlled by an operator. The above is one manner of raising and lowering the elevating arms 26; any other suitable means, for example, a cam and clutch mechanism, may be utilized. Each of the main radial arms 2 is provided with an elevating arm of similar construction which operates in a similar manner.

Modified constructions for lifting and lowering the passenger vehicles 4 are illustrated in Figs. 7 and 8. As shown in Fig. 7 the vehicles are attached directly to the outer ends of the radial arms 2*a* by cables 5*a* and the radial arms 2*a* are secured directly to the central shaft 1*a*. The central shaft 1*a* is supported by a carriage 52 and vertical movement of the latter lifts and lowers the central shaft 1*a* and the arms 2*a* and vehicles attached thereto. The carriage 52 fits about and is attached to the central shaft 1*a* and has wheels 53 that rest on a riding platform 55. The riding platform 55 is adapted to be raised and lowered by a motor 56 through speed reducing means 58, shaft 59, gears 61 and 62 and eccentrics 64 and 65 mounted on shafts 67 and 68. Turning on the motor 56 causes the shafts, gears and eccentrics to rotate so as to raise or lower riding platform 55. The riding platform may be guided during raising and lowering thereof by guide rods 70 which fit into sockets 71. In this modification the entire central shaft 1*a* is raised and lowered and a bumper spring 73 may be utilized to minimize possible jarring of the central shaft 1*a* as it comes to rest at its lowermost position. Also, the pulley or gear 25*a* which turns the central shaft 1*a* is preferably keyed to the central shaft so that the shaft may move vertically at the same time that it is being rotated.

The modified construction illustrated in Fig. 8 is similar to the construction of Fig. 7, except that in this instance the central shaft 1*b* remains stationary and the radial arms 2*b* move vertically with respect to it. The radial arms 2*b* are secured to a sleeve member 75 that fits about the central shaft 1*b*. The sleeve member 75 is keyed to the central shaft 1*b*, so that it will rotate therewith, and is vertically movable along the central shaft. The sleeve member 75 is supported by a carriage 52*b* having wheels 53*b* that rest on a riding platform 55*b*. Vertical movement of the sleeve and carriage along the cen-

tral shaft 1b raises and lowers the arms 2b and the vehicles attached to the outer ends thereof. The riding platform 55b, carriage 52b and sleeve 75 are adapted to be raised and lowered by eccentrics 64b and 65b through mechanism similar to that described in connection with Fig. 7. In Figs. 7 and 8 the eccentrics are shown holding the riding platforms in raised position so that the radial arms hold the passenger vehicles off the ground. Turning on the motor causes the shafts, and the eccentrics mounted thereon, to rotate so as to lower the riding platform and the arms carried thereby. Since only the radial arms 2b are raised and lowered about the central shaft in this modification, the riding platform 55b and the mechanism which operates it are preferably mounted on an elevated platform supported near the upper part of the central shaft 1b.

The foregoing described constructions for raising and lowering the elevating arms are illustrative. Other known constructions, for example, hydraulic means, may be utilized to raise and lower the radial arms.

In each of the above described modified constructions the supporting arms 2a and 2b preferably have transversely extending vehicle supporting shafts mounted directly upon their ends. The elevating arms 26 described in connection with Figs. 1 and 2 are not required in the modifications illustrated in Figs. 7 and 8.

The passenger vehicles 4 carried by the transversely extending shafts 2a and cables 5 are preferably constructed to simulate aeroplanes. As illustrated, each of the vehicles comprises a body or fuselage 76 preferably having separate seats or compartments 7 and 8 arranged in tandem for a pilot and a gunner. The body or fuselage is preferably mounted upon wheels 82 and 83 located adjacent the front and rear thereof, respectively. The front wheels 82 spread or diverge outwardly for a reason to be hereinafter described. Wings provided with ailerons 13, and tail surfaces including a rudder 14 and elevators 16 are also provided. The fuselage of each vehicle is connected at spaced points 77 and 79 with the respective ends of the cables 5 which pass over the guide wheels 31, 32 and 34 on the transversely extending shafts 29 carried by main supporting arms 2. The vehicles face in the direction of rotation of the radial arms 2 so that as the central shaft and arms 2 rotate, the vehicles will be pulled along and passengers therein will obtain the effect of forward movement. The cables 5 which support each of the vehicles are free to move longitudinally over the guide wheels 31, 32 and 34 (Figs. 3–5). In this manner inclination of an aeroplane vehicle 4 is facilitated. When a passenger in the pilot's compartment 7 operates the controls to move the elevators 16, the vehicle will point its nose upwardly or downwardly depending upon the direction in which the elevators are moved. Excessive inclination of the vehicles may be prevented by stops 80 clamped or otherwise secured to the cables 5. These stops 80 limit the amount of cable 5 that may pass over the guide wheels by abutting against the guide wheels when a desired length of cable has passed over them. In this way it will be impossible for a passenger to incline a vehicle to a dangerous degree and throw out the passengers. This feature is also very desirable in connection with landing the vehicles as the central shaft 1 and radial arms 2 slow down. The stops 80 insure either the front wheels 82 or the tail wheel 83 coming into contact with the ground or runway 11. If these stops were not provided it would be possible for a passenger to incline the wheels to such a degree that either the nose or tail of an aeroplane vehicle would first strike the ground and be dragged along. It will also be noted that the transverse vehicle supporting shafts 29 are mounted in bearing surfaces 85 and 86 carried by the main supporting arms 2. This construction permits the transverse shafts to pivot or turn about their longitudinal axes and facilitates movement of a vehicle suspended from the arms 24, as will be hereinafter referred to.

In Figs. 9 and 10 there is shown an aeroplane type passenger vehicle generally similar to that of Figs. 1 and 2. Figs. 9 and 10 bring out details common to each of the vehicles and also certain modifications over the vehicle of Figs. 1 and 2. The ailerons, rudders and elevators of each of the vehicles 4 are connected with a control stick 88 or rudder bar 89 located within the pilot's compartment and may be controlled therefrom by a passenger. (Fig. 10.) Preferably the control stick and rudder bar connect with and control the ailerons, rudder and elevators, similarly to an actual aircraft. In Fig. 10 there is illustrated one manner of connecting the controlling surfaces. The rudder 14a is connected by wires 91 and 92 with the respective ends of a rudder bar 89 pivoted at its center to the floor of the vehicle. Moving the rudder bar to the right or left about its central pivot moves the rudder 14a in a corresponding direction and tends to move the aeroplane vehicle 4 about a vertical axis. The elevators 16a are connected by wires 94 and 95 to the lower part of the control stick 88 which may be pivoted at 1. Pulling the control stick 88 toward the pilot moves the elevators in one direction and pushing the control stick away from the pilot moves the elevators in an opposite direction. This tends to move the aeroplane 4 about a transverse axis. The ailerons 13a carried by the wings may be connected by cables 97 and 98 with a reel or other means 100 mounted on a shaft 101 which has a hand wheel 102 mounted at the other side thereof. Turning the hand wheel 102 in one direction moves one aileron up and the other one down and turning the wheel in an opposite direction reverses the movements of the respective elevators. The aeroplane in this way tends to move about a longitudinal axis. A passenger sitting in the pilot's seat 7a may operate the control shaft 88 and rudder bar 89 to move the controlling surfaces connected therewith. The controls and surfaces may operate similarly to an actual aeroplane and tend to make the passenger vehicle 4 simulate the movements of an actual aeroplane. By means of the rudder and ailerons a passenger may cause the vehicle to move toward or away from the central panorama cylinder 17. The pivoted connection of the transverse aeroplane supporting shafts 29 with the radial arms 2, described in connection with Figs. 3–5 facilitates swinging of the aeroplanes 4 toward and away from the panorama cylinder, as the shafts 29 are thus enabled to turn in their bearings with a vehicle instead of resisting the movements thereof. Moving the elevators up or down causes the vehicles 4 to incline in a corresponding upward or downward direction since they are carried by the freely mounted cables 5. Excessive inclination is prevented by the stops 80 secured to the cables 5 which come into contact with the pulleys 31 or 32 located at the ends of the transverse shafts 29.

The gunner's compartment or cockpit has an aim registering device or gun 10 of the photoelectric cell type adjustably mounted at one side thereof so that it may be aimed in any direction. A gunner's seat 104 is preferably mounted adjacent its front part on an upright pivot member 105 and is supported at its rear by wheels or gears 106 which travel on a substantially semi-circular support or gear rack 107 secured to a wall 108 of the gunner's compartment 8. The seat 104 may thus be swung about with the pivotally mounted upright member 105 in substantially a semi-circle at one side of the compartment 7a so that it may face in the same general direction in which the gun 10 is aimed. Foot supports 109 assist a passenger to support himself when moving the seat and aiming a gun. Entrance and exit to and from the gunner's compartment may be through a door 115 in the side of the fuselage and a cover 118 made from some transparent molding material may be used to close the compartment and protect a passenger from wind during a ride.

In Fig. 11 a modified form of gun and seat construction is shown wherein a seat 104a is operatively connected with a gun 10a so that movement of the seat moves the gun and assists in aiming it. The aim registering device or gun 10a is pivotally mounted by means of a universal joint or the like on the upper end of a supporting post 111 located at the side of the compartment opposite to the seat 104a. The gun post 111 has a wheel or gear 112 adjacent its lower end adapted to ride on a track or gear rack 113 to facilitate movement of the gun and post about a semi-circle and is connected with the upright seat supporting member 105a by an extension 114. The extension 114 is fixedly secured to the seat support 105a at its free end so that as the seat 104a and support 105a rotate about a pivot 116 this will swing the extension 114 connected therewith so that the gun post 111 and gun 10a will be in line with the direction in which the gunner is facing. As the extension 114 swings in its path it moves the wheel 112 and gun post along the track 113. In addition, the gun 10a may also be swung about a vertical axis by means of the pivotal connection 117 and may be directed up and down about a horizontal axis 119.

While the aeroplane type passenger vehicles have been described with reference to single seats arranged in tandem for a pilot and a gunner, it will be clear that any other convenient seating arrangement could be utilized. For example, two gunners' seats could be used so that each passenger could obtain instruction or amusement in aiming at targets during movement of the vehicles.

Each of the aeroplane type vehicles preferably has a propeller 120 driven by an electric motor 21 mounted in the vehicle. A two horsepower motor is suitable for this purpose. This propeller 120 may thus be used to provide additional speed, power, and maneuverability for each of the aeroplane vehicles. For certain instances it may not be desired to utilize a motor but to allow the propeller to be driven by the wind during rotation of the vehicles 4 about the central shaft 1.

The front wheels 82 on the undercarriage of the aeroplane vehicles are preferably inclined or spread outwardly with respect to each other to cooperate with an inclined or banked runway 11 to assist in simulating the take off and landing of an actual aeroplane. The inclined runway 11 extends completely about the central cylinder 17 and has a radius slightly greater than the length of the main vehicle supporting arms 2. When the device is at rest the vehicle wheels rest on the flat surface inside of the runway, as illustrated at the left in Fig. 1. As the central shaft and radial arms begin to rotate, the vehicles move around the shaft 1 and swing outwardly, the elevating arms 26 are raised upwardly by the cables 35, or the main supporting arms are raised by the modified construction of Figs. 7 or 8, and the vehicles tend to ride up onto the inclined runway 11. Finally the wheels are lifted from the inclined runway and the vehicles are in the air. The reverse procedure occurs as the device slows down and the supporting arms lower the vehicles to the ground. The runway 11 contributes considerably toward smoothing the take off and landing of the aeroplane type vehicles. The stop members 80 secured to the vehicle supporting cables 5 limit the amount of inclination of the vehicles even though they are inclined when slowing down to land on the runway 11; the front wheels or rear wheels will be the first parts to touch the ground. If the vehicles are inclined as they land, the touching of the wheels and weight of the vehicles will cause them to level out without any assistance from a passenger.

The photoelectric cell gun 10 (Figs. 12 and 13) comprises an outer casing 125 having a light-sensitive photocell 126 mounted therein and adapted to be affected by light rays emitted by targets. The targets will be later described in detail. The photocell 126 is connected with a trigger 128, suitable amplifying relays 129, and a pin or marking means 131 for making perforations in or printing on a record sheet 132 which may be moved past the pin by a motor or any other suitable driving means 134. The gun 10 preferably has the circuit through the photocell hook-up interrupted approximately 500 times per minute to simulate the firing of a machine gun. This may be done by the motor 134 or any other satisfactory means. A similar result could be achieved by mounting a motor driven shutter in front of the photocell adapted to open and close approximately 500 times a minute to simulate the firing of a machine gun. It will be understood that any desired speed of interrupting the circuit or opening and closing the shutter may be utilized. By thus periodically causing the photocell to be ineffective, the hits and misses of an actual machine gun will be closely simulated, for if the gun is pointed at a target light when the current is interrupted or the shutter is closed, no hit will be scored; if the photocell gun is not correctly aimed at a target when the circuit is closed, there will still be no hit scored.

Pulling the trigger 128 closes operating switch 136, starts the motor or other device 134 which intermittently opens and closes the circuit through the photocell or, in the modification, opens and closes the shutter in front of the photocell. As shown in Fig. 13, the motor turns a wheel 139 having a conducting portion 141 and a non-conducting portion 142. Brushes 144 and 145 are in contact with the wheel and current flows through them only when the conducting portion of the wheel is in contact with both brushes. If no light from a target strikes the photocell 126 nothing happens and no hit is scored. When the photocell 126 is correctly directed at a target, the light therefrom passes through a lens 137 to the photocell 126 and amplifying relay 129 connected therewith causes a sole-

noid 140 to move the pin or other recording means 131 so as to make an indication on the record sheet 132 which moves at appropriate speed past the pin. The record strip may be unrolled from a roll 149 and moved past the indicating means 131 by the motor 134 through gear 146, chain 147, sprocket 148 and rollers 150 connected to the shaft of sprocket 148. The record strip 132 provides a permanent record which the passenger may detach and take with him after a ride. Preferably the photocell casing 125 contains red electric bulbs 154 and 155 that flash on every time the circuit through the photocell 126 is interrupted or the shutter in front of the photocell is open. The red lights flashing on and off may be seen through apertures 153 in the casing and further enhance the realistic effect for they simulate the flashes of fire which accompany the firing of an actual machine gun. Current for operating the electric gun may be supplied through electric cables 157 which connect with a collecting ring 158 turned by the central shaft 1. The collecting ring has current supplied to it by an available power line (not shown).

The targets 19 which carry lights for actuating the photocell 126 of an electric gun are illustrated more particularly in Figs. 14 to 16. Each of these targets 19 preferably comprises a member 159 shaped to represent an aeroplane and having an aperture 161 therein preferably covered by a lens 162. Located behind each of the targets and within a casing or reflector 164 is an electric bulb 165. Current may be supplied to the bulbs 165 by wires 167. Light rays from the light source 165 pass through the aperture in the target member 159 and through the lens carried thereby. When the photoelectric cell mounted in a gun is correctly aimed at a lens and aperture, a hit will be registered on the record sheet or any other suitable scoring means connected therewith.

The targets 19 travel around the substantially cylindrical wall 17 that extends about the central shaft 1. In the preferred embodiment the targets 19 are carried by a chain or cable 168 that extends around the circumference of the cylinder 17 and is moved by sprockets or pulleys 170. A pair of spaced conductors 172 and 173 located below the target driving chain 168 and connected with an available power line are adapted to supply current to the bulbs 165 through brushes 175 and wires 167. The driving sprocket 170 may be turned by gears 176 and drive shaft 177, the latter being turned by any suitable driving means (not shown). Preferably the target carrying chain is carried by idler sprockets in its course about the cylinder 17 and the idler sprockets are at different heights above the ground so that as a target 19 travels around the cylinder it will vary its vertical position and increase the amount of skill required by a gunner in order to obtain a "hit." The speeds of travel of the targets may be varied by controlling the speed of the motor which turns the driving sprocket 170. Also, any number of additional rows of targets may be carried at different heights than the first row. For example, note the target conveying chain 168*a*, sprocket 170*a* and gears 176*a* which are driven by the same shaft 177 which drives the first described row of targets.

To further increase the element of skill required in order to hit a target with an electric gun, the targets may be caused to pass at intervals behind obstructions 178 made to simulate clouds. These obstructions may have irregularly shaped cloud outlines and may be held in position by brackets bolted to the cylinder wall 17. The targets 19 pass, at intervals, between the outside of the cylinder wall and the rear of the cloud obstructions. Preferably the sprockets which drive and support the target chain are located behind these simulated clouds.

In Fig. 17 there is shown a modified form of target moving means. In this embodiment targets 19*a* are carried around the cylinder 17 by supporting rods 180 which extend down the outside of the cylinder 17. The target supporting rods 180 are supported at their upper ends by outwardly extending arms 181 connected with and turned by the central shaft 1. The target supporting rods 180 may be prevented from swinging outwardly by providing their lower ends with rollers 182 which follow a trackway 183. Electricity may be supplied to the target bulbs by a cable 185 connected therewith and carried by each of the supporting rods 180 and horizontal arms 181. The inner end of the cable may connect with a collector ring 186 on the central shaft 1.

Preferably the targets are caused to confuse the aim of a gunner and to increase the element of skill by varying their vertical positions during travel about the cylinder. This may be achieved by providing the upper end of the cylinder 17 with an irregular track 188 on which rides a roller 189 carried by the horizontal target moving arms 181. The target moving arms are provided with suitable pivot joints 191 at their ends so that the roller 189 may move up and down while following the irregular track. By this construction the track and roller lift and lower the targets up and down at irregular intervals as they travel about the cylinder 17. The simulated cloud effects described in connection with the preferred embodiment may also be used with this modified form of target means.

To further increase the realistic effect, the target planes are represented as attempting to attack a metropolis by bombing it. In Fig. 1 the bombing objective comprises a city located beneath the paths over which the target planes travel. The buildings, factories, warehouses, docks, etc., which represent the city may be cut from, painted or otherwise formed on wall structures 191 which are spaced from and extend about the lower part of the panorama cylinder 17. Intermediate the spaced wall structures 191 and the panorama cylinder 17 may be located colored spot lights 192 and steam jets 193. The spot lights and steam jets are connected with operating means located within the interior of the main panorama cylinder 17 and are intermittently operated to release steam and produce red, blue, green or other colored flashes of light. The flashes of light and release of steam simulate fires, smoke and explosions in the metropolis. The effect may be further enhanced by utilizing sound effects and by searchlights that shine upwardly from between the wall structures 191 and the panorama cylinder 17.

In operation, both seats on all of the aeroplanes are occupied, that is, one passenger acts as a pilot and another passenger as a gunner for each plane. While the pilot and gunner are having their safety belts strapped in position they are also given instructions for maneuvering the plane and working the electric guns. A siren begins to blow to announce the approaching on the city of enemy aeroplanes. The target aeroplanes which represent the enemy aeroplanes emerge from behind the clouds and begin to move around

the cylinder wall 17. Simulated explosions are made to occur in the city by means of the colored spot lights and steam jets mounted behind the lower cylindrical walls. While this occurs the central shaft 1 begins to rotate and turn the radial arms 2. The passenger aeroplanes commence to move around the cylinder 17 for a take off. The aeroplanes make almost a complete run about the circumference of the cylinder while increasing their speeds; this carries them up onto the inclined or banked surface of the runway 11 and the elevating arms finally lift them off the runway. As the speed continues to increase the aeroplanes swing outwardly away from the cylindrical walls 17 due to centrifugal force. The pilots must then attempt to maneuver their ships closer to the cylinder wall 17 and vary the inclinations thereof to obtain the best positions for a gunner to shoot at the target aeroplanes. The gunner aims at the aperture of a target through which the light may be seen and pulls the trigger of his photoelectric cell gun 7. When the gun is correctly aimed at a target aperture, the light rays therefrom cooperate with the photocell and indicating mechanism to indicate hits on the paper strip which passes through the gun. After the simulated battle has progressed for a desired time, for example three minutes, the central shaft slows down and the speed of the passenger aeroplanes begins to decrease. As the speed continues to decrease the passenger aeroplanes move inwardly toward the cylinder 17, approach the inclined runway 11, and finally land thereon and taxi to a stop.

It will be seen that the present invention provides a new and improved roundabout type of amusement or instruction device for closely simulating an aerial battle between rival areoplanes. The passenger vehicles which represent aeroplanes take off smooth and evenly and land in a similar manner, thus realistically imitating actual aeroplanes. Each passenger carried by the aeroplane vehicles actively participates in a simulated battle with enemy bombing aeroplanes. The device may be used to instruct aviators and gunners in the maneuvering of aeroplanes and the aiming and firing of aircraft armament. Since no bullets are used by the electric guns, the cost of instruction in aiming and "firing" the guns is minimized. There is no danger of wild shots going astray to injure nearby persons or property. If desired, the device may be constructed of sufficient size to support and rotate actual aeroplanes about the target cylinder and aviators and gunners may then obtain instruction in the actual aeroplanes which they are to fly. The improved photoelectric cell guns on the aeroplane vehicles and the targets on the cylinder wall may be caused to move with respect to each other to further increase the realistic effect and the element of skill required for obtaining hits. The simulated clouds add still another hazard and realistic effect.

As various changes may be made in the form, construction and arrangement of the parts herein without departing from the spirit and scope of the invention and without sacrificing any of its advantages, it is to be understood that all matter herein is to be interpreted as illustrative and not in a limiting sense.

Having thus described my invention, I claim:

1. An amusement device of the class described comprising, in combination, a central shaft, rotatable vehice supporting arms adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, a substantially cylindrical wall located interiorly of the path defined by said vehicles during said circular movement thereof targets movably mounted on said cylindrical wall to travel about said cylindrical wall, and means for moving said targets relative to said moving planes.

2. An amusement device of the class described comprising, in combination, a central shaft, rotatable vehicle supporting arms mounted adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, cable-like supporting and guiding means extending about said central shaft, movable targets carried by said means and devices to move said targets at variable heights and speeds.

3. An amusement device of the class described comprising, in combination, a central shaft, rotatable vehicle supporting arms mounted adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, cable-like supporting and guiding means extending about said central shaft, and movable targets carried by said means and devices for moving said targets about said shaft at a different rate of speed than said vehicles.

4. An amusement device of the class described comprising, in combination, a central shaft, a rotatable vehicle supporting arm mounted adjacent the upper end of said shaft, a vehicle carried by said arm adapted to be moved about a circular path upon rotation of said arm, an adjustably mounted aim registering device carried by said vehicle, a substantially cylindrical wall extending about said shaft and a target adapted to travel around said wall and to effect actuation of said aim registering device when said device is directed at certain portions of said target.

5. An amusement device of the class described comprising, in combination, a central shaft, rotatable vehicle supporting arms mounted adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, adjustably mounted aim registering devices simulating fire-arms carried by said vehicles, means for guiding a plurality of targets in a substantially circular path about said shaft and a plurality of targets on said guiding means adapted to effect actuation of said aim registering devices when said devices are directed at certain portions of said targets.

6. An amusement device of the class described comprising, in combination, a central shaft, rotatable vehicle supporting arms mounted adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, adjustably mounted aim registering devices carried by said vehicles, a substantially cylindrical wall extending around said central shaft, a plurality of targets adapted to travel about said wall and adapted to effect actuation of said aim registering devices when they are directed at certain portions of said targets.

7. An amusement device of the class described comprising, in combination, rotatable means for supporting a plurality of vehicles, aircraft simulating vehicles carried by said rotatable means having controlling surfaces operable from

within the vehicles for varying the movements thereof during rotation of said rotatable means, adjustably mounted aim registering devices carried by said vehicles, a substantially cylindrical wall extending about said shaft having means thereon for moving targets about said wall and a plurality of targets on said target moving means each having means thereon adapted to effect actuation of said aim registering devices when the latter are directed at certain portions of said targets.

8. An amusement device of the class described, comprising, in combination, a central shaft, rotatable vehicle supporting arms mounted adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, adjustably mounted aim registering devices carried by said vehicles, a substantially cylindrical wall extending around said central shaft, a plurality of targets adapted to travel about said wall and adapted to effect actuation of said aim registering devices when they are directed at certain portions of said targets and means spaced from said wall for intermittently hiding said targets from view of said vehicles and the air registering devices carried thereby.

9. An amusement device of the class described comprising, in combination, a central shaft, rotatable vehicle supporting arms mounted adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, adjustably mounted aim registering devices simulating firearms carried by said vehicles, a plurality of targets adapted to effect actuation of said aim registering devices when said devices are directed at certain portions of said targets and means for intermittently varying the heights of said targets.

10. An amusement device of the class described comprising, in combination, a central shaft, rotatable vehicle supporting arms adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, adjustably mounted aim registering devices carried by said vehicles, a substantially cylindrical wall extending about said central shaft having an irregular track surface thereon, and a plurality of targets supported by arms and travelling on said irregular track surface and adapted to have their heights varied thereby, each of said targets having means thereon adapted to effect actuation of said aim registering devices when said devices are directed at certain portions of said targets.

11. An amusement device of the class described comprising, in combination, a central shaft, rotatable vehicle supporting arms adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, adjustably mounted aim registering devices carried by said vehicles, a substantially cylindrical wall extending around said central shaft, a plurality of targets shaped to simulate aircraft adapted to travel about said wall and adapted to effect actuation of said aim registering devices when said devices are directed at certain portions of said targets, and means adjacent the lower part of said wall below the paths of travel of said targets simulating a metropolis.

12. An amusement device of the class described comprising, in combination, a central shaft, rotatable vehicle supporting arms adjacent the upper end of said shaft, vehicles carried by said arms adapted to be moved about a circular path upon rotation of said arms, adjustably mounted aim registering devices carried by said vehicles, a substantially cylindrical wall extending around said central shaft, a plurality of targets shaped to represent aircraft adapted to travel about said wall and adapted to effect actuation of said aim registering devices when said devices are directed at certain portions of said targets, means adjacent the lower part of said wall below the paths of travel of said targets simulating a metropolis, and means adjacent said metropolis adapted to represent explosions therein.

13. An amusement device of the class described comprising, in combination, a central shaft, rotatable supporting arms adjacent the upper end of said shaft, vehicle supporting means mounted on said supporting arms including a pair of pulleys, vehicles tiltably suspended from said pulleys and adapted to move about a circular path and to simultaneously move outwardly due to centrifugal force upon rotation of said arms, and an inclined runway adapted to support said vehicles during part of the movements thereof.

14. An amusement device of the class described comprising, in combination, a central shaft, rotatable arms adjacent the upper end of said shaft, elevating arms secured to said rotatable arms rope-like members suspended from said elevating arms, vehicles carried by said rope-like members adapted to move about a circular path and to simultaneously move outwardly due to centrifugal force upon rotation of said arms, means for raising said elevating arms and said rope-like members to lift the vehicles carried thereby, and a runway extending about said central shaft having an inclined cross section adapted to support said vehicles during part of the movement thereof.

15. A device of the class described comprising, in combination, a central shaft, rotatable supporting arms adjacent the upper end of said shaft extending outwardly therefrom, and elevating arms each secured adjacent one end thereof to said supporting arms, a downwardly depending rope-like member adjacent the other end thereof, and a passage carrying vehicle attached to the lower end of each of said rope-like members, said elevating arms being adapted to be raised and lowered to vary the heights of said passenger vehicles.

16. A device of the class described comprising, in combination, a central shaft, rotatable supporting arms adjacent the upper end of said shaft and extending outwardly therefrom, elevating arms secured to said supporting arms having cross arms adjacent one end thereof with cables suspended from the ends thereof adapted to facilitate movement of a passenger vehicle carried thereby, and passenger vehicles operatively connected with said cables and tiltable with respect to said elevating arms.

17. A device of the class described comprising, in combination, a central shaft, rotatable supporting arms adjacent the upper end of said shaft and extending outwardly therefrom, elevating arms secured to said supporting arms having means including a pair of spaced pulleys adjacent one end thereof adapted to facilitate longitudinal inclination of a passenger vehicle carried thereby, and passenger vehicles opera-

tively suspended from the pulleys of said elevating arms and longitudinally inclinable with respect to said elevating arms.

18. A device of the class described comprising, in combination, a central shaft, rotatable supporting arms adjacent the upper end of said shaft, transversely extending cable supporting members secured to said arms adjacent the outer ends thereof, spaced pulleys on said transversely extending members, a cable extending over said pulleys with depending ends, and passenger vehicles carried by the depending ends of said cables.

19. A device of the class described comprising, in combination, a central shaft, rotatable supporting arms adpjacent the upper end of said shaft, transversely extending cable supporting members secured to said arms and having pulleys adjacent the outer ends thereof, cables extending over said pulleys and adapted to move with respect thereto to facilitate inclination of a vehicle carried thereby, and a longitudinally inclinable passenger vehicle carried by each of said cables.

20. A device of the class described comprising, in combination, a central shaft, rotatable supporting arms adjacent the upper end of said shaft, transversely extending cable supporting members secured to said arms and having guideways for cables adjacent the outer ends thereof, cables movably supported in said guideways of each of said transversely extending members and adapted to move with respect thereto to facilitate inclination of a passenger vehicle carried thereby, a longitgudinally inclinable passenger vehicle carried by said cables, and means for limiting the amount of inclination of said passenger vehicle.

21. A device of the class described comprising, in combination, a central shaft, supporting arms radiating outwardly from the upper end of said shaft, passenger carrying vehicles suspended from said supporting arms, and an eccentric effective upon the inner ends of said arms and adapted to be rotated to raise and lower said supporting arms and the passenger carrying vehicles suspended from the outer ends thereof.

22. An amusement device of the class described comprising, in combination, rotatable means and elevating means for raising and supporting a plurality of vehicles in flight-simulating condition, aircraft-simulating vehicles carried by said rotatable means and said elevating means having controlling surfaces operable from within the vehicles for varying the movements thereof during rotation of said rotatable means, adjustably mounted aim registering devices carried by said vehicles, a substantially cylindrical wall having means thereon for moving a plurality of targets thereabout and a plurality of targets mounted on said target moving means each having means thereon adapted to effect actuation of said aim registering devices when the latter are directed at certain portions of said targets.

23. An amusement device of the class described comprising, in combination, rotatable arms having elevating arms mounted thereon adjacent the outer ends thereof for raising and supporting a plurality of vehicles in flight-simulating condition, aircraft-simulating vehicles carried by said elevating arms having controlling surfaces operable from within the vehicles for varying the movements thereof during rotation of said rotatable arms, adjustably mounted aim registering devices carried by said vehicles, and a plurality of movable targets each having means thereon adapted to effect actuation of said aim registering devices when the latter are directed at certain portions of said targets by an operator located within the aircraft simulating vehicles.

24. An amusement device of the class described comprising, in combination, rotatable arms having elevating arms mounted thereon adjacent the outer ends thereof for raising and supporting a plurality of vehicles in flight-simulating condition, transversely extending cable-supporting members carried by said elevating arms for facilitating longitudinal inclination of an aircraft-simulating vehicle, aircraft-simulating vehicles suspended from said transversely extending cable-supporting members having controlling surfaces operable from within the vehicles for varying the movements thereof during rotation of said rotatable arms, adjustably mounted aim registering devices carried by said vehicles, and a plurality of movable targets each having means thereon adapted to effect actuation of said aim registering devices when the latter are directed at certain portions of said targets.

25. A device of the class described comprising, in combination, a central shaft, outwardly extending members adjacent the upper end of said shaft, transversely extending cable supporting members secured to said outwardly extending members and having guideways for cables adjacent the outer ends thereof, cables movably supported in said guideways of each of said transversely extending members and adapted to move with respect thereto to facilitate inclination of a passenger vehicle carried thereby and longitudinally inclinable passenger vehicles carried by said cables.

26. A device of the class described comprising, in combination, a central shaft, means having rotatable supporting arms thereon radiating outwardly from the upper end of said shaft, passenger carrying vehicles suspended from said rotatable supporting arms and a plurality of eccentrics effective upon said means and adapted to be rotated to raise and lower said supporting means and the passenger carrying vehicles suspended from the outer ends thereof.

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