Sept. 23, 1952 N. D. ASHWOOD 2,611,355

CATAPULT FOR LAUNCHING MODEL AIRPLANES

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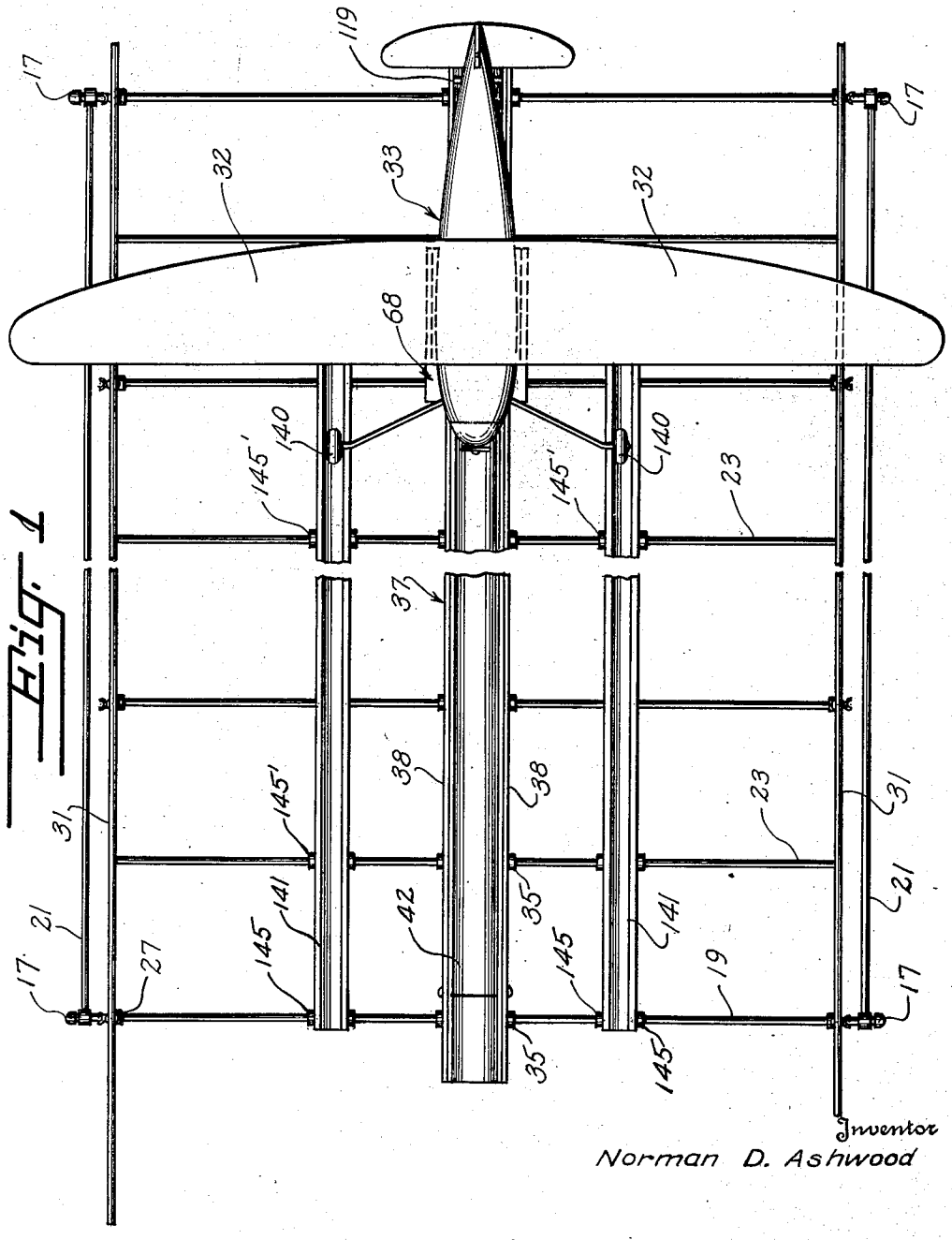

Fig. 1

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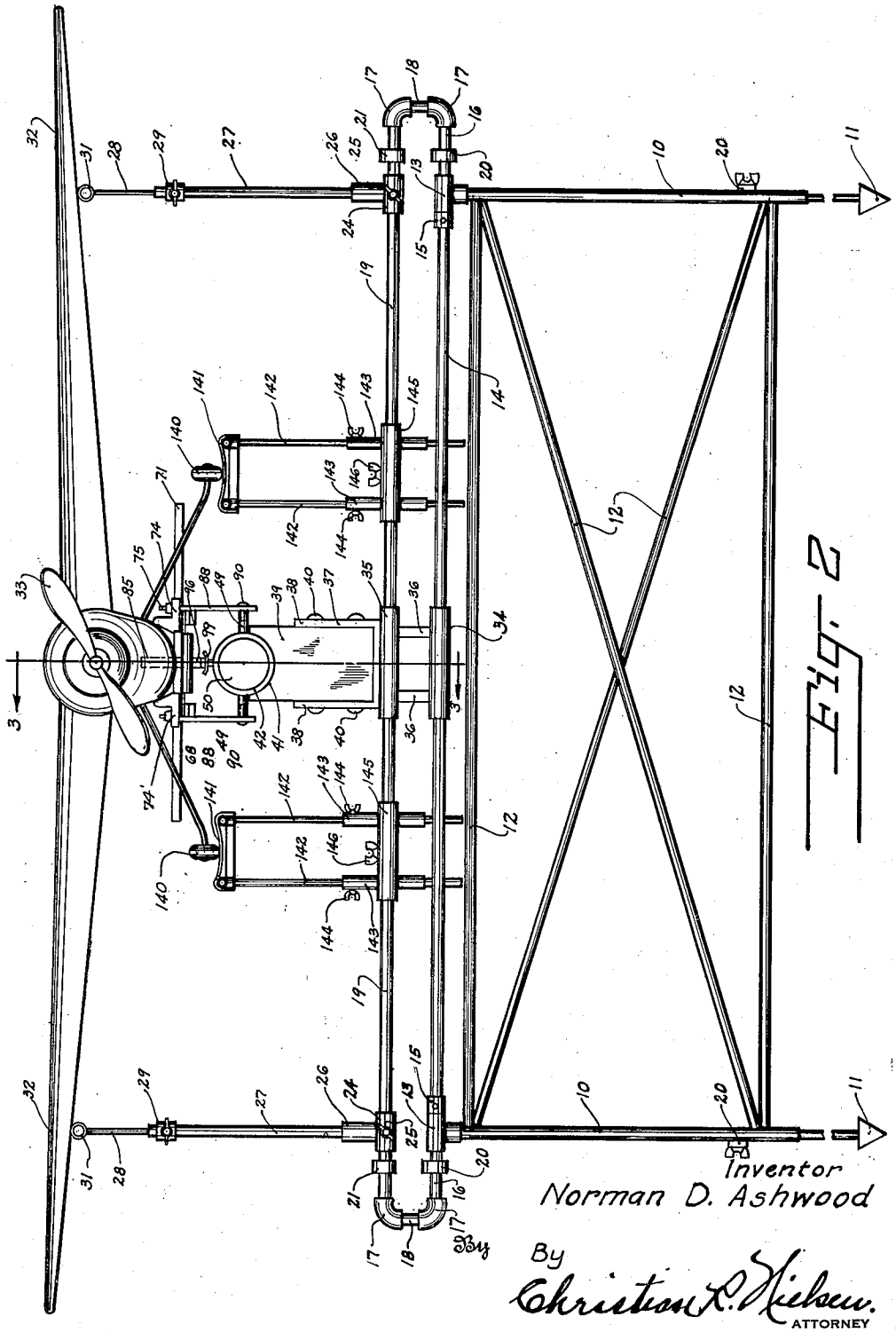

FIG. 2

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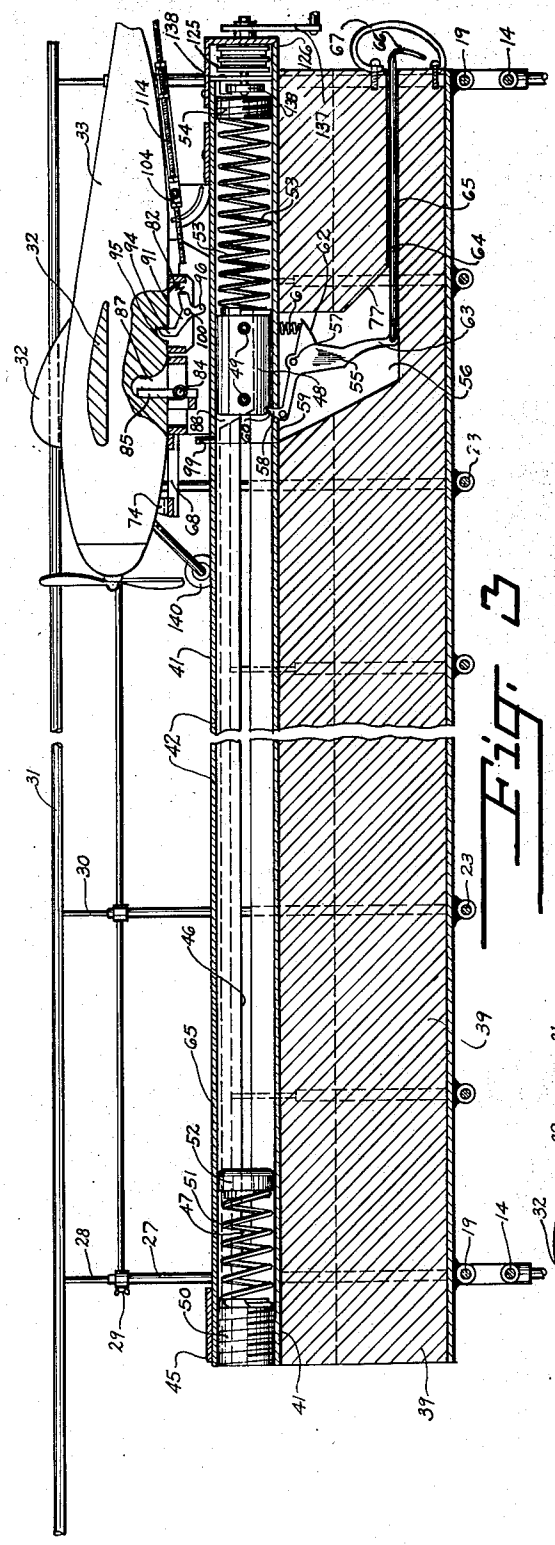

Fig. 3

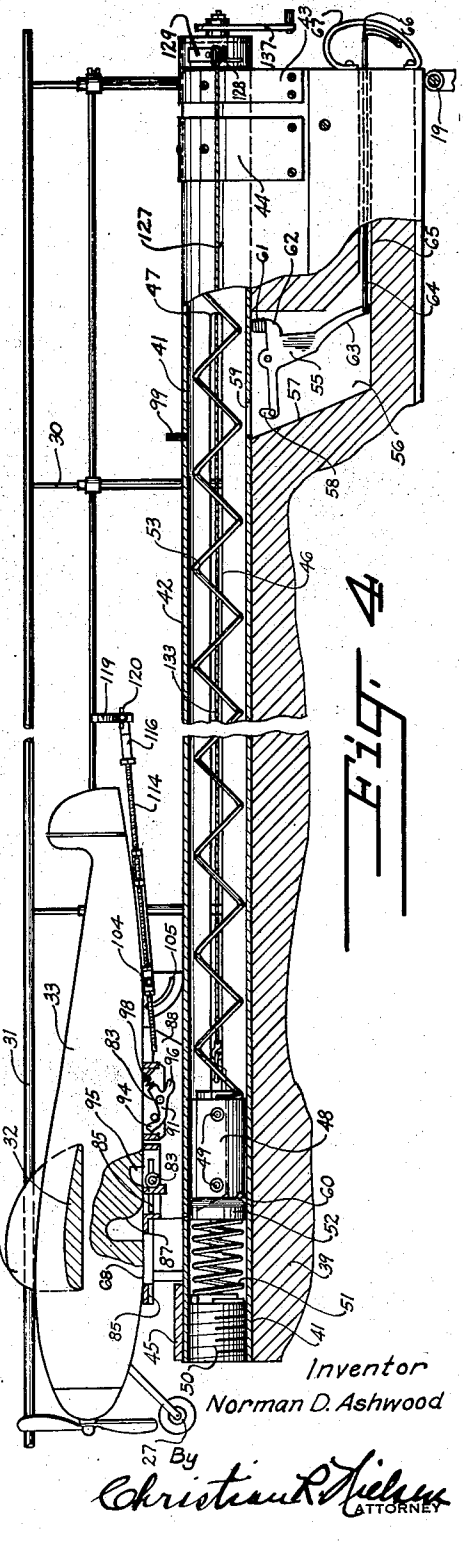

Fig. 4

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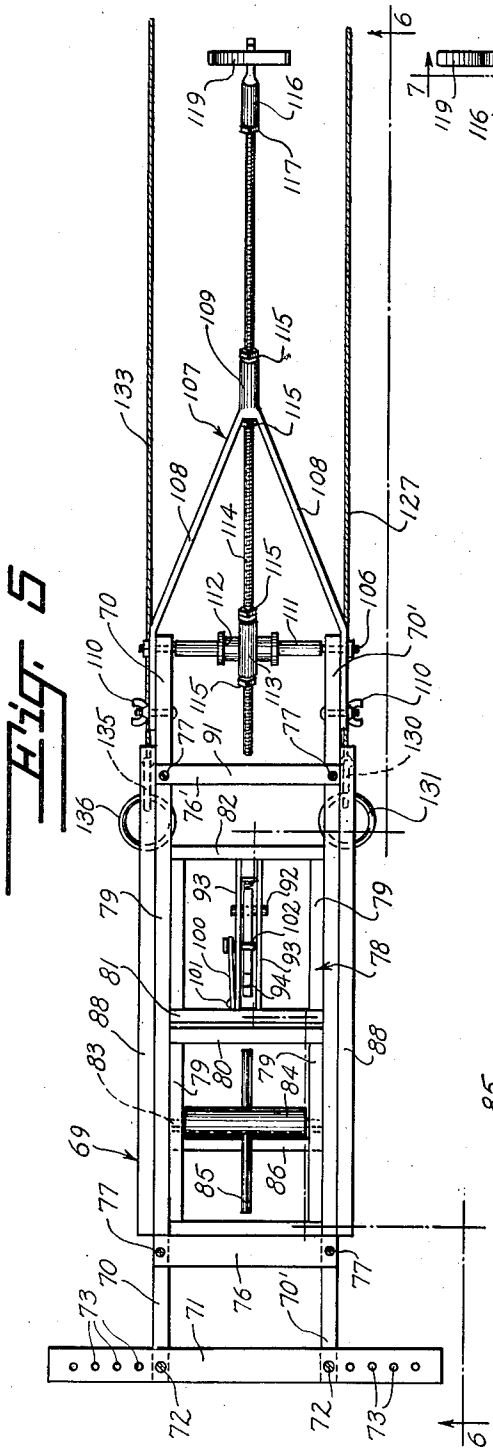

Fig. 5

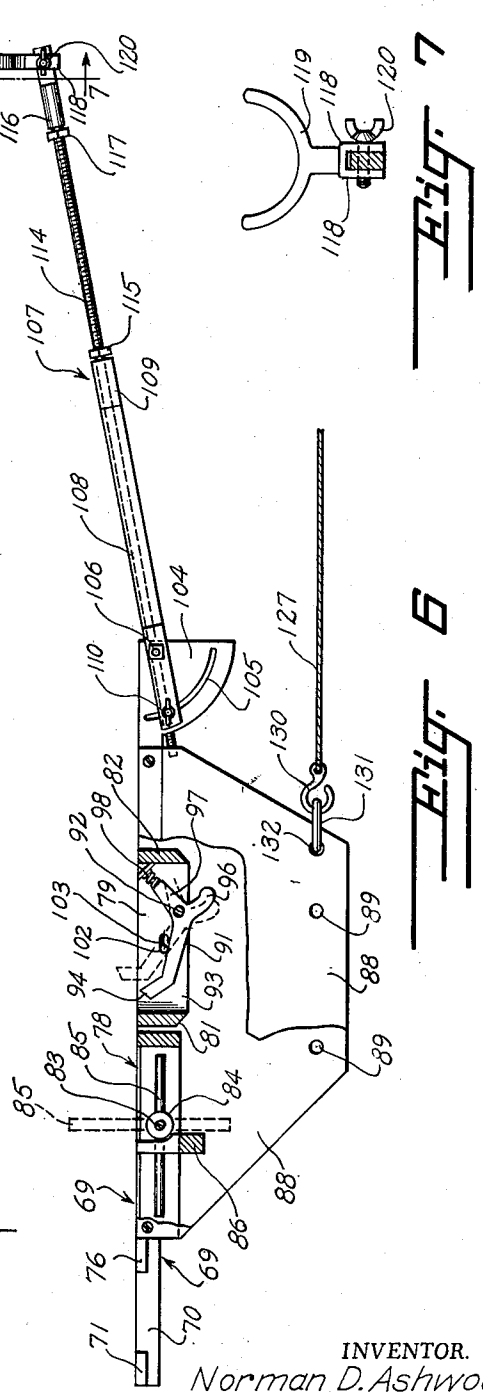

Fig. 6

Fig. 7

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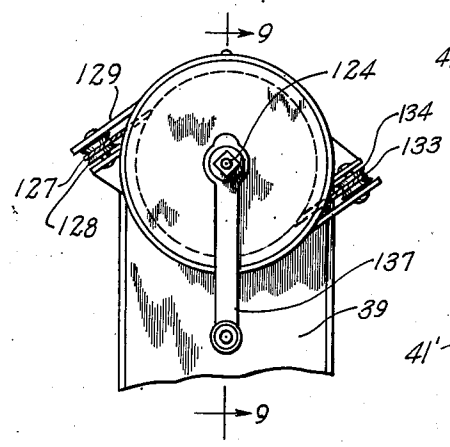

Fig. 8

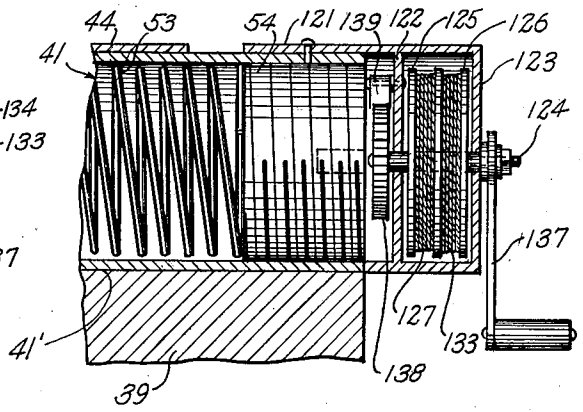

Fig. 9

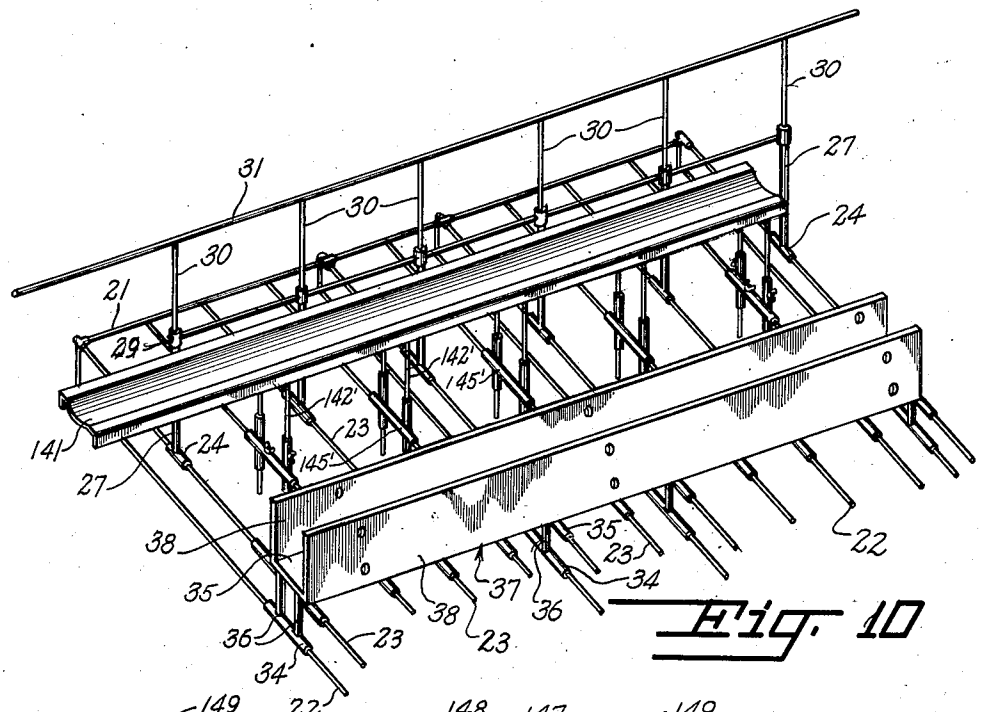

Fig. 10

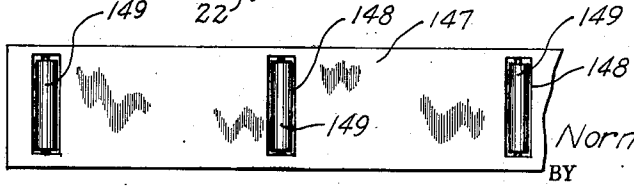

Fig. 11

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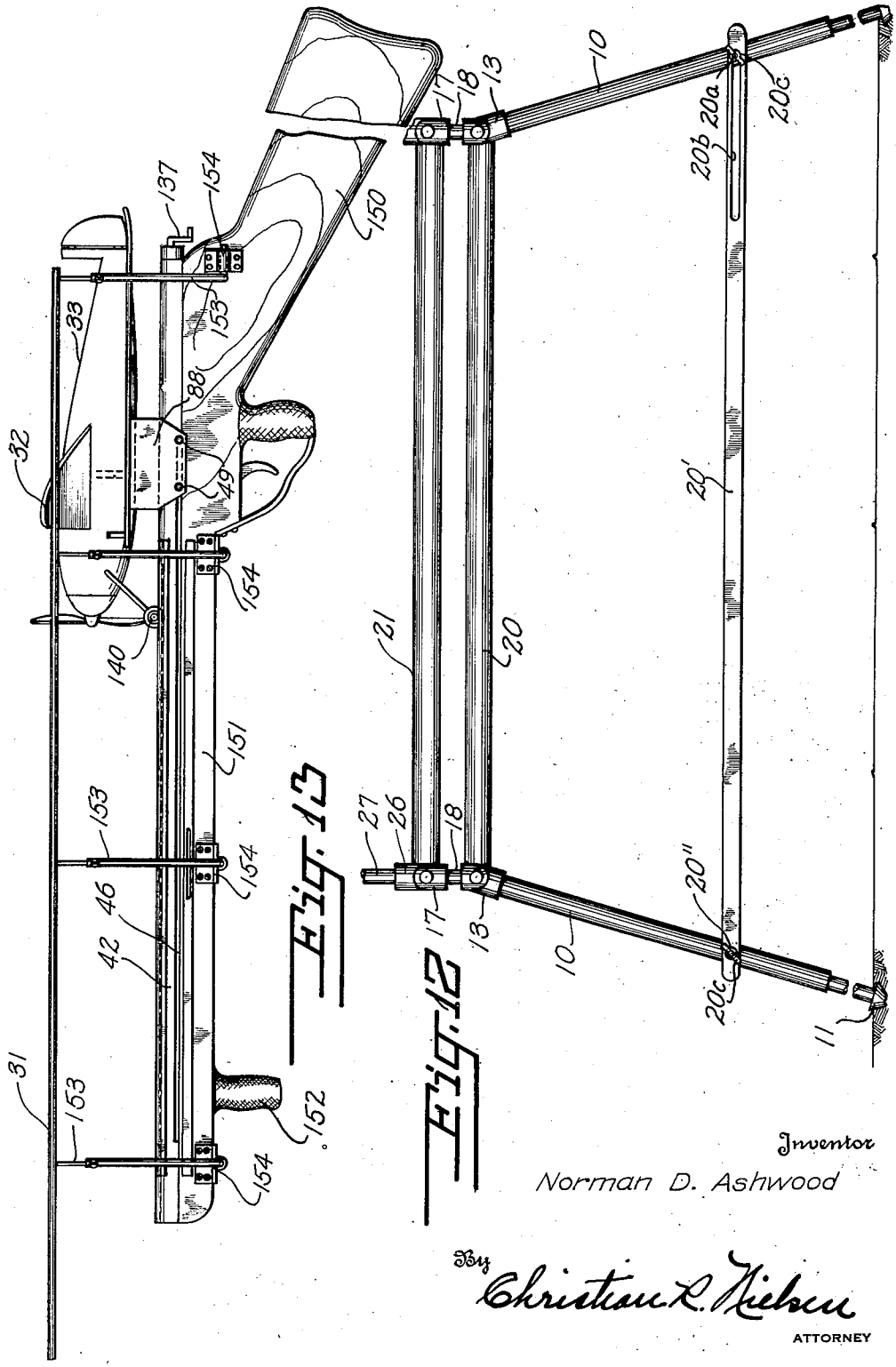

Fig. 13

Fig. 12

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Patented Sept. 23, 1952 2,611,355

UNITED STATES PATENT OFFICE

2,611,355

CATAPULT FOR LAUNCHING MODEL AIRPLANES

Norman D. Ashwood, Victoria, British Columbia, Canada

Application July 29, 1949, Serial No. 107,398

2 Claims. (Cl. 124—26)

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This invention relates to a catapult for launching model airplanes and the like, and it consists in the construction, arrangements and combinations herein described and claimed.

It is an object of the invention to provide a sturdy structure for support of runways upon which a plane may traverse during a take-off, the structure including a projecting means for imparting the initial movement of the plane along the runways, as well as means for releasing the plane from the projecting means in order that the plane may assume its flight.

It is also an object of the invention to provide a catapult device for model airplanes wherein a carriage for support of an airplane is arranged medially and longitudinally between a pair of runways, the carriage being spring actuated to move the plane along the runways, there being trigger means for holding the carriage in retracted position against the tension of the spring, as well as an automatic trip device for releasing the plane from the carriage, the catapult device further including means for retracting the carriage for engagement with the trigger holding means.

It is a still further object of the invention to provide a catapult supporting structure which is adjustable enabling its use with various types and sizes of planes.

Additional objects, advantages and features of the invention will be apparent from the following description considered in conjunction with the accompanying drawings, wherein

Figure 1 is a top plan view of the catapult with a plane in position thereon, the supporting structure, runways and carriage guide being broken away;

Figure 2 is a front elevational view thereof;

Figure 3 is an enlarged longitudinal sectional view of the catapult with the plane supporting carriage in retracted position;

Figure 4 is a similar view illustrating the position of the parts at the time of release of the plane from the carriage;

Figure 5 is a plan view of the plane supporting carriage;

Figure 6 is a longitudinal sectional view taken on the line 6—6 of Figure 5;

Figure 7 is a sectional view taken on the line 7—7 of Figure 6;

Figure 8 is a rear elevational view of the drum for retracting the plane supporting carriage;

Figure 9 is a sectional view taken on the line 9—9 of Figure 8;

Figure 10 is a fragmentary perspective view of a portion of the supporting structure of the catapult and plane;

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Figure 11 is a fragmentary top plan view of a modified form of runway;

Figure 12 is a side elevation of the supporting structure for the runway, illustrating the manner in which the upright supports may be adjusted with respect to the vertical; and

Figure 13 is a side elevational view of the catapult as embodied in a gun style support.

Reference is now invited to Figures 1, 2 and 12 of the drawings, wherein the supporting structure for the catapult is shown and this embodies a pair of spaced parallel vertically disposed standards 10 arranged at the front and rear of the structure. Each standard 10 has an anchorage means 11 on the lower end thereof for engaging the ground for support of the standards. A plurality of braces 12 extended between the standards afford rigidity and maintain the standards in proper spaced relation.

The standards 10 at front and rear are of identical construction, and as best seen in Figure 2, the upper end of the standards 10 has fixed thereon a T-fitting 13 for mounting a horizontal bar 14. The fitting 13 is swingably mounted on the bar 14 but is maintained against sliding movements by means of adjustable collars 15. The bar 14 extends beyond the fittings 13 a distance as at 16 and has suitable elbows 17 and pipe sections 18 for support of a second bar 19 immediately above the bar 14. A longitudinally extended brace rod 20 is connected to respective rods 14 of the front and rear support structures, at each side, and a similar rod 21 is connected between the rods 19.

As best seen in Figures 1 and 10 of the drawings, the rods 20 are connected by transverse rods 22 and the rods 21 are connected by transverse rods 23 for bracing the structure, as well as to afford support for runways and other structure of the catapult, as will be described.

Upon the rod 19 a pair of T-fittings 24 are adjustably mounted, which may be secured in a desired position by means of set screws 25. The fittings 24 have a vertical collar 26 within which a hollow rod 27 is secured, slidably receiving a rod 28 in the upper end thereof. A set screw 29 carried by the rod 27 secures the rod 28 in desired vertical heights for a purpose presently to be described. Similar adjustable support rods 30 are mounted upon the transverse rods 22 and in longitudinal alignment with the rods 28, and upon the upper ends of the rods 28 and 30 wing supporting rails 31 are suitably

mounted, these rails being positioned at respective sides of the supporting structure, and function to support respective wings 32 of a plane 33. As will be apparent the rails 31 may be raised and lowered to accommodate the position of wings of various sizes and constructions of planes.

Intermediately of the bar 14 a sleeve 34 is secured and a similar sleeve 35 is mounted upon the rod 19, these sleeves being connected by struts 36 (see Figure 2). Upon the upper side of the sleeve 35 a U-shaped frame 37 is fixed, upwardly extended legs 38 receiving a body member 39 therewithin, the body being secured within the frame by suitable fastening means 40. The frame 37 extends from the front to the rear of the supporting structure and the body 39 is of a corresponding length. The body 39 projects above the frame 37 for mounting a catapult 41. The body 39 is formed with an arcuate recess 41' extending the length of the body and receives a cylindrical barrel member 42 therein which is of a corresponding length. The barrel member is firmly secured in the recess by suitable brackets 43 and 44 at the rear and by a similar bracket 45 at the front of the body. Additional brackets may be employed if found necessary.

The barrel member 42 is provided with a pair of opposed slots 46 extending longitudinally thereof terminating inwardly of the ends of the barrel as indicated at 47. Slidable within the barrel member 42 there is a cylindrical plunger 48 which has a pair of pins 49 projecting from respective sides, these pins being received in the opposed slots 46 of the barrel for guidance of the plunger during movements along the barrel.

The forward end of the barrel is closed by a plug 50 and rearwardly of the plug there is a coiled spring 51 and a cushion disk 52 for absorbing the impact of the forwardly moving plunger 48.

For causing forward movement of the plunger 48, a large coil spring 53 is connected at one end to the rear end of the plunger and the other end of the spring is connected to a closure plug 54 threadedly engaged in the rear end of the barrel. In the operative position, as shown in Figure 3, the coiled spring 53 is under compression, the plunger 48 being held in retracted position by a trigger mechanism 55 which when released permits the spring 53 to force the plunger longitudinally along the barrel.

The body member 39 is cut away as at 56 for mounting of the trigger mechanism 55. The trigger is pivoted upon a pin 57 and has a finger 58 at its forward end which projects through a slot 59 formed in the underside of the barrel 42 for engaging a notch 60 in the forward end of the plunger. A small coiled spring 61 is interposed between a rear extension 62 of the trigger and the barrel for holding the finger in raised position. The trigger 55 further includes a downward extension 63 to which there is connected a pull rod 64 which passes through a bore 65 formed in the body member, the rod 64 terminating in a finger-engaging lug 66, exteriorly of the body. A guard 67 surrounds the lug 66 so as to prevent accidental release of the trigger.

A carriage 68 is provided for support of the model airplane 33 and is operatively connected to the plunger 48 (see Figures 2, 5 and 6). The carriage includes a frame 69 which embodies a pair of longitudinally extending spaced parallel bars 70—70' connected at their forward ends by a strip 71 as at 72. The strip 71 is formed with a series of apertures 73 which are adapted to register with suitable apertures formed in a pair of opposed guide members 74 and 74', bolts 75 being extended through aligned apertures and engaged by suitable nuts for maintaining the guides upon the strip 71. The guide members 74 and 74' are adapted to engage the lower front portion of the airplane 33 and are adjustable towards or away from each other to accommodate planes of various sizes.

The bars 70 and 70' are additionally braced by strips 76 and 76' extended transversely thereacross and secured by bolts 77. Upon the bars 70 and 70' there is secured a sub-frame 78 of rectangular form consisting of parallel side stringers 79 connected by transverse straps 80, 81, and 82. In advance of the strap 80, a shaft 83 is journalled in the stringers 79 and has a sleeve 84 mounted thereon. A transverse thrust pin 85 extends through the sleeve 84 and is fixed thereto. A stop member 86 disposed beneath the sleeve 84 and secured between the stringers 79 is provided. This stop serves to limit rotative movements of the sleeve 84 by engagement with the pin 85. The pin 85 is of a length to project into a cell or compartment 87 formed in the bottom of airplane 33 (see Figure 3) so that as the plunger 48 moves towards the front in the barrel 42, the airplane will likewise move therewith.

In order that the carriage 69 and airplane 33 may move in unison along the barrel, the carriage 69 is provided with a pair of depending parallel side walls 88, which are each provided with spaced openings 89 in registry with the trunnions 49 of the plunger 48 and secured by means of bolts or screws 90, as best seen in Figure 2 of the drawings.

A means is provided for releasing the plane 33 from the carriage in order that the plane may assume its flight and this means comprises an arm 91 which is pivotally mounted on a pin 92 secured in parallel spaced stringers 93 connected between the straps 81 and 82. The arm 91 is formed at its forward end with a hook member 94 adapted to project into an opening 95 formed in the belly of the plane. The arm 91 has a downwardly projecting trip 96 and a rear extension 97, the latter being engaged by a spring 98 supported upon the strap 82, the spring holding the hook 94 in raised position within the openings 95 of the plane. As long as the hook 94 is engaged with the opening 95, the plane cannot leave the carriage, and for releasing the hook 94 of the arm from the plane a lug 99 projects upwardly from the barrel in the path of the trip 96 so that the arm 91 will be moved in a downward direction so as to withdraw the hook from the opening 95 of the airplane, the airplane thus being released from the carriage. For maintaining the hook portion 94 out of the opening 95, a flat leaf spring 100 has one end secured to one of the stringers 93 by screws 101 (see Figure 5) and carried by the other end of the spring 100 there is a transverse pin 102 which is forced through a slot 103 in the stringer 93 as soon as the arm 91 is moved below the slot 103 (Figure 6). The pin 102 maintains the arm 91 in its downward position until the next plane is launched, when the operator merely retracts the pin 102 so as to clear the arm 91, the spring 98 returning the arm to its raised position in advance of the pin 102, the latter being held under tension by the leaf spring 100.

From the structure thus far described, it will be seen that the forward portion of a plane is

supported, but obviously, the rear of the plane must also be supported by the carriage 69, and as may be seen in Figures 5 and 6, the rear ends of the frames 70 and 70' terminate in respective quadrants 104 each of which has an arcuate slot 105 formed therein.

A shaft 106 extended transversely between the frames 70—70' mounts a support member 107 as will now be described. The member 107 comprises a pair of leg members 108 converging toward the longitudinal axis of the carriage 69 where the legs are joined with a sleeve 109. The legs 108 are pivotally mounted upon the shaft 106 upon the outer faces of the quadrants 104, and each leg carries a bolt and wing nut 110 complemental to the arcuate slot 105 for securing the member 107 in various angular positions with respect to the horizontal axis of the carriage 69.

Upon the shaft 106 an axle 111 is oscillatably mounted having an enlarged bearing 112 upon which a sleeve 113 is suitably secured, the sleeve 113 being in alignment with the sleeve 109. A threaded shaft 114 is extended through the sleeves 109 and 113 and lock nuts 115 complemental to respective ends of the sleeves function to secure the shaft in an adjusted position. Obviously by loosening the nuts 115 the shaft may be moved inwardly or outwardly with respect to the sleeves for obtaining an adjustment as to length of the support member 107. Upon the rear end of the rod 114 there is threadedly engaged a sleeve 116 which is secured thereon by a lock nut 117. The sleeve 116 has its outer end flattened as best seen in Figure 7, for reception of spaced legs 118 of an upwardly opening yoke 119. The legs 118 of the yoke are apertured, as is the flattened end of the sleeve 116 and through these apertures there is engaged a wing bolt 120 for securing the yoke 119 in adjusted positions for support of rear portions of airplanes.

A manually operable means is employed for retracting the plunger 48 and its associated carriage 69, and as best seen in Figures 8 and 9, this comprises a housing 121 fixed to the rear end of the barrel 42, the housing having a partition 122 and an outer closure plate 123, and between the partition and closure plate, a shaft 124 is suitably journalled, extending longitudinally of the barrel 42. A pair of drums 125 and 126 are keyed to the shaft 124 and about the drum 125 there is wound a cable 127, trained through a guide pulley 128 mounted exteriorly of the housing 121 in a suitable bracket 129. The end of the cable 127 has a hook 130 for engaging a ring 131 secured in an opening 132 of the next adjacent plate 88 of the carriage 69. A similar cable 133 is wound upon the drum 126, trained around a pulley 134, the terminal end of the cable 133 having a hook 135 for engagement with a ring 136 fixed in an opening formed in the next adjacent plate 88 of the carrier.

The shaft 124 is rotated by means of a hand crank 137 and the cables 127 and 133 are so wound upon their respective drums 125 and 126 as to simultaneously move in the same direction. In order to prevent the spring 53 from forcing the plunger 48 forwardly during the retracting movement of the carriage, a ratchet wheel 138 is keyed to the inner end of the shaft 124, there being a pawl 139 cooperable with the teeth of the ratchet wheel.

In order to support the landing wheels 140 of the airplane 33 respective runways 141 are disposed and suitably mounted at respective sides of the catapult 41, which as here shown, are supported upon upright rods 142 telescopically mounted in vertical sockets 143. The rods 142 are secured in vertical adjusted positions by means of wing bolts 144. The sockets 143 are mounted upon respective sleeves 145 horizontally slidable on the rods 19. The sleeves 145 are secured in an adjusted position by means of wing bolts 146. On intermediate portions of the runways 141 are supported sleeves 145' which are adjustably mounted upon the rods 23, there being adjustable upright rods 142' in each of the sockets (see Figure 10).

A modified form of runway is illustrated in Figure 11, wherein the runway 147 is formed with longitudinally spaced openings 148 in each of which there is revolubly journalled a roller 149. This construction of runway is admirably suited for support of pontoons of amphibious planes.

In Figure 12, there is shown a construction of support for the catapult wherein the standards 10 at the front and rear of the structure are adjustable with respect to the vertical so that the standards 10 may be positioned at an angle to a supporting surface and thus afford greater rigidity to the structure. As has been explained the standards 10 are swivelly mounted to the rods 14, by virtue of the T-fittings 13. A brace bar 20' is extended between the standards 10 at the front and rear, at respective sides the bar 20' being vivotally connected on a pin 20'' of one of the standards 10. The other standard 10 has a pin 20*a* complemental to a longitudinal slot 20*b* formed in the brace bar 20'. Suitable wing nuts 20*c* are engaged upon the pins 20'' and 20*a* for securing the adjustment of the legs of the standards. Also, by this construction, it will be apparent that the brace bar 20' may be released from the legs to permit folding of the legs for ready transportation of the catapult.

In Figure 13 a modified form of support for the catapult is shown, the support being in the form of a firearm embodying a shoulder stock 150, a main body or barrel stock 151, the underside of which is provided with a hand grip 152 for support of the catapult mechanism, the latter being the same as previously described for effecting launching of a plane. Vertically adjustable rods 153 are suitably supported in brackets 154 spaced at proper positions along the stock and barrel for support of the rods 31.

The operation of the device is as follows:

Assume that the airplane 33 is in the retracted position shown in Figure 3. The airplane is of course a conventional model airplane and is provided with a suitable engine or gasoline motor (not shown) for propelling or driving the airplane 33 after the airplane has been launched by the catapult of the present invention. Then, the user inserts one of his fingers into engagement with the lug 66 and moves the pull rod 64 rearwardly to the position shown in Figure 4. At the same time the pawl 139 is manually moved out of engagement with the ratchet and the movement of the pull rod 64 causes the trigger 55 to pivot about the pin 57 so that the finger 58 is moved out of engagement with the notch 60 in the lower front end of the plunger 48. Thus, the spring 53 thrusts or forces the plunger 48 forwardly, and it carries the carriage 68 therewith, since the pins 49 project from the plunger 48 and into engagement with the openings 89 of the side plates 88. It will be noted that the thrust member 85 projects into the cell

81 in the bottom of the airplane when the airplane is in its retracted position, as shown in Figure 3. Therefore, when the carriage moves forwardly the airplane 33 is also thrust forwardly by means of the member 85. Further, the hook portion 94 of the arm 91 is arranged in engagement with the recess 95 so that the airplane cannot disengage itself from the carriage when the carriage and airplane are in their retracted position. However, after the piston 48 moves forwardly a small distance, the lug or trip 99 contacts the lower end 96 of the arm 91 to thereby pivot the arm in a counter-clockwise direction to thereby free the hook portion 94 from the recess 95. As soon as the arm 91 has pivoted a sufficient distance (see Figures 5 and 6), the pin 102 is forced through the slot 103 by means of the spring 100 and therefore the arm 91 will be maintained in an out of the way position so it will not interfere with the disengagement of the airplane from the carriage. When the piston 48 reaches the forward end of the barrel 42, the shock absorber lessens or reduces the jarring or impact caused by the forwardly moving piston. Now, the airplane 33 has been given a sufficient forwardly moving impetus so that the airplane is now able to fly away under its own power. To launch additional airplanes, the user merely rotates the crank or handle 137 to thereby wind the cable onto the pulleys 125 and 126 so that the piston 48 is moved from the position shown in Figure 4 to the position shown in Figure 3 and the finger 58 of the trigger 55 again maintains the plunger 48 in its retracted position.

As the airplane advances along the catapult, the wheels 140 ride in the tracks 141 of the device, and the wings 32 of the airplane are slidably supported by the rails 31. The launching and catapulting device is so constructed that the tracks 141 and the rails 30 can be adjusted vertically, as well as horizontally, so that planes of various sizes can be accommodated thereon.

I claim:

1. A catapult for launching a model airplane comprising a supporting structure having transverse bar members, a pair of runways supported on vertically adjustable uprights, said uprights being laterally adjustable on said transverse bars to accommodate landing wheels of various types of airplanes, upright supports carried by said transverse bars disposed at opposite sides of said runways, said upright supports being vertically and laterally adjustable with respect to said transverse bar members, a rail member connected to the upper ends of said upright supports and extending parallel with said runways for engaging and supporting respective wings of the airplane.

2. A catapult for launching a model airplane comprising a supporting structure having transverse bar members, a pair of runways supported on said transverse bars, said runways being vertically and laterally adjustable to accommodate landing wheels of various types of airplanes, upright supports carried by said transverse bars disposed at opposite sides of said runways, said upright supports being vertically and laterally adjustable with respect to said transverse bar members, a rail member connected to the upper ends of said upright supports and extending parallel with said runways for engaging and supporting respective wings of the airplane, a carriage supported by said supporting structure disposed between said runways and longitudinally movable along said supporting structure, means releasably connecting an airplane to said carriage, means for forcibly moving the carriage and airplane to effect movement of the airplane along said runways, and automatic means for actuating the releasing means between the carriage and airplane.

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