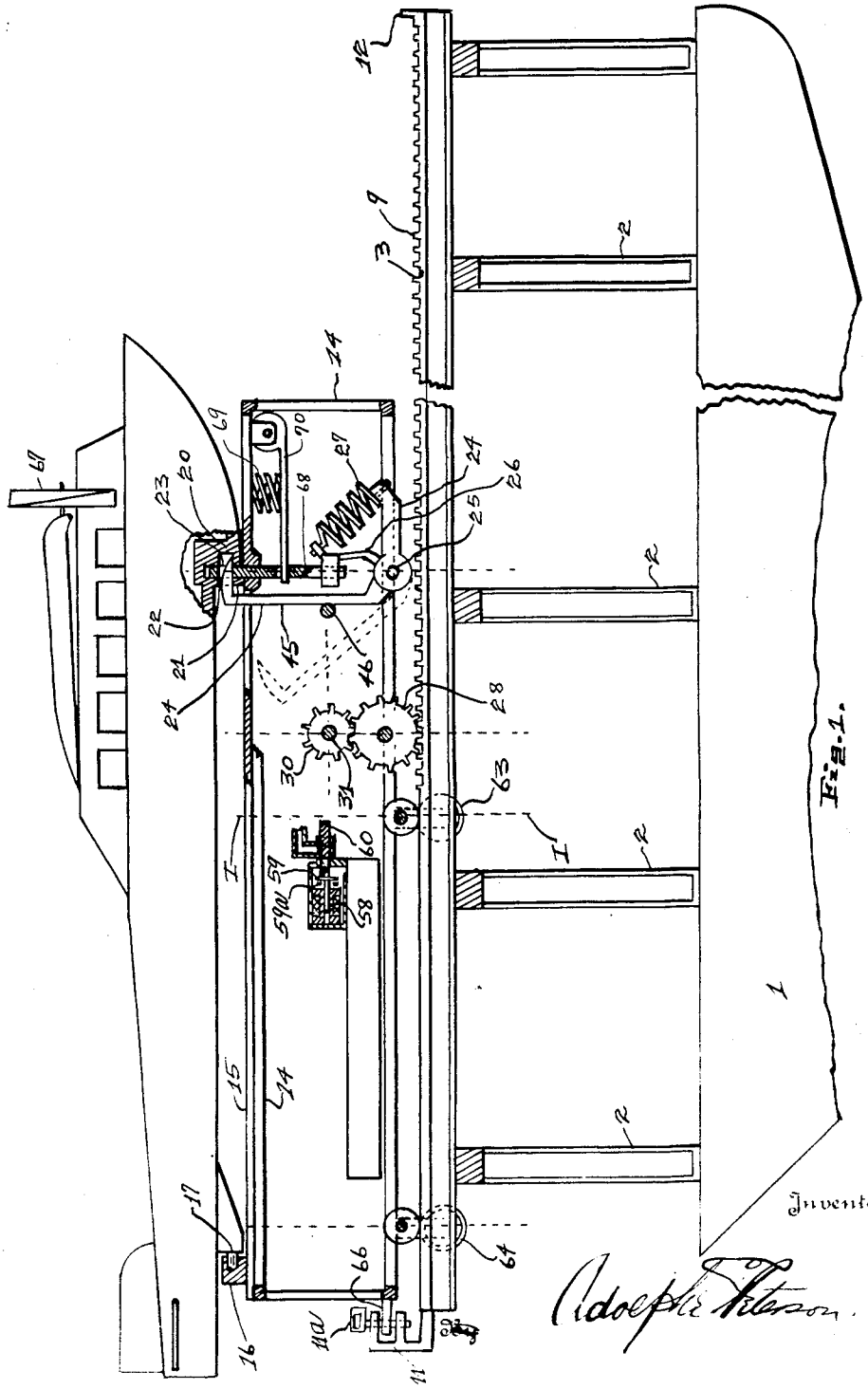
July 26, 1932. A. C. PETERSON 1,869,212

LAUNCHING MEANS

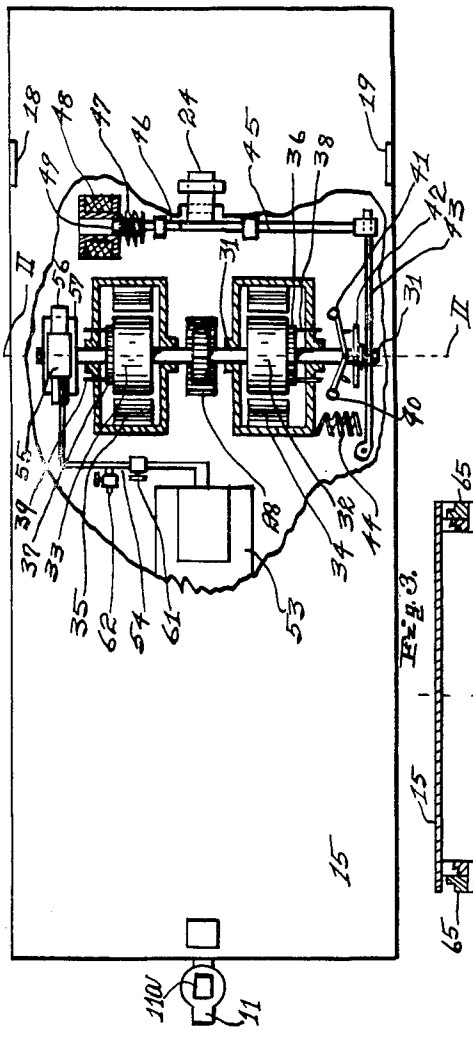
Filed June 16, 1927 2 Sheets-Sheet 1

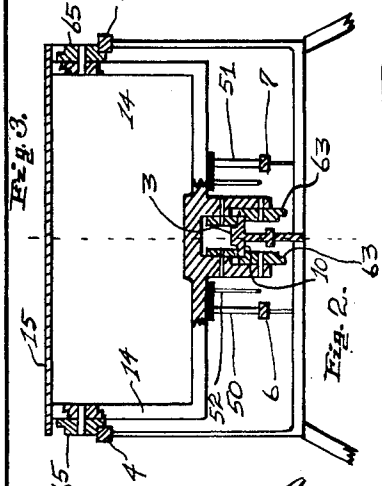


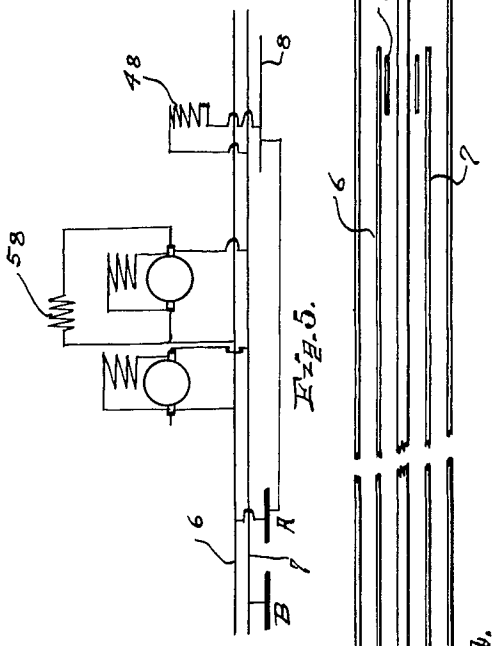
July 26, 1932. A. C. PETERSON 1,869,212

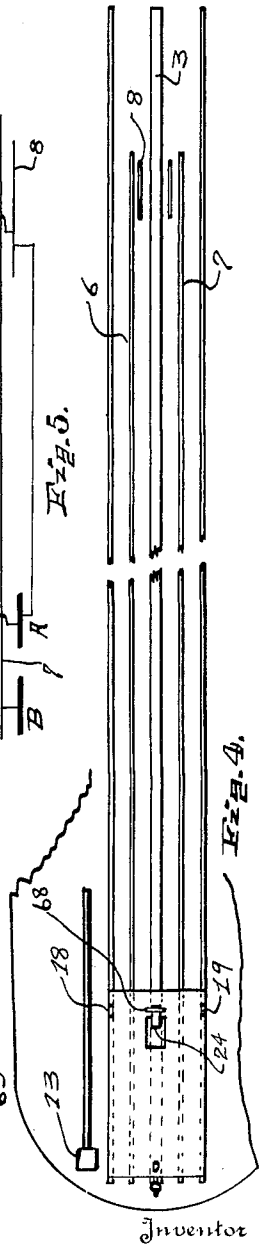
LAUNCHING MEANS

Filed June 16, 1927 2 Sheets-Sheet 2









Inventor

Adolph C. Peterson.

Patented July 26, 1932

1,869,212

UNITED STATES PATENT OFFICE

ADOLPHE C. PETERSON, OF MINNEAPOLIS, MINNESOTA

LAUNCHING MEANS

Application filed June 16, 1927. Serial No. 199,376.

My invention relates to means for launching air-planes, particularly of the sea-plane type and is called a launching means.

The objects of my invention are to provide a means for launching air-planes of any type, seaplane or land plane, whereby the launching may be performed in less space, whereby the launching may be performed with greater safety than is usual, whereby launching of heavily loaded planes is facilitated, whereby launching of large planes is facilitated, and whereby any planes may be launched with greater safety and with greater assurance of effective launching. The object is particularly to provide a means of launching planes from vessels at sea and particularly in such cases to provide a means for launching the very heavy and very heavily loaded planes, whether land or sea-type planes from vessels at sea. An object is particularly to provide a means which may be carried on any vessels going to sea whether they be commercial vessels of the passenger or freight type, and to provide such a means as may be carried by any vessel at sea for the safe and effective launching of any plane which may be desired to be launched as for instance any plane which may be taken on board at sea or which may be met with at sea.

The principal devices and combinations of devices comprising my invention are as hereinafter described and as hereinafter defined in the appended claims. In the accompanying drawings which illustrate my invention like characters refer to like parts in each of the several views.

Referring to the drawings:

Figure 1 is a view partly in vertical cross section running vertically through the center of the launching means lengthwise thereof, some parts being shown in full side elevation and some parts being broken away; this view showing also superimposed upon the device a plane in the position ready for launching.

Figure 3 is a plan view looking from the angles to the plane of the device or figure in Figure 1 on the line I—I of Figure 1.

Figure 3 is a plan view loking from the top with the plane removed and with part of the table broken away to show other parts more clearly.

Figure 4 is a plan view of the rails and conductor rails and car in reduced size.

Figure 5 is a diagrammatic view showing the electric circuits.

Referring first to the figures from 1 to 4 both inclusive, the numeral 1 indicates a vessel whereon the device is constructed and upon which it is supported by means of towers 2 which may preferably be of the steel lattice type such as is used for the support of fighting tops upon war vessels. This type of tower is preferably used, although shown diagrammatically only, for the reason that it would be a lighter type and more readily adaptable to the requirements especially in connection with passenger carrying vessels upon the sea, in order that as little as possible of the view from the decks of the vessel may be obstructed by the towers. Upon the towers there are firmly secured a rack rail 3 and two side-rails 4, 5, the latter being placed one on each side of the central rack rail and on a plane slightly or somewhat above the height of the central rack rail. Each of these are firmly secured on the towers and are of such strength that they will support the carrying device and the plane thereupon during the launching though the plane itself may weight say ten or twenty or even forty or more tons, whatever may be the plan and use for which the device is constructed.

Near the rack rail and approximately on the same level, as the rack rail there are firmly secured also, to the towers, one so-called positive conductor rail 6, one so-called negative conductor rail 7, and one relatively short so-called secondary conductor rail 8. The rack rail 3 has centrally placed upon its top a toothed rack 9 and its top bar 10 is relatively wide so that it will perform the guiding function in connection with the roller wheels hereinafter described. The towers should be so spaced and of such number that they will serve to keep the rails rigid, the rails being also of a proportionate strength so that the towers need not be too many in number. The towers may be spaced

say twenty or thirty feet or so apart. The vessel upon which the device is constructed should preferably be of a size say at least four hundred feet and preferably say seven or eight hundred feet but may be constructed upon smaller vessels depending upon the size of the planes to be launched.

The rails have at one end a so-called clevis 11 and bar 11*a*, removable manually or otherwise, by which the plane may be retained until it is desired to be launched. The rails have at the other end a stopping block 12. The vessel has fixed to its deck an electric or other power crane 13, which latter is very strong and large and capable of being extended some distance out over the water in which the vessel lies and capable of lifting a very heavily loaded large plane from the water and capable of lifting or raising such a plane to a position for launching from the rails, that is the position indicated by the plane in the drawings. This crane is preferably placed at the forward end of the vessel the rails adapted to launching the plane rearwardly from the vessel but this may be reversed.

The rails described and towers, support a launching car which is supported and rolls upon the rails. This launching car has a steel frame 14 and a substantially flat table top 15 this being so smooth and level that it will not offer any obstruction to movement of a plane from it except the special devices hereinafter described. At the rear end of the table top upon it there is a block 16 which has a central hole or depression horizontally bored into it as shown and in this depression a bar or pin 17, the latter secured to the plane, is placed when a plane is to be launched. Near the forward end of the table top 15 at each side on the top there are placed cleats 18, 19, these being merely intended to prevent sidewise movement of the plane until the plane moves relatively forwardly at a greater speed than the launching car.

The plane intended to be used should preferably be constructed with a step 20 somewhat in the manner hydro-planes are constructed, that is the hull should be so constructed. At the rear side of this step the duralumin or steel or other frame of the sea plane hull has a relatively flat metallic depending part 21 which is placed transversely of the hull beneath it and parallel to the rear of the step and has formed in it a rectangular opening 22 which is just opposite a similar rectangular opening or recess 23 in the rear side of the step. Thus the step 20 and part 21 form a means whereby a so-called automatic hook 24, the latter trunnioned on an axis 25 in a bracket 26 of the car, may grasp and hold the plane firmly on the table top of the launching car. The automatic hook 24 during the launching movement or acceleration occupies the position shown in full lines but when the plane is released occupies the position shown by dotted lines in Figure 1. The automatic hook 24 is yieldably and strongly pulled by the coil spring 27 into its released position, the spring being attached to the bracket 26 as shown. In its released position the automatic hook is pulled by the coil spring 27 out of the openings 22, 23 in the plane's frame, and is pulled downwardly into the car body so that it then lies wholly beneath the table top of the launching car, and does not obstruct movement of the plane from the table top.

The launching car has in its lower part and near its forward end beneath the table top a spur gear wheel 28 which is rotatably mounted in bearings 29 in the launching car frame so that it will roll upon the toothed rack 9 of the rack rail. This spur gear wheel 28 is driven by a smaller spur gear 30 mounted on a parallel axis shaft 31 directly above the spur gear wheel 28 in the launching car frame. The axis shaft 31 has secured upon it two electric motor armatures 32, 33 which revolve in fields 34, 35 respectively, and have respectively commutators 36, 37 and brushes 38, 39. The electric motors are powerful motors having large accelerative power and speed. They are preferably direct current motors but may be other than direct current motors.

The motor shaft 31 at one end has fixed pivotally to it two centrifugal governor weights 40, 41 which are adapted to press a disk 42 against a lever 43 under high speed of the motor shaft 31. Under such high speed the governor weights 40, 41 will press the lever 43 against a spring 44. The lever 43 normally holds a locking bar 45 in a position exactly in the rear of the automatic hook 24 but under the speed of the motor shaft 31 the lever 43 will when a certain speed is reached move the locking bar away from the automatic hook 24 so that the latter is then free to be pulled downwardly by its spring 27. The automatic hook 24 is also normally held by a so-called position locking bar 46, the function of which is to hold the automatic hook until the launching car has reached a certain point in its travel. The position locking bar 46 is normally held in position behind the automatic hook 24 by a coil spring 47 but may be pulled out of that position by a solenoid 48 acting upon the armature 49 under excitation.

The launching car carries three contact brushes, brush 50 contacting with positive conductor rail 6, brush 51 contacting with negative conductor rail 7 and brush 52 contacting with secondary conductor rail 8. The positive and negative conductor rails end a short distance before the end of the rack rail and side rails, just so much that the braking hereafter described is properly effected, and the secondary conductor 8 is only a short rail

extending only a few feet at a location just slightly before the end of the positive and negative conductor rails. The positive and secondary conductor rails are connected with one main lead A and the negative conductor rail with the other main lead B, so that the secondary conductor rail when performing its function creates a minor shunt through solenoid 48 from the main leads A and B. The main line leads A and B are connected to any source of electric current of the proper power, say the vessel's main generating source, or dynamo.

The launching car carries also an air pressure receiver 53 which carries air under high pressure and is adapted to deliver this air through a conduit 54 to an air brake cylinder 55 contracting a brake band or shoe 56 upon a drum 57, the latter fixed to motor shaft 31. This braking air is permitted to pass only when electric current through solenoid 58 is broken so that armature 59 is permitted to move and permit valve 60 to move its position releasing air to the brake cylinder. The solenoid 58 is in circuit with the electric motors, and therefore is in circuit and has current passing until the positive and negative conductor rails have been passed by the brushes. A hand valve 61 may be used to block passage of air. A hand valve 62 may be used to release air from the braking cylinder.

The launching car has near its forward end roller wheels 63 trunnioned in the car frame which roll under the sides of the top bar 10 and the car near its rear end has roller wheels 64 which perform a similar function at rear end of the car. The table top has under its side edges roller wheels 65 which roll on the side rails and assist in carrying the weight and guiding the travel of the launching car. The table top should be just a sufficient width and the side rails so far apart as to provide the requisite lateral stability but no wider.

A hand switch C is provided whereby an operator riding with the car may control the releasing if desired, but this switch is in the ordinary use open as the function is intended to be automatically performed ordinarily.

In the use or operation of my device it is intended that the crane carried by the vessel will be used to raise a plane from the water, in which the plane may alight, to the position shown in Figure 1 upon the launching car, and that the plane hull will then be properly located upon the table top as shown and that the automatic hook 24 will be raised by manual effort or otherwise to its position locking the plane hull to the table top as shown, and that the position locking bar and the other locking bar will then be moved into the position locking the automatic hook against its downward movement, so that in this position the plane hull is locked to the table top. In this position the launching car and plane are at the forward end of the vessel upon that end of the rack rail and side rails and the bar 11*a* is passed through the clevis 11 and eye 66, (the latter fixed to the launching car) so that the launching car and plane are then held against forward movement over the launching rails. In this location no current passes through the solenoid 48 so that the position locking bar 46 remains fixed during travel of the launching car until the secondary conductor rail is reached by brush 52. If now current from the main leads A and B is passed to the conductor rails 6, 7, 8, current flows through rails 6, 7, to their related brushes to the electric motors and through solenoid 58 thereby holding the valve 60 in position blocking passage of air to air brake cylinder and also simultaneously creating high rotative torque in the motor armatures. If now the bar 11*a* is pulled out of the eye and clevis, the launching car is thereby released and the electric current creates high accelerative power and rapidly increases speed of rotation of motor shaft 31 from zero so that spur gear 28 is given a high speed over to the rack 9 thereby rapidly accelerating launching car and plane from zero. It is to be noted that the motor or motors of the plane must have been started also so that propeller or propellers 67 are rapidly revolving at and from the start of launching movement. It is contemplated that when the launching car and plane shall have thereby been rapidly accelerated over the rails so that at about four hundred feet more or less of travel the launching car and plane accelerated by plane motors and electric motors of launching car will have attained a speed of say seventy or more miles per hour, or as great as minimum flying speed but preferably somewhat greater than this speed so that large lifting power will be attained, and that thus the plane, being properly positioned and having its elevators properly positioned, will at this point have acquired considerable lifting impulse. Also at this point of the travel the speed of motor shaft 31 is such that the governor weights will then move the lever 43 so as to move the locking bar 45 out of its locking position so that then this locking bar will not serve to hold the automatic hook 24 in position. However the position locking bar 46 is still held in position by its spring locking the automatic hook 24 until the secondary conductor rail is reached by brush 52, whereupon the electric current will also pass in a shunt through the solenoid 48 thereby pulling the locking bar 46 out of its locking position. Thereupon, both the locking bar 45 and position locking bar 46 being pulled out of their locking positions, the automatic hook 24 is released and pulled by its spring is released and moves downwardly

into the launching car beneath the table top and lock plate 68 is pulled down by spring 69 acting on lever 70 so that the plane hull is completely released and the plane may then be propelled by its motors away from the table top, but at this instant or slightly after the automatic hook 24 is released, the conductor rails 6, 7 end and the current through the motors and solenoid 58 is broken and motor torque ceases and valve 60 is released and air released to air braking cylinder so that the brake band or shoe is contracted upon the drum and brakes the motor shaft 31 and thereby brakes the launching car. The remainder of the travel of the launching car is occupied by the braking movement and this travel should be short and if the plane has not been released by the governor and locking bar 45 then the plane is decelerated with the launching car. The hand valve 61 should of course be open during the launching movement. The governor weights by their control thereby prevent releasing of the plane until the speed of the motor shaft 31 and the launching car shall have reached the predetermined minimum and if this minimum is not reached before the launching car reaches the end of the conductor rails then the electric motor torque ceases and the brake is applied and the car and plane are braked to a stop by rapid deceleration. It is to be noted that this deceleration travel must be relatively short and deceleration rapid so that the plane will not need to travel but a short distance above the ends of the rails but that in any event if the plane is released it will have such speed and lifting power that it will immediately rise. Preferably the launching movement should launch the plane rearwardly from the vessel so that any forward movement of the vessel will tend to take the vessel away from the plane if the latter should drop to the water behind the vessel, but the launching speed should be such as to overcome this forward speed or counterbalance it, and give to the plane a net speed through the air of say seventy or more miles per hour.

It is to be noted that I contemplate that the device may be used as a land launching car, that is the launching car may be made to travel over rails or over a road bed on land the device acting automatically to release the plane when the predetermined speed has been reached, in the same or a similar way.

Figure 4 shows diagrammatically the relation of the rails and launching car in the first form, the car being much reduced in size of illustration in order to show the relative size more clearly as compared to the rails and vessel. This is a plan view.

While I have shown detailed devices and combinations of devices in the illustration of my invention, I contemplate that other detailed devices and combinations of devices may be adopted in the realization of my device without departing from the contemplation and spirit thereof.

What I claim is:

1. In a launching means, an air-plane accelerating and propelling means adapted to rapidly accelerate an air-plane from zero to flying speed, in combination with governor controlled means preventing the air-plane from leaving the air-plane accelerating and propelling means until a predetermined speed has been attained.

2. In a launching means, an air-plane speed accelerating means having a motor driving means, in combination with means holding an air-plane thereto and a governor control means adapted to release the air-plane from the holding means.

3. In a launching means, an air-plane speed accelerating means having a motor driving means, in combination with automatic means holding the air-plane to the speed accelerating means until a predetermined speed has been attained.

4. In a launching means, an air-plane carrier having automatic means holding the air-plane to the air-plane carrier until a predetermined speed has been attained in combination with motor driven speed accelerating means adapted to accelerate the air-plane.

5. In a launching means, guide rails and a carrier adapted to hold an air-plane automatic means holding the air-plane to the carrier until a predetermined speed has been attained, in combination with motor driven means adapted to accelerate the air-plane over the guide rails.

6. A launching car having a propelling means, a holding means holding an air-plane to the launching car and a speed governor control means whereby the holding means may release the air-plane.

7. A launching car having a propelling means, a holding means holding an air-plane to the car, and an automatic control means adapted to cause the holding means to release the air-plane from the launching car when a predetermined speed has been attained.

8. A launching car having a propelling means, a holding means holding an air-plane to the car, and an automatic control means adapted to cause the holding means to release the air-plane from the launching car when a predetermined speed has been attained, and a means adapted to prevent the release of the air-plane from the car until a predetermined position in the travel of the launching car has been reached.

9. A launching means having a propelling motor, a guide means whereby an air-plane is guided in a launching course, a holding means whereby the air-plane is held to the guiding course and released therefrom by

governor controlled means when a predetermined speed has been attained.

10. A launching means having a propelling motor, electric conductor rails whereby the propelling motor may receive current for driving the motor, speed governor control means whereby when the launching means reaches the end of the conductor rails the air-plane is released from the launching means.

11. A launching means, a propelling means for accelerating the launching means, governor controlled means holding an air-plane to the launching means and releasing the air-plane when a predetermined speed of the air-plane has been attained.

12. A launching means, a propelling means for accelerating the launching means, governor controlled means holding an air-plane to the launching means and releasing the air-plane when a predetermined position in the launching course has been reached.

13. A guiding rail course, a supplementary control rail, means propelling an airplane over the guiding rail course, governor controlled means retaining the airplane until a predetermined speed is attained and means controlled by the supplementary control rail and releasing the air-plane when the supplementary control rail is passed.

14. A guiding rail course, a supplementary control rail, means propelling an air-plane over the guiding rail course, automatic control means retaining the airplane until a predetermined speed has been attained, a trip hook adapted to hold the air-plane to the guiding rail course and controlled by the supplementary control rail so as to release the air-plane from the guiding rail course when the supplementary control rail has been passed.

15. A guiding rail course, a retaining means adapted to move over the guiding rail course, a supplementary control rail extending over part of the guiding rail course, a locking means moving on the supplementary control rail and adapted to hold the retaining means until the supplementary control rail has been passed and to thereupon be released and release the retaining means from the air-plane, and supplementary automatic speed controlled means retaining the airplane until a predetermined speed has been attained.

16. A guiding rail course, a launching means adapted to move over the guiding rail course and to hold an air-plane to the guiding rail course during a launching travel, a propelling means carried by the launching means and adapted to accelerate the air-plane over the guiding rail course, a supplementary control rail extending for part of the guiding rail course, a releasing means normally held by a lock moving on and held by the supplementary control rail and adapted to release the airplane when the supplementary control rail has been passed.

17. A guiding rail course, a launching means adapted to move over the guiding rail course, and to hold an air-plane to the guiding rail course during a launching travel, a propelling means adapted to accelerate the air-plane over the guiding rail course, a supplementary control rail extending for part of the guiding rail course, a mechanically actuated releasing means holding the air-plane until the supplementary control rail has been passed, and a speed governing means adapted to lock the air-plane to the launching car until a predetermined speed has been reached.

18. An airplane carrier having speed accelerating means, a governor means sensitive to the speed of the carrier and adapted through retaining means to retain an airplane upon the carrier until a predetermined speed of the carrier has been attained.

19. An airplane carrier having speed accelerating means, a loop or eye adapted to be raised from the carrier and having related means to withdraw the loop, a hook adapted to be raised from the carrier and to cooperate with the loop to hold an airplane by a cooperating attachment on the airplane, means whereby the hook and loop are controlled so as to be withdrawn and release the airplane when a predetermined speed is attained by the carrier.

20. An airplane carrier having speed accelerating means and adapted to be propelled over a guiding course, a control rail extending over the guiding course, a retaining hook adapted to retain an airplane on the carrier when the hook is in a retaining position, a torque applying means adapted to withdraw the hook, and a control element related to the hook and cooperating with the control rail to hold the hook in the retaining position until the control rail has been passed.

In witness whereof I have hereunto set my hand this 6th day of June, 1927.

ADOLPHE C. PETERSON.