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AIRPLANE

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2 Sheets-Sheet 1

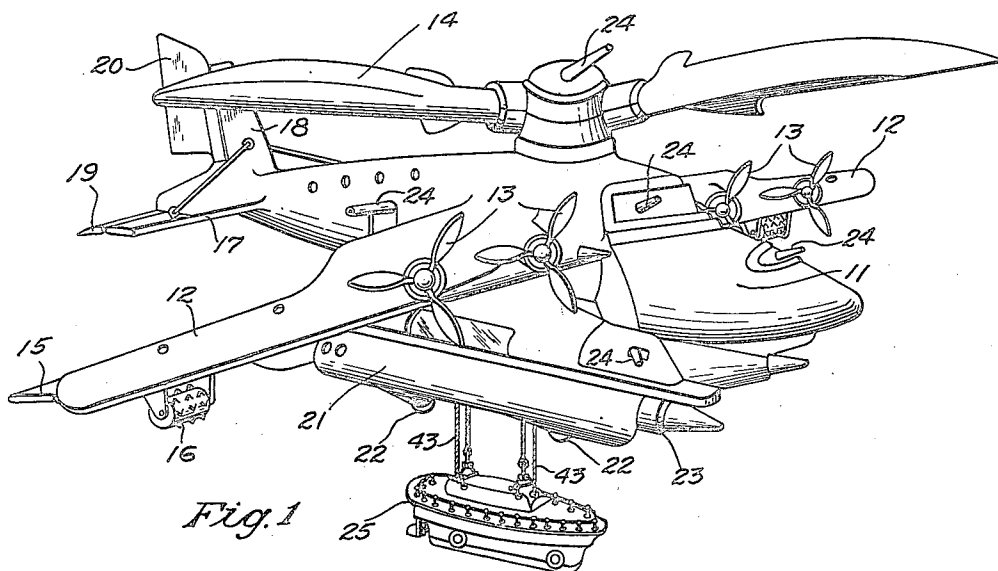


Fig. 1

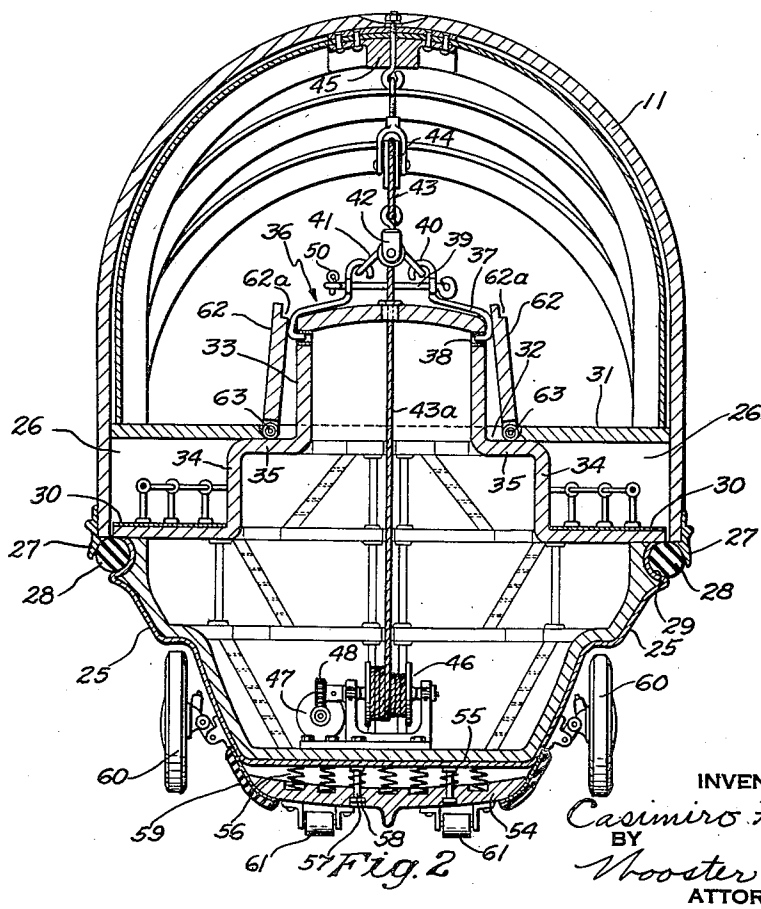


Fig. 2

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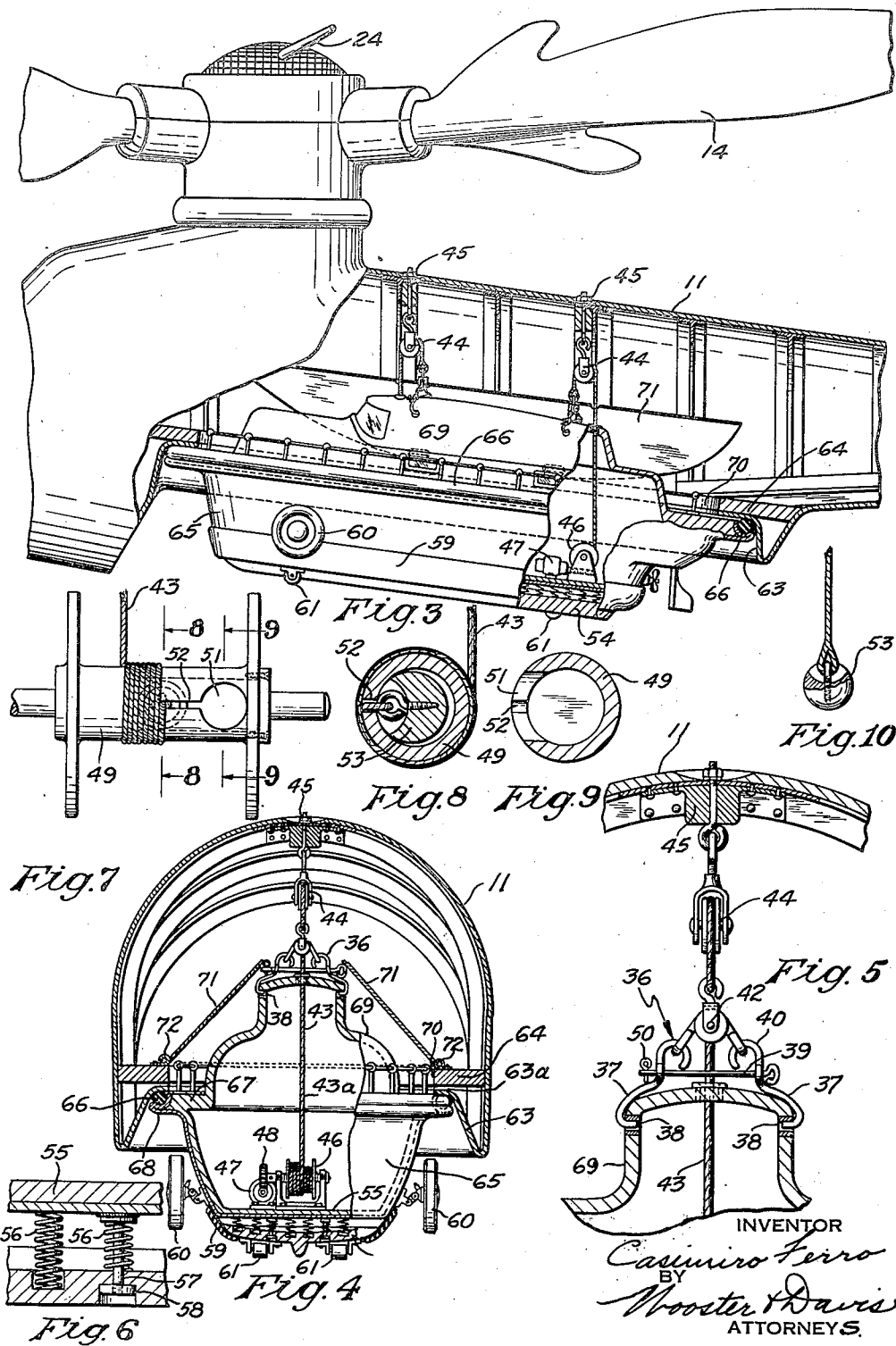
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,366,321

AIRPLANE

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12 Claims. (Cl. 244—2)

This invention relates to airplanes, and particularly to an airplane carrying a boat which may be lowered from the body or fuselage to allow for descent of passengers or crew in normal operation or to allow escape in case of emergency or landing of troops or arms in case of war.

It is also an object of the invention to provide an improved construction in which the boat in normal operation of the plane is concealed in a compartment opening through the body or lower part of the fuselage and when so mounted closes and seals this opening, and the bottom of the boat forms a portion of the bottom of the fuselage.

It is a further object to provide improved means for mounting the boat and to raise and lower it in combination with an airplane having wings sufficient to support the plane with propellers for driving it in a horizontal position for normal operation, in combination with a relatively large lifting propeller having power means for driving it about a vertical axis and having sufficient lift so that the speed of the plane may be lowered sufficiently to permit lowering and launching of the boat while the plane is in flight, and to permit take-off and landing of the plane itself in a small space where running room is limited.

With the foregoing and other objects in view I have devised a construction illustrated in the accompanying drawings forming a part of this specification, it being however understood I am not limited to the specific construction and arrangement shown but may employ various changes and modifications within the scope of the invention.

In these drawings:

Fig. 1 is a perspective view of a plane embodying my improvements and showing the boat being lowered therefrom;

Fig. 2 is a transverse section through the body or fuselage and indicating how a boat may be mounted therein;

Fig. 3 is a partial side elevation or partial longitudinal section of the fuselage showing a somewhat different arrangement of the boat and means for mounting it;

Fig. 4 is a transverse section of the body or fuselage of Fig. 3;

Fig. 5 is a partial section and elevation showing an improved lifting and lowering means for the boat;

Fig. 6 is a detailed section of the bottom of the boat;

Fig. 7 is a side elevation of an improved type of winch drum;

Fig. 8 is a transverse section thereof substantially on line 8—8 of Fig. 7;

Fig. 9 is a transverse section substantially on line 9—9 of Fig. 7; and

Fig. 10 is a partial elevation and partial section showing an improved cooperating means on the lifting rope or cable for detachably securing it to the winch drum.

The airplane shown comprises a longitudinal body or fuselage 11, and extending from opposite sides thereof are lifting wings 12 preferably of sufficient span and width to support the plane in normal flight in horizontal direction, there being any suitable number of propellers 13 associated with these wings and driven by any suitable type of motor for driving the plane in normal horizontal direction. Mounted above the body or fuselage is a relatively large lifting propeller rotating about an upright axis and also driven by any suitable motors, not shown, and it may be mounted on an upright column as described and claimed in my copending application executed and filed of even date herewith. It is preferred that this lifting propeller be of sufficient size and driven by sufficiently powerful motors to provide a large amount of lift for the plane, preferably sufficient lift so that the plane will remain in flight with very low horizontal motion to permit launching of a boat lowered from the plane on the water or raising of such a boat from the water while the plane is in flight, and also to permit take-off or landing of the plane in a relatively small space or from and on a short runway or where running room is limited. At the rear edges of the wings 12 are the usual ailerons 15, and other devices such as braking flaps or auxiliary pontoons 16 may be provided on these wings. In the tail of the fuselage are the usual horizontal and vertical stabilizers 17 and 18 together with the elevators 19 and rudder 20.

If desired the body or fuselage may be formed to carry large pontoons 21 given the general shape of boats on their under sides so that they may support the plane on the water, and these boats may have suitable engines, driving screw propellers for driving these pontoons on the water. They may also be provided with landing wheels 22 for landing and taking off on and from land, which wheels may be retractable into the bodies or not as desired. If the ship is to be used for war purposes these pontoons may have suitable torpedo tubes 23, and any desirable type of guns 24 may be mounted in various locations about the plane.

The detachable and removable boat is indicated

at 25, no attempt being made to show the complete details, but it is shown somewhat diagrammatically. It will however be understood it will have the necessary or desired accommodations for passengers and crew or for cargo, and will have a screw propeller and suitable engines for propelling the boat on the water. The pontoons 21 forming the under side of the fuselage are not shown in Figs. 2, 3 and 4, these views being confined to showing somewhat diagrammatically a section of the fuselage, the detachable boat and the means for mounting and retaining it in the fuselage and the mechanism for lowering it from or raising it to its position in the fuselage.

In Fig. 2 the body or fuselage is shown as having in its lower part a compartment 26 opening through the lower part thereof in which the boat 25 is mounted. Surrounding the opening are inclined walls 27, and extending about the periphery or sides of the boat is a resilient yieldable sealing means 28 of rubber or other suitable material. This may be mounted in any suitable way, but in the present case it is shown as mounted in a suitable recess or channel 29 extending around the periphery of the boat in the side walls thereof and adjacent the deck 30. When the boat is in position as shown in the compartment 26 this sealing means cooperates with the inclined walls 27 to seal and close the opening about the boat and make it water-tight. The top of the compartment 26 is formed by a deck or floor 31 of the body or fuselage, and it may have an elongated opening 32 through which projects the upright upper portion 33 of the cabin or super structure of the boat. Between this upper portion 33 and the lower deck 30 may be an upright portion 34 of the super structure wider than the upper portion 33 and connected therewith by horizontal deck portions 35, which when the boat is in position is at the under side of the floor 31. While the boat is mounted in the body or fuselage it forms a part thereof and furnishes accommodations in the body for passengers or crew or for freight or other cargo and supplies, there of course being provided suitable communicating doors and openings between the interior of the boat and the interior proper of the plane. It will be seen in Fig. 2 that the lower outside walls of the boat form general continuations of the walls of the body.

Suitable means are provided for retaining the boat in position and these means may also be used for raising the boat to and lowering it from the body of the plane. If however it is desired not to rely wholly on this raising and lowering means for retaining the boat in position, additional means may be provided for securing and locking the boat to the lower side walls of the plane body.

A supporting and raising and lowering means shown comprises suitable tackle 36 including suitable hook members 37 having hooked ends seating in suitable sockets 38 in the super structure of the boat. They may be retained therein by a transverse rod 39 extending through the members 37 and retaining them against separation. The members 37 have additional hooks or eyes 40 supported in suitable links 41 in a block 42 suspended by a suitable cable 43. This cable may run over suitable pulley 44 to support it from any suitable supporting structure 45 of the body of the plane. The other portion of the cable 43a is carried down into the boat to a winch 46 either driven by a power motor or by hand cranks operating through suitable reducing gearing. In the

present case it is shown operated by a motor 47 operating through gearing 48 to drive the drums 49 of the winch to wind or unwind the cable 43 in the raising and lowering operations, and when the boat is in position in the compartment 26 the drum is locked against movement to retain it therein. It will be understood the raising and lowering means may be reversed with the winch and its operating means mounted in the body or fuselage of the plane instead of on the boat.

It is desired that each end of the rope or cable be secured so that there is no danger of its being accidentally or inadvertently disconnected. However, it is also necessary that it may be readily disconnected from the boat after the boat has been lowered so as to release it entirely from any connection with the plane. Thus in the upper tackle connection 36, by removing the stop pin 50 and withdrawing the bar 39, the hooks 37 may be readily removed from the sockets and thus disconnected from the boat. The other end of the cable may be readily disconnected from the winch drum 49. This drum is hollow and has an opening 51 leading to the space within the drum and a narrow slot 52 leading longitudinally from this opening. Secured to the end of the cable is a ball 53 of metal or other suitable material, or a large knot could be provided in the cable. This is inserted through the opening 51 and then the cable drawn laterally into the slot 52 so that the ball or knot is under this slot as shown in dotted lines Fig. 7 and in Fig. 8. As the ball or knot is larger than the width of the slot the cable cannot be withdrawn from the slot by a pull outwardly on it, but by sliding the cable and the knot or ball back into the opening 51 it may be withdrawn through this opening and the cable readily disconnected from the drum.

It is preferred that the bottom of the boat be provided with some means for cushioning the shock of landing, particularly if the landing is made on solid ground. For this purpose it is formed with a false or moveable bottom 54 below the real bottom 55 and spaced therefrom. Between the two bottoms are a series of coil springs 56 tending to separate the bottoms. A portion of these springs is mounted on bolts 57 secured to the bottom 55 and passing through openings in the bottom 54 and on which this bottom is slidable so that it may move toward and from the bottom 55, the outward movement however being limited by the heads 58 on the bolts. As this bottom hits the ground or water it will yield upwardly against the action of the springs thus cushioning the blow on the bottom of the boat. The space between the two bottoms may be closed and sealed by any suitable means, such as a flexible rubber strip 59 or other suitable means secured to the two bottoms. Also to facilitate landing, as on solid ground or facilitate drawing the boat onto a beach or dock, the boat may be provided with retractable landing wheels 60 and may also have small wheels or rollers 61 mounted on the under surface.

If it is desired to launch the boat the speed of the plane is reduced to a desired amount and then the boat lowered by means of the winches 46 and cables 43. Any number of cables and winches may be provided as is found desirable or necessary. After lowering the boat to the water the cables may be readily disconnected from the boat by disconnecting the tackle 36 and disconnecting the cable from the winch drum. As the boat is lowered it is desirable that the opening 32 in the floor or deck 31 be closed to prevent anyone fall-

ing through. For this purpose a pair of doors 62 may be provided each hinged at 63, one at each side of the opening. They may be lowered by suitable lowering mechanism or they may be mounted to normally be slightly inclined and lean against the structure 33 so that as the boat is lowered they automatically follow down with it thus closing the opening, the edges of the doors of course being provided with suitable notches or recesses for the cables 43. The edges may also be rabbetted as shown at 62a so as to overlap and make a tight closure. Such doors could also automatically be opened by the boat as it is raised into the body.

The construction shown in Figs. 3 and 4 is slightly different, although the same principle is involved as in Fig. 2, and the main structure is substantially the same. In this case the side walls of the body 11 are extended upwardly and inwardly on an incline as indicated at 63 and then substantially horizontally at their upper edge below the floor or deck 64 of the body to thus provide the opening from the compartment 63a in which the boat 65 is mounted. The rim of this boat is also provided with a flexible and resilient seal 66 corresponding to the seal 28 of the first form extending about the periphery or edge of the deck 67 of the boat, and when the boat is in position it cooperates with the inclined walls 63 to close and seal the opening from the compartment. This seal is also mounted in a recess or channel 68 in the periphery of the boat. The super structure 69 projects up through the opening 70 in the floor 64 and free communication is had between the boat and the interior of the body the same as described in connection with the form of Fig. 2. This boat is suspended and raised and lowered by the same mechanism as described in connection with Fig. 2 including the tackle 36, the winch 46 and the cable 43. The bottom of the boat may be provided with the same false cushioning bottom 54 as in the first form and provided with landing rollers 61, and the boat may be provided with the same retractible landing wheels 60. The opening 70 in the floor 64 may be closed when the boat is lowered in a manner similar to that described in connection with the opening 32 in the first form. Here a pair of doors 71 may be hinged to the floor 64 at opposite sides of the opening 70 as indicated at 72 and normally inclined inwardly to rest on the super structure of the boat. As the boat is lowered they will automatically follow down with it and close the opening 70, or if preferred they may be provided with suitable raising and lowering mechanism.

Having thus set forth the nature of my invention what I claim is:

1. In an aircraft of the type described, a hollow longitudinal body forming a first compartment, supporting wings extending laterally at opposite sides of the body, a propeller for each wing for driving it in a horizontal plane, an upright supporting column in the body, a lifting propeller rotatable about an upright axis mounted on said column above the body, the under side of the body being provided with a second compartment communicating with the first compartment and open at its lower side, a boat mounted in the second compartment and closing said lower side thereof, and means for lowering the boat from the body while the aircraft is in flight.

2. In an aircraft of the type described, a longitudinal body forming a first compartment and

having elevators and a rudder at the rear thereof, supporting wings extending laterally at opposite sides of the body capable of supporting the aircraft, an upright propeller associated with each wing spaced laterally from the longitudinal center of the body, a relatively large lifting propeller above the body rotatable about an upright axis, said body being provided with a second compartment in the lower part thereof communicating with the first compartment and opening through the under side of the body, a boat mounted in said second compartment and closing said opening and forming a continuation of the body, and means for lowering the boat from the body while the aircraft is in flight.

3. In an aircraft of the type described, a longitudinal body forming a first compartment, supporting wings extending laterally at opposite sides thereof, propellers associated with said wings to drive the craft in a horizontal plane, a lifting propeller above the body rotatable about an upright axis, means for driving the propellers, said body having a second compartment in the lower part thereof communicating with the first compartment and opening through the under side of the body, a boat mounted in the second compartment and closing said opening and means for raising and lowering the boat to and from the latter compartment.

4. In an aircraft of the type described, a longitudinal body forming a first compartment and having a second compartment in the lower part thereof communicating with the first compartment and opening through the under side of the body, a boat mounted in said second compartment and closing said opening, and cooperating means in the boat and body for raising and lowering the boat to and from the latter compartment while the aircraft is in flight.

5. In an airplane, a longitudinal hollow body forming a first compartment and having a second compartment in the lower part thereof communicating with the first compartment and opening through the under side of the body, a downwardly and outwardly inclined wall surrounding said opening, a boat mounted in the second compartment and closing said opening, resilient yielding sealing means mounted around the periphery of the boat cooperating with said inclined wall to seal the opening, and means for securing the boat in the second compartment.

6. In an airplane, a longitudinal hollow body forming a first compartment and having a second compartment in the lower part thereof communicating with the first compartment and opening through the under side of the body and surrounded by downwardly and outwardly inclined depending walls, a boat mounted in said second compartment and closing said opening, and resilient sealing means extending around the sides of the boat and cooperating with said depending walls to seal the opening.

7. In an aircraft, a longitudinal body forming a first compartment and having a second compartment in the lower part thereof opening through the under side of the body, a boat in said second compartment and said boat having a superstructure, a floor in the body above the second compartment and having an opening therein forming a communication between the compartments through which a portion of the superstructure extends, means for lowering the boat from the body while the aircraft is in flight, and closures for the opening in the floor constructed

and arranged to close automatically as the boat is lowered from the opening.

8. In an aircraft, a longitudinal body forming a first compartment and having a second compartment in the lower part thereof opening through the under side of the body, a boat in said latter compartment and said boat having a superstructure, a floor in the body above the second compartment and having an opening therein forming a communication between the compartments through which a portion of the superstructure extends, means for lowering the boat from the body, and closures for the opening in the floor hinged at their lower edges on opposite sides of said opening and normally inclined inwardly toward the superstructure and resting thereon so that they will be automatically lowered to the closed position as the boat is lowered.

9. In an aircraft, a longitudinal body forming a first compartment and having a second compartment in the lower part thereof opening through the underside of the body communicating with the first compartment, a boat in said opening and sealing the opening, means for lowering the boat from the opening comprising a pulley supported from the body, a cable passing over the pulley, means for detachably securing one end of the cable to the boat, a winch including a winding drum in the boat, means for connecting the other end of the cable to the drum so that it may be readily detached therefrom to free the boat, and means for operating the drum.

10. In an aircraft, a longitudinal body forming a first compartment and having a second compartment in the lower part thereof opening through the underside of the body communicating with the first compartment, a boat in said opening and sealing the opening, a tackle mechanism for raising and lowering the boat comprising readily removable hooks entering co-

operating means in the boat, a pulley wheel mounted in the body, a cable extending over said wheel and connected to said hooks, a winch on the boat including a drum, means for connecting the other end of the cable to the drum constructed to be readily detached therefrom to free the boat, and means for operating the drum.

11. In an aircraft, a longitudinal body having a compartment in the lower part thereof opening through the underside of the body, a boat in said opening closing the opening and forming a continuation of the body, means for lowering the boat from the opening, said boat having a main bottom and a false bottom located below the main bottom and spaced therefrom, covering means extending between the main bottom and the false bottom around the periphery of the false bottom and extending in alignment with the side walls of the boat to close the space between the bottoms, and spring means between the bottoms tending to separate them to cushion the blow on the false bottom incident to landing on land or water.

12. In an aircraft, a longitudinal body having a compartment in the lower part thereof opening through the underside of the body, a boat in said opening closing the opening and forming a continuation of the body, means for lowering the boat from the opening, said boat having a main bottom, a false bottom below and spaced from the main bottom, covering means extending between the main bottom and the false bottom around the peripheries of the bottoms to close the space between the bottoms, a series of springs between said bottoms tending to separate them to cushion the blow on the false bottom incident to landing the boat, and rollers on the false bottom to facilitate movement on a solid support.

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