P. H. PAGÈS.

AEROPLANE SUSPENSION RAILWAY.

APPLICATION FILED FEB. 16, 1909.

1,037,973.

Patented Sept. 10, 1912.

6 SHEETS—SHEET 1.

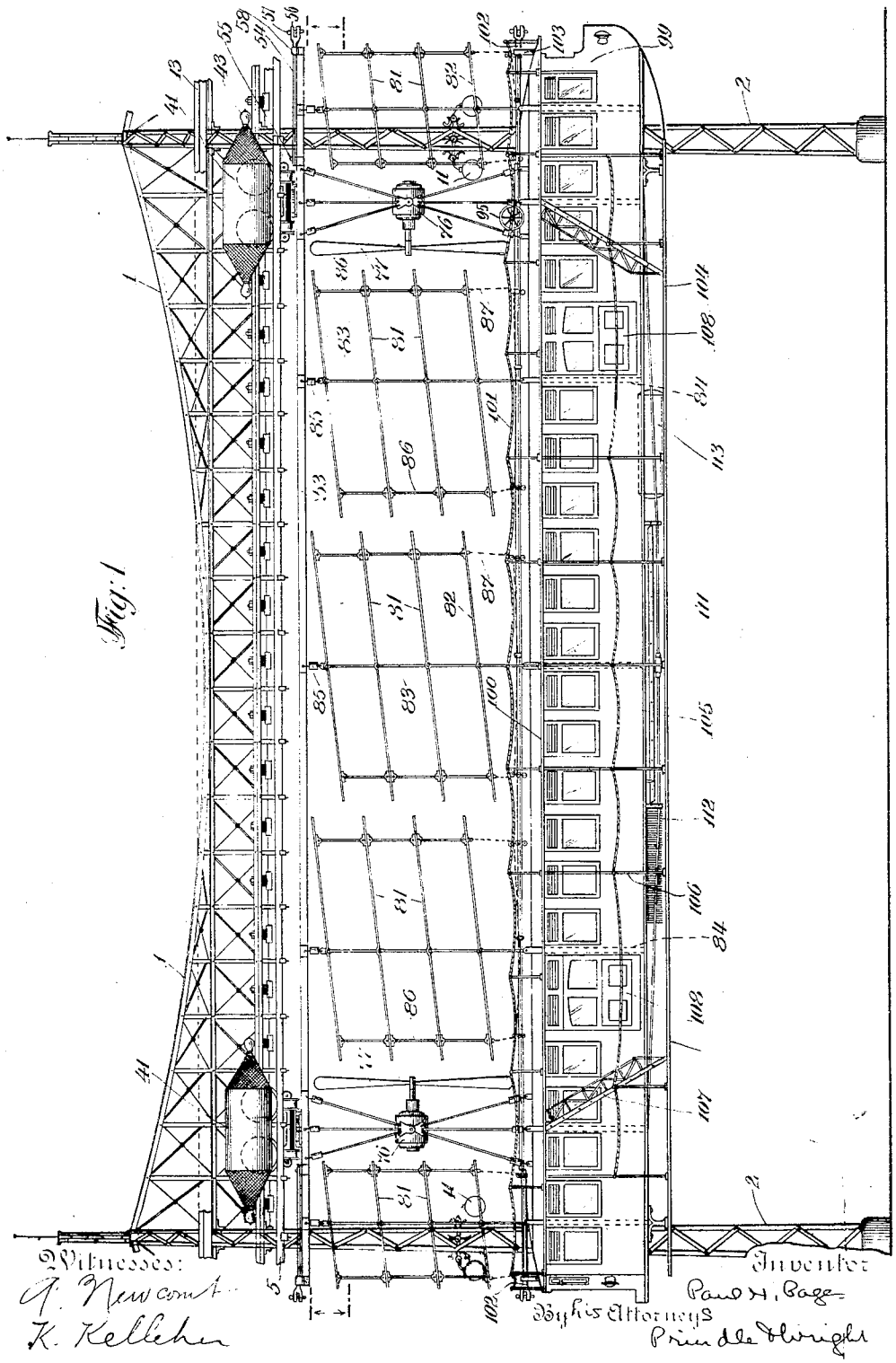

Fig. 1

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6 SHEETS—SHEET 2.

Fig. 10

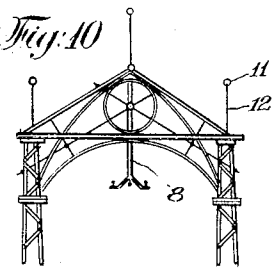

Fig. 11

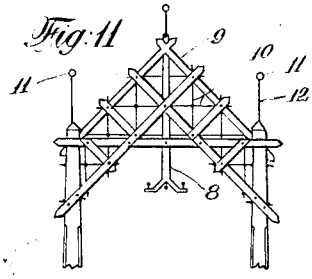

Fig. 2.

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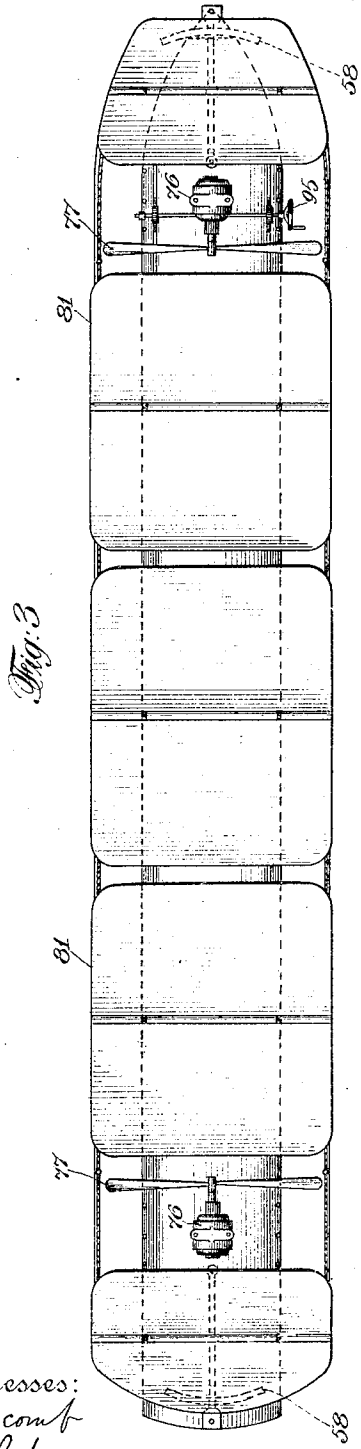

Fig. 3

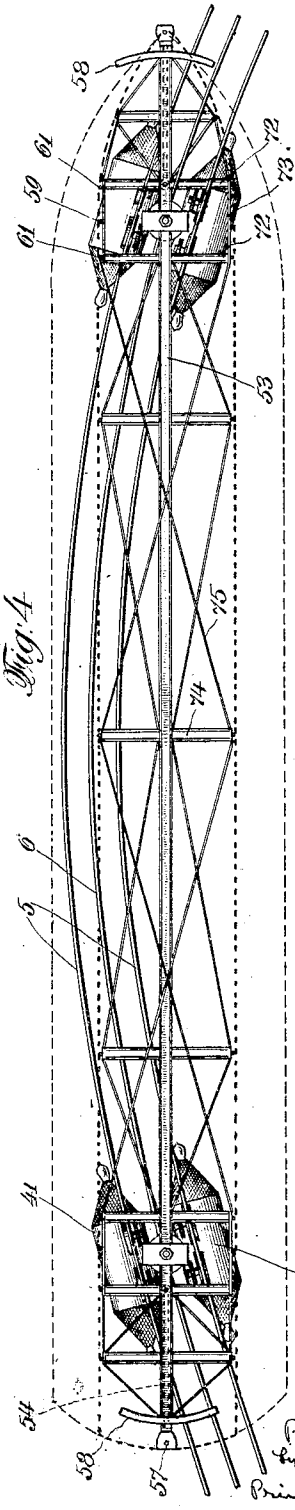

Fig. 4

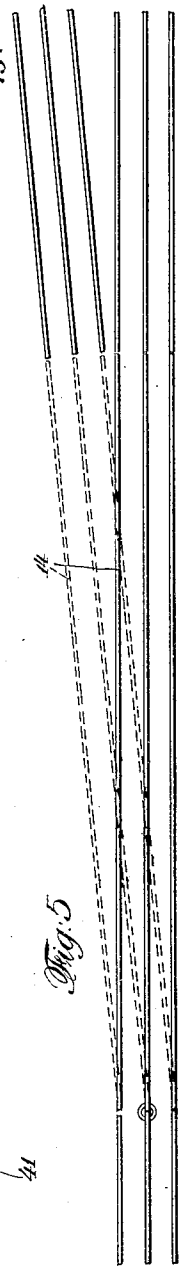

Fig. 5

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6 SHEETS—SHEET 4.

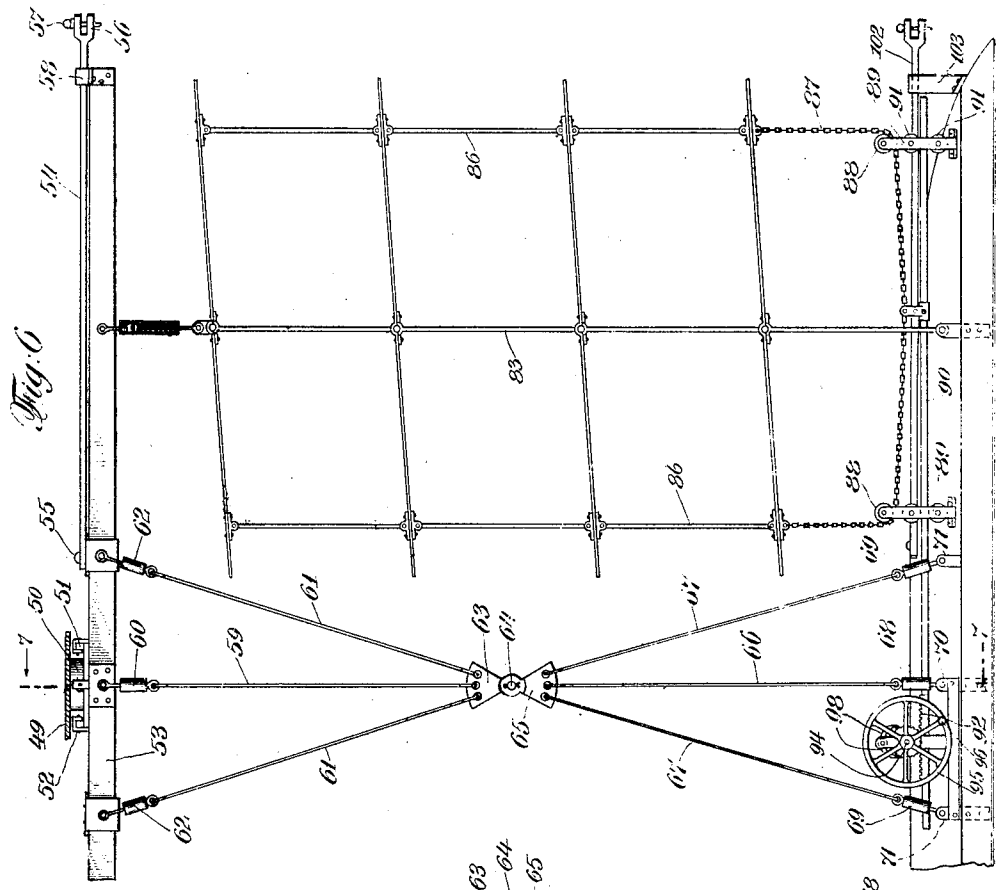

Fig. 6

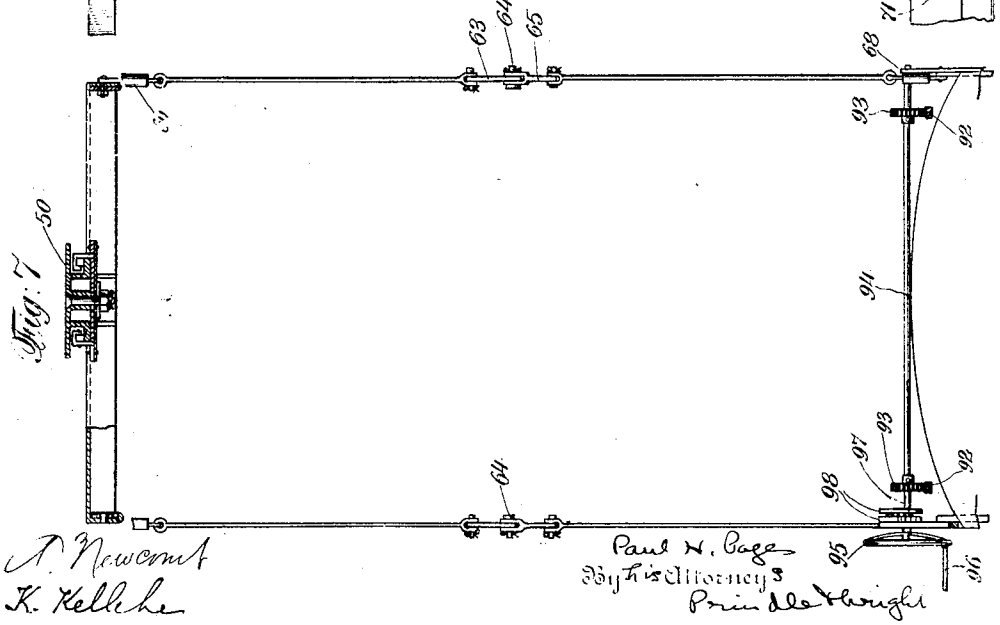

Fig. 7

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6 SHEETS—SHEET 5.

Fig. 8

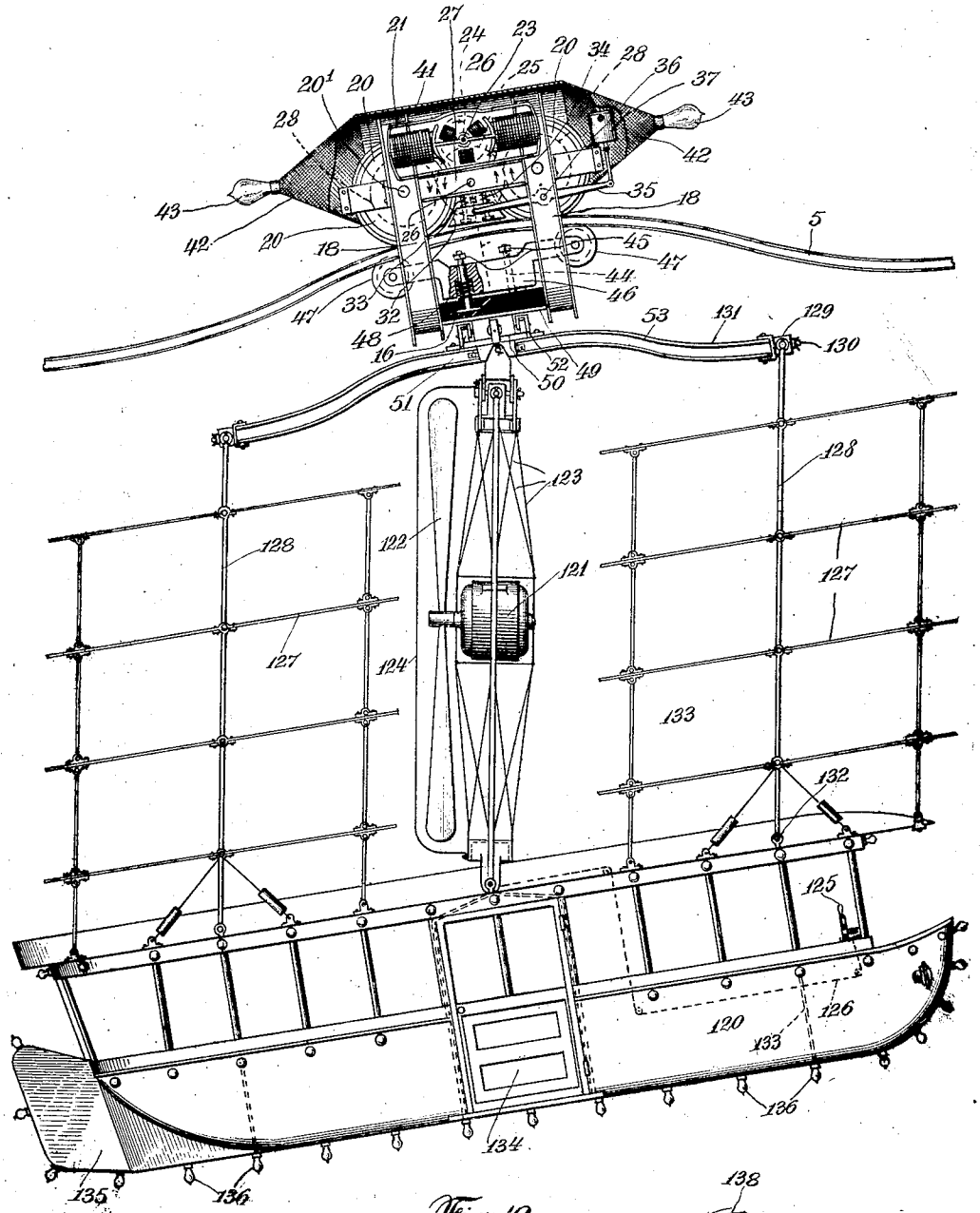
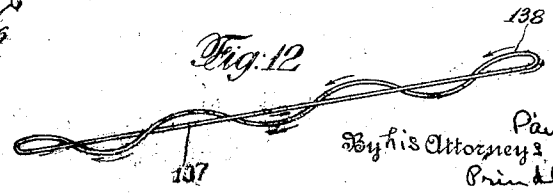


Fig. 12



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6 SHEETS—SHEET 6.

Fig. 9

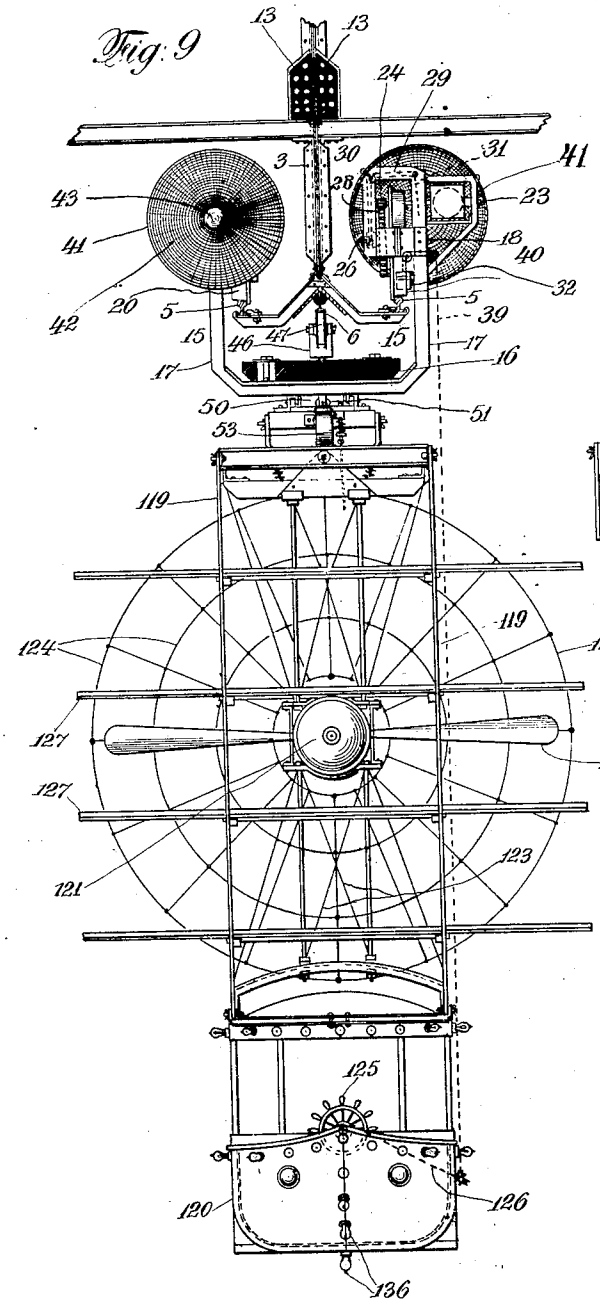
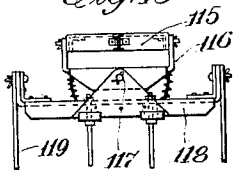


Fig. 13



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UNITED STATES PATENT OFFICE.

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AEROPLANE SUSPENSION-RAILWAY.

1,037,973. Specification of Letters Patent. Patented Sept. 10, 1912.

Application filed February 16, 1909. Serial No. 478,187.

To all whom it may concern:

Be it known that I, PAUL H. PAGES, of the borough of Brooklyn, in the county of Kings, city of New York, and in the State of New York, have invented a certain new and useful Aeroplane Suspension-Railway, and do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to an aeroplane safety suspension electric railway system for transporting passengers, mail, baggage, etc., either for long distances or for shorter distances for amusement purposes.

The object of my invention is to provide a railway system of this kind which is so constructed that the greater the speed the less will be the weight of the cars upon the supporting rails, and the less will be the friction and wear upon the moving parts and superstructure.

For amusement purposes, my object is especially to reproduce as far as possible the sensations of aerial flight, providing the car with a series of aeroplanes for this purpose, and causing it to be given an undulating movement and also a swinging or pitching movement from time to time.

I have shown my invention in the accompanying drawings, in which—

Figure 1 is a side elevation of a railroad and car constructed according to one embodiment of my invention. Fig. 2 is a transverse view showing a superstructure carrying two separate tracks and cars suspended from said tracks traveling in opposite directions. The car shown to the left of this figure is indicated in its position as located between the supporting pillars of the superstructure, while the car to the right of the figure is shown as located opposite one of said pillars. Fig. 3 shows a plan view of one of the cars used in said modification. Fig. 4 shows a plan view of a track carrying said car. Fig. 5 shows the form of switch used in the track. Fig. 6 is an enlarged detail showing the method of moving the aeroplanes. Fig. 7 is a cross sectional view of the same taken on lines 7—7 of Fig. 5. Fig. 8 is a side elevation partly in section of another modification of my invention used for amusement purposes. Fig. 9 is an end elevation of the same. Fig. 10 is a transverse view of a steel superstructure used for supporting a single track. Fig. 11 is a similar section of a superstructure constructed of wood. Fig. 12 is a diagrammatic view of a track adapted to carry the second modification used for amusement purposes, and Fig. 13 is a detailed view of a portion of the supporting mechanism permitting a free swaying movement of the car.

In the drawings referring to Figs. 1, 2, 3, 4, 5, 6, 7, 10 and 11, 1 is a trussed superstructure made of steel and supported upon steel columns 2. Said superstructure carries a pair of track supporting brackets 3 supported in and braced from the superstructure in the proper manner. Each track supporting bracket 3 comprises a pair of wings 4, each of said wings carrying a track 5. Between each pair of wings 4 upon each of the track-supporting brackets there is a third track for rail 6, projecting downwardly and supported upon an insulated base 7.

The superstructure shown in Fig. 10 is especially designed to support a single track-supporting bracket 8, the construction therein being of steel or other suitable material. The superstructure shown in Fig. 11 is constructed in a similar manner except that the construction therein is especially designed with a view to making use of wooden beams 9 and tie rods 10. The superstructures may be provided with lights 11 and flag-poles 12 in any desired manner.

In each track-supporting bracket I have located a pair of insulated conduits 13 for carrying the conductors of electricity for power and lighting. The two upwardly directed rails 5 are connected to the conductors in one of said conduits 13 while the third rail 6 is connected to the conductors in the other conduit 13. In the case where a single track is used, as shown in Figs. 10 and 11 I make use of a switch 14 as shown on Fig. 5. Said switch 14 is so connected to the conductors in the conduit 13 that the current is cut off from the rails at some distance from the switch when the latter is open, thus automatically withdrawing the power from a train which is approaching an open switch. The cars shown in Fig. 1 may be operated in

trains of a number of cars each. I have, however, shown in the drawings only a single car. Each car in the modification shown in the figures above referred to comprises a pair of trucks 15. Each truck 15 comprises an insulating base 16 having arms 17 extending upwardly at either side thereof and bent inwardly and downwardly over the tracks 5 forming journal brackets 18 and 19 for the wheels 20 of which there are four located on each truck. Each wheel 20 is supported upon a stub shaft 20′ extending between a pair of journal brackets 18 and 19 extending upwardly from the insulating base 16. A side bracket 21 is located at each side of the insulating base 16 and supported upon the journal brackets 18. The bracket 21 is adapted to support an electric motor 22 for the purpose of driving the wheels located at that side of the truck. As already shown in Figs. 8 and 9 the motor has a driving shaft 23 carrying a gear 24 at its inner end which meshes with a gear 25 carried by a stub shaft 26 supported on a cross bar 27 extending between the journal brackets 18. Each of the axles 20′ has attached thereto a gear wheel 28 which meshes with the gear 25. The wheels on each side of the truck are thus positively driven in the same direction by the operation of a single motor. The journal bearing 19 at each side of the truck supports a bell crank lever 29 pivoted at 30 thereto. The vertical member of the bell crank lever 29 is attached to a collar upon the gear 25 while the horizontal member of the bell crank lever has attached thereto a wire cable 31 extending downwardly to the car where it may be operated to throw the gear 25 out of mesh with the gear 24 in case the motor should become damaged so as to prevent its efficient operation. A brake 32 is provided located between each pair of wheels 20 at either side of the truck. Said brake 32 is supported upon a pair of downwardly extending bolts 33 carrying springs 34 for positively forcing the brake 32 downwardly. In order to operate the brake to stop the car, I have provided a pneumatically actuated lever 35 pivoted at 36 to one of the journal bearings 18 and operated by means of a compressed air cylinder 37. In order to operate the brake in the case of an emergency I also attach thereto a wire cable 39 extending over pulleys 40 and attached to the upper face of said brake. The cable 39 extends downwardly to the car where it is operated in a manner to be hereinafter described. In order to give each motor an attractive appearance and in the case of amusement devices an appearance suggesting aerial flight, I cover each over with a torpedo like shell 41 having conical ends 42 made of wire screens to permit the motor to be cooled by the passage of air. At the apex of each cone 42 there is located an electric light 43. The insulating base 16 supports on its upper surface a pair of guide rods 44 having adjustable nuts 45. At their upper ends a wheel bracket 46 is slidably supported upon said rods 44, the wheel bracket 46 carrying at either end thereof a flanged wheel 47 riding upon the third rail 6. In order to maintain the wheels 47 constantly in contact with the rails 6 the wheel bracket 46 is continually forced upward by means of a pair of springs 48 situated upon the rods 44 and located in recesses in said wheel bracket. A certain amount of play is permitted between the wheel bracket 46 and the top of the base 16. The amount of play, however, is not quite as great as the depth of the flanges on the wheels 47 and 20, the proportions being such therefore as to prevent the wheels from jumping the tracks. A metal plate 49 underlies the insulating base 16 and extends from one pair of journal brackets 18 to the other. Attached to plate 49 there is an annular track 50 upon which a series of rollers 51 are adapted to ride. The rollers 51 are carried in a plurality of brackets 52 projecting upwardly from the car supporting frame 53.

In the embodiment shown in Fig. 1, etc., the frame extends from the front to the rear truck and is shown in the accompanying drawings as a channel iron. The front and rear of said frame 53 is provided with a coupling link 54 pivoted at 55 thereto and having at its end a bifurcated socket 56 divided with a coupling pin 57. The end of the coupling link 54 is supported within a slideway 58 which permits the same to move upon the pivot 55 when the train of cars is going around the curve. Beneath each truck there are located the car supporting rods which comprise a vertical rod 59 connected to the supporting frame 53 by means of a spring 60 and two diagonally converging rods 61 similarly connected to said frame 53 by means of springs 62. The rods 59 and 61 are attached to a single plate 63 attached at its lower end at 64 to a similar plate 65. The plate 65 is connected by means of vertical and diagonally converging rods 66 and 67 and springs 68 and 69 to bars 70 and 71 extending upwardly from the car. The rods 59 and 61 as shown in Fig. 4 are attached at their upper ends to cross-beams 72 and connecting bars for the same 73 which constitute a subsidiary frame extending at right angles to the beam 53. The said beam 53 is furthermore provided with a plurality of cross beams 74 to the end of which are attached a number of tie rods 75 which act to brace the end supporting frame. There are, of course, two sets of the rods 59 and 61, one of said sets being located at either side of one of the trucks. Beneath each truck there is situated a propeller motor 76 carrying a propeller 77. This construction is the same with regard to

each of the trucks except that the propellers 77 are directed toward the center of the car and are designed to rotate in opposite directions to prevent the production of a torque which if formed would decrease the efficiency of the propeller located at the rear of the car. Each propeller is inclosed by a protecting guard 78 to prevent injury by contact with the blades. Supporting rods 79 and springs 80 are provided connecting the supporting frame 53 with the propeller motors 76. At the front and rear of the car and also between the propellers are located a plurality of series of aeroplanes 81. Each of these comprises a number of superimposed parallel planes 82 connected about their center by means of said supporting rods 83 extending from the supporting frame 53 to the car and connected at the lower part with bracing rods 84 extending to the bottom of the car. Springs 85 are interposed between the upper ends of the rods 83 and the supporting frame 53. The ends of each series of aeroplanes are furthermore connected together by means of rods 86 so as to maintain them always parallel. Means are provided for shifting the angle of the series of aeroplanes to decrease the load upon the trucks as much as desired, and to obtain a maximum of efficiency in lifting effort. The change of angle is accomplished by the movement of chains 87 extending in each series of aeroplanes at either side thereof from one end of the lower aeroplane to the other and passing around guide pulleys 88 supported upon brackets 89 projecting from the roof of the car. These chains 87 at either side of the car are connected to a rod 90 carried between rollers 91, supported upon the brackets 89. Each rod is furthermore equipped with a rack 92 with which a gear wheel 93 is designed to mesh, the gear wheel 93 being carried upon a shaft 94 extending across the top of the car and operated by means of a hand wheel 95 having a handle 96. The shaft 94 is also provided with a pair of ratchet wheels 97, adapted to coöperate with a pair of pawls 98. The function of the pawls 98 is to provide the rotation of the shaft 94 in either direction desired. The car 99 is provided with a metallic projecting roof 100 which projects laterally therefrom to produce an upper deck for the convenience of trainmen. Around the edge of the deck 100 is located a railing 101. At either end of the car upon the said roof 100 there is situated a coupling link 102, supported in slideways 103, and constructed in other respects like the coupling links 54, above described. The car 99 is furthermore provided with a lower deck or side platform 104, provided with railing 105 attached to uprights 106 extending from the lower platform to the upper deck. Ladders 107 connect the upper and lower platforms. Side doors 108 open from the car 99 upon the lower platform 104. The car is also provided with an end door 109 to permit communication between adjacent cars. When the car reaches a station it is carried above the platform 110 situated only a few inches below the bottom of the same. The said platform 110 extends completely across the structure from the supporting columns 2 on one side to those on the other. In case of accident requiring the stopping of the car between platforms the passengers can be discharged through a trap door leading to a ladder 111 normally carried in a horizontal position beneath the car which can be let down so as to reach the ground. 112 indicates a resistance coil such as is used in electric railways, and 113 a storage reservoir for compressed air. A ladder 114 leads from the upper platform 100 to the supporting frame beneath the motors so that the latter can be readily reached for the purpose of repair and adjustment.

The modification shown in Figs. 8, 9, 12 and 13 is specially designed for amusement purposes. In this modification, the motor construction and gear shifting and brake devices are in all respects alike. Said parts will be described in connection with another modification. The same is true of the turntable, consisting of track 50, rollers 51 and roller supporting brackets 52. Additional means are provided, however, in the modification shown in brackets 89 for permitting the car to swing in the direction of its movement or laterally to give the sensation of aerial flight. In order to effect this movement the track 50 is connected to a supporting plate 115. Upon said plate 115 there is pivoted a yoke 116. Said yoke in turn is pivoted at 117 to a lower yoke 118, situated beneath the yoke 116. The axes of movement of the yokes 116 and 118 are located at right angles to each other. The yoke 118 is connected by a plurality of bars 119 with the body of the car 120, and said bars 119 also support intermediate their ends the propeller motor 121 carrying a propeller 122. The motor is furthermore braced by means of a number of wire cables 123. In order to prevent injury to trainmen the propeller 122 is inclosed by guard 124. It will be noted that in this instance there is only a single truck for each car 120, the latter being made short. At the front of the car 120 is situated a wheel 125 which operates an inner cable 126 connected to the brake operating cable 39. Suitable mechanism is also provided at the front of the car to operate the brake pneumatically, the wheel 125 and cable 126 being designed to be operated only in case the pneumatic operating mechanism becomes disabled. The car on this modification is also provided with

a plurality of series of aeroplanes 127 to give the appearance of aerial flight. The series of aeroplanes 127 in this instance are however always maintained parallel to the roof of the car as there is no need in this instance to decrease the weight upon the truck. Each series of aeroplanes 127 is connected at its sides by means of a pair of large rods 128 extending downwardly from a cross-beam 129, pivoted at 130 to an I beam 131, extending longitudinally in a front and rear direction from the plate 115. The said rods 128 are also connected at their lower ends to the roof of the car by means of I bolts 132. Rods 133 connect the end of each series of aeroplanes at either side thereof to the roof of the car. The car in this instance is also provided with a side door 134 for the discharge and entry of passengers upon each side of the car. In order to increase the illusion the car carries a rudder 135 and a number of incandescent lights 136 situated upon its exterior.

Fig. 12 shows a form of track that would be specially desirable in adapting a device for amusement purposes. The track comprises a straight upwardly inclined grade 137 so connected with the electric conductors as to feed the full amount of power to the car, and a wavy coasting grade 138 disconnected from the electric conductors to permit the car to coast when traveling downwardly over the same.

In the operation of the railway the train of cars such as that referred to in the description of the first modification is propelled at a high speed by means of the several motors which are applied to each and every supporting wheel and the motor driven aerial propellers. The planes 82 having been adjusted to their most efficient angle, the same effect a lifting effort which increases the speed of the train. As a result, the amount of friction of the parts and the wear upon the same are very markedly decreased because of the presence of the planes. This reacts upon the moving parts and permits even a higher speed than would be obtainable without the use of the planes. At the same time, the construction is such as to absolutely prevent any possibility of derailment, as each truck is positively locked to the three rails by the flanges of the several wheels. As the train proceeds, should it approach an open switch the current would be automatically cut off from the rails which supply the current to the train, thus bringing the train to a stop before the switch is reached. Should one of the motors become damaged during the movement of the train, the same could be thrown out of operation by depressing the wheel crank lever 29 and disengaging the gear 24 from the gear 25 connected thereto. In order to stop the train, the same can be effected at any time by the operation of the pneumatic or mechanical brakes. If it should be found desirable to stop the train at any point between stations, the passengers can be readily discharged from the cars by lowering the ladders 111. When so lowered the passengers can readily pass outwardly through a trap door in the floor of the car to the ground. Upon a station being reached, the train is carried above a platform 110 upon which the passengers are discharged from the side doors of the car 108. When it is desired to have the train go in the opposite direction, the angles of the planes 82 can be shifted so that they tilt upwardly at their opposite ends by operating the hand wheel 95. In this construction there is no chance for the trolley to become displaced from the third rail. The second modification shown in Figs. 8, 9, 12 and 13 operates in a similar manner except that, as referred to above, it is not required therein to change the angles of the planes 127 to decrease the weight of the moving car upon the rails 6. A further difference in this modification is that the supporting mechanism for the car is so constructed that the latter is permitted to swing backwardly and forwardly, and from side to side in order to give all the sensations of aerial flight. The delusion is furthermore added to by the wavy character of the track 138, it being well known that aeroplanes in their passage through the air have a gently undulating movement. Again, in this modification when it is desired to drive the car in the opposite direction, it is only necessary to turn the same on the track 50 until the car points in the opposite direction. The propeller motor, under these circumstances, will drive the car in the new direction, and the electric motors situated upon the truck will be operated in the opposite direction by means of a controller situated in the car of the usual type.

My invention is capable of many modifications and is applicable to many other purposes without departing from the spirit thereof. Among other uses to which the invention could be put might be mentioned the fact that the lifting effort of aeroplanes could be scientifically determined in the entire absence of any danger to the experimenter. Furthermore, the modifications shown in Figs. 8, 9, 12 and 13 could be made in miniature size so as to be used for a toy.

I claim:—

1. In a device of the character described, the combination of a car, one or more aeroplanes attached thereto, a flexible connector between the front and rear ends of the aeroplanes, and means for shifting said connector to change the angles of the planes, including a rack and pinion.

2. In a device of the character described,

the combination of a car, one or more series of aeroplanes attached thereto, a flexible connector between the front and rear ends of each series of aeroplanes, and a common means for shifting said connectors to change the angles of the planes, including a rack and pinion.

In testimony that I claim the foregoing I have hereunto set my hand.

PAUL H. PAGES.

Witnesses:
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