Nov. 17, 1936. M. JELALIAN 2,061,075

AIRSHIP

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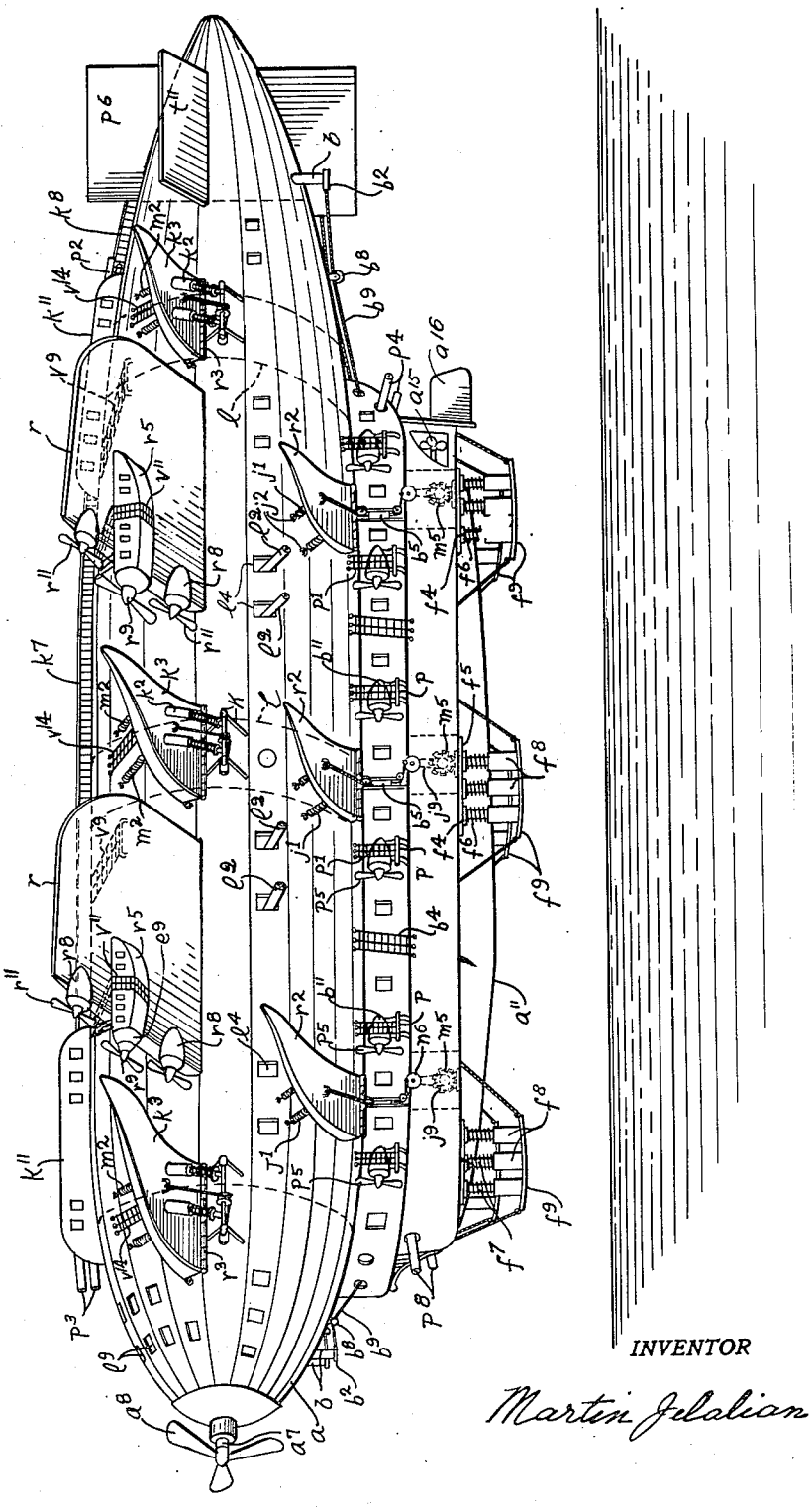


Fig. 1.

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Fig. 2.

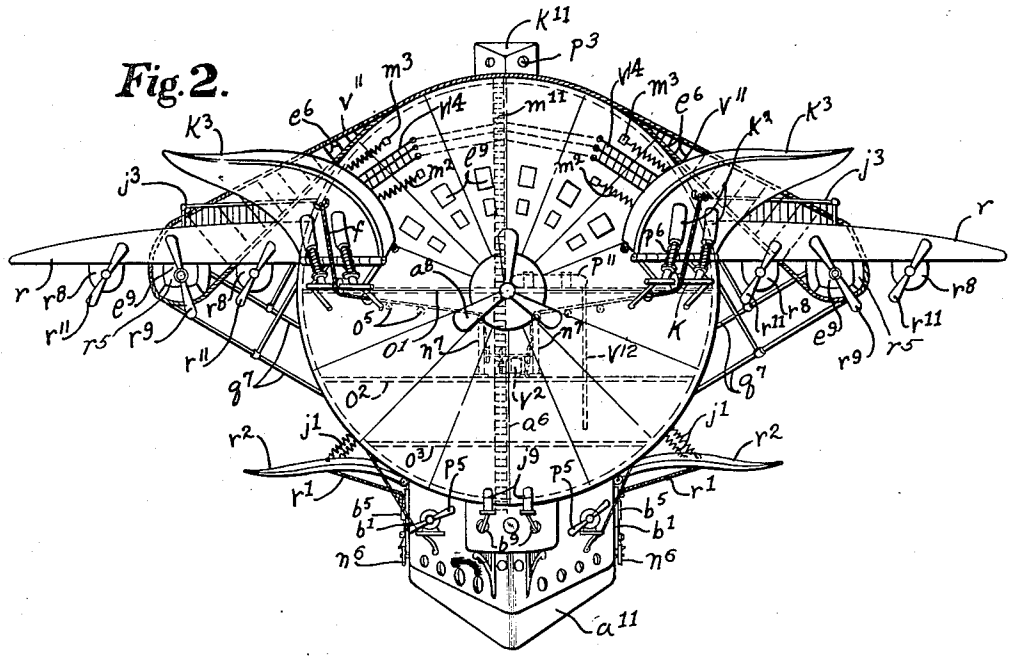
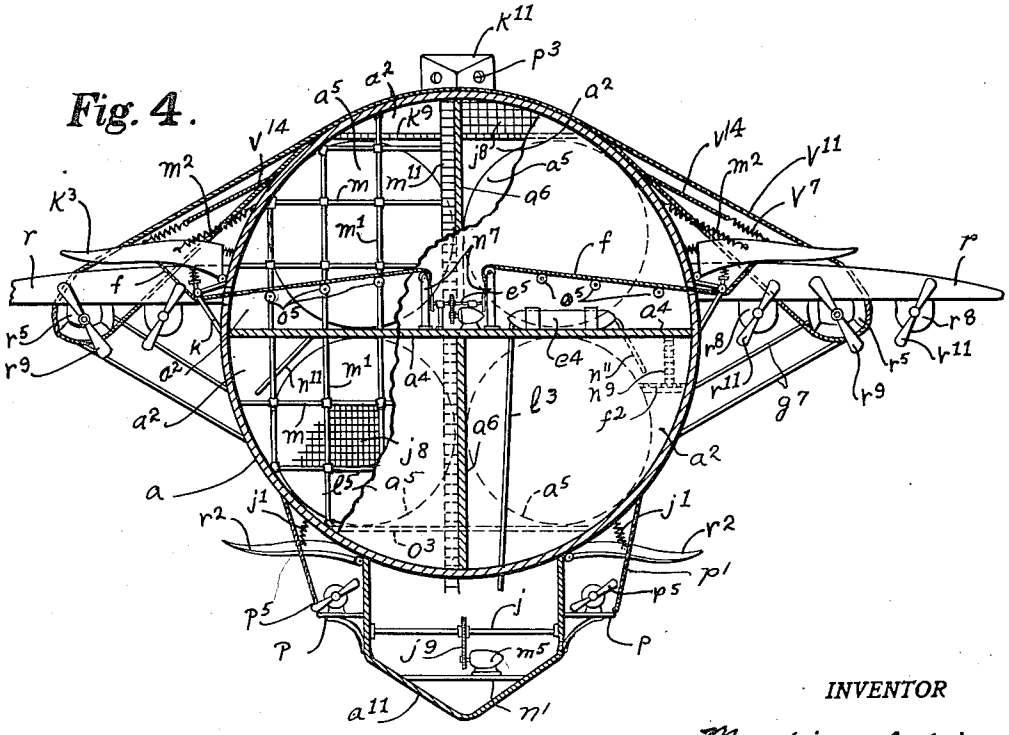


Fig. 4.



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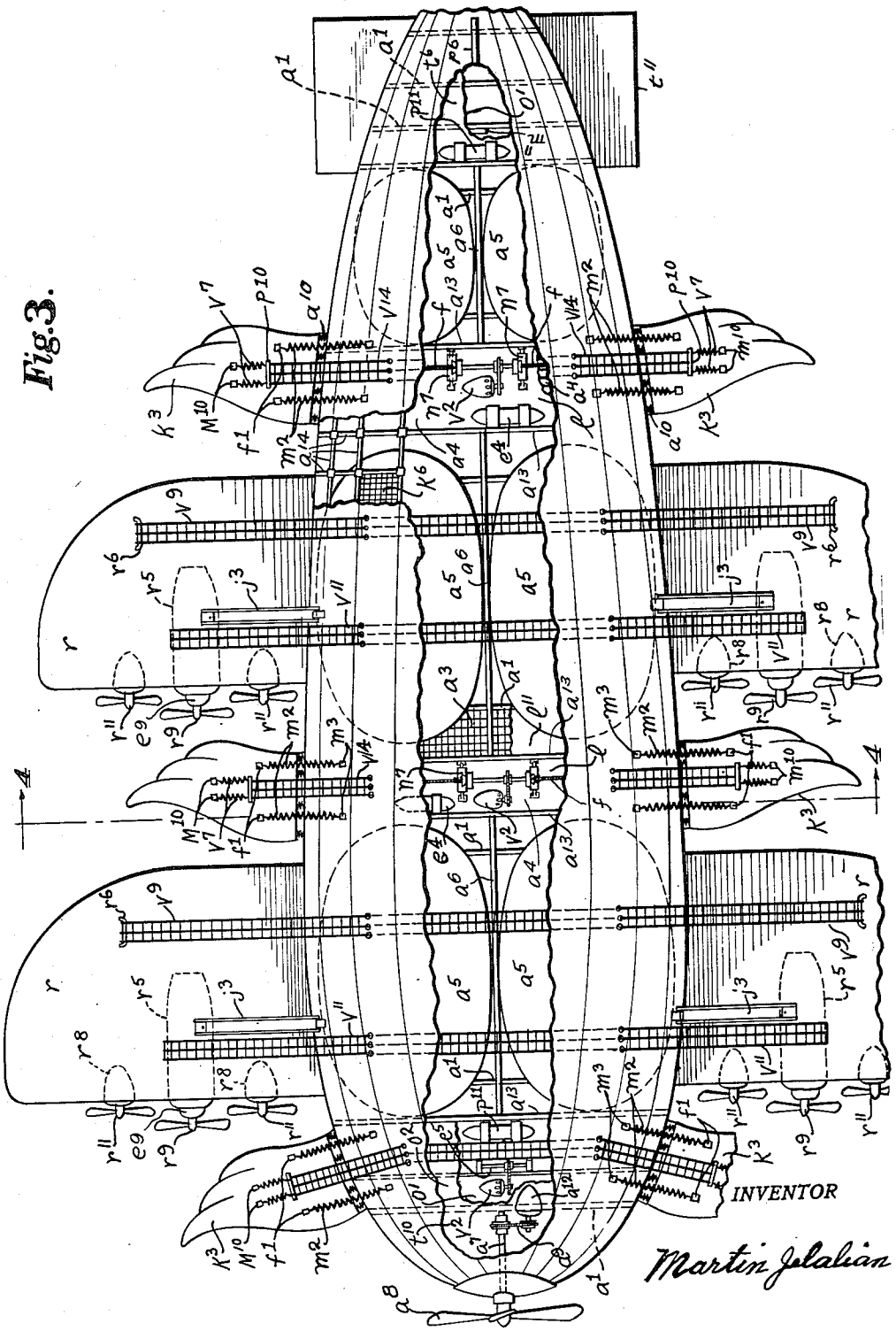
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Fig.3.



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Fig.5.

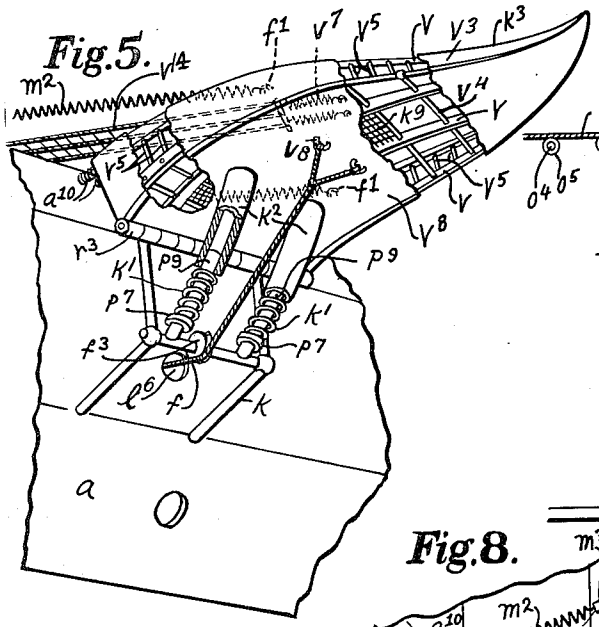


Fig.9.

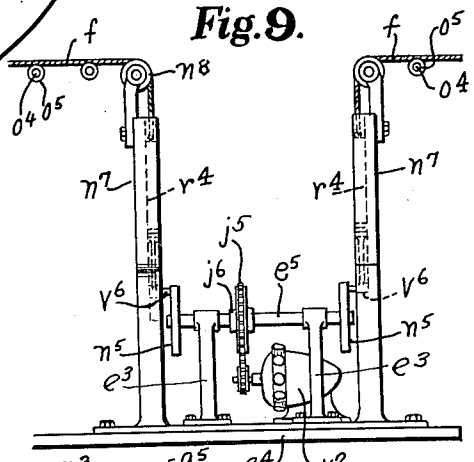


Fig.8.

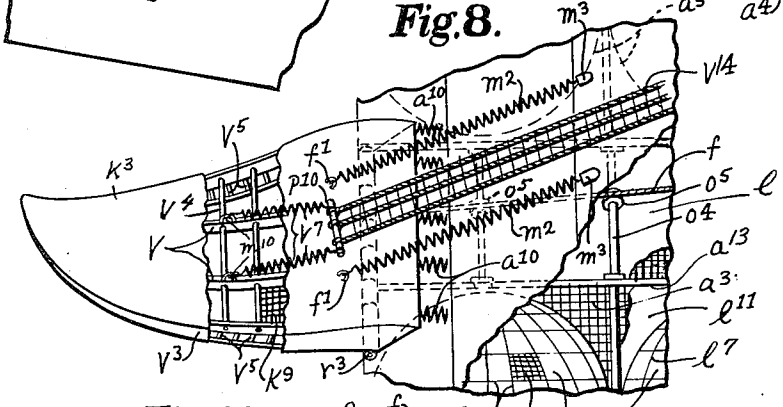


Fig.10.

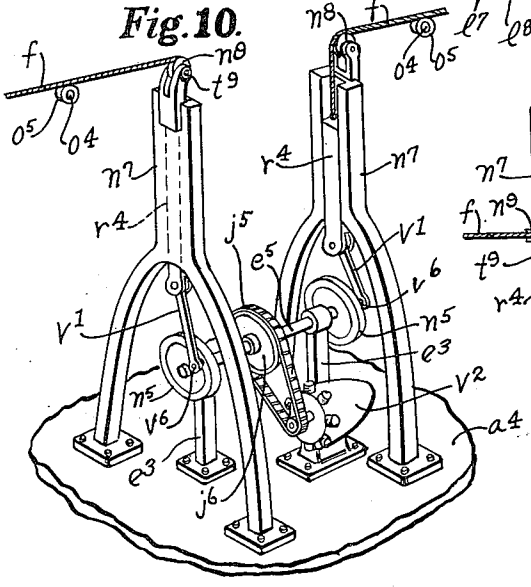
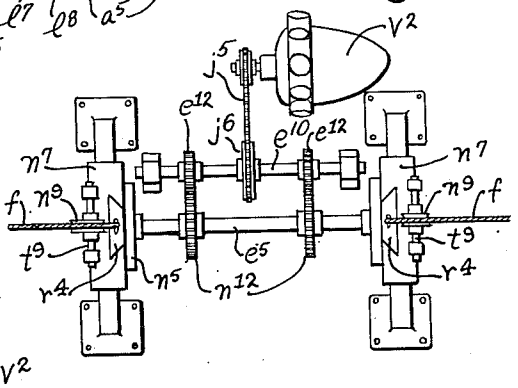


Fig.11.



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Fig. 6.

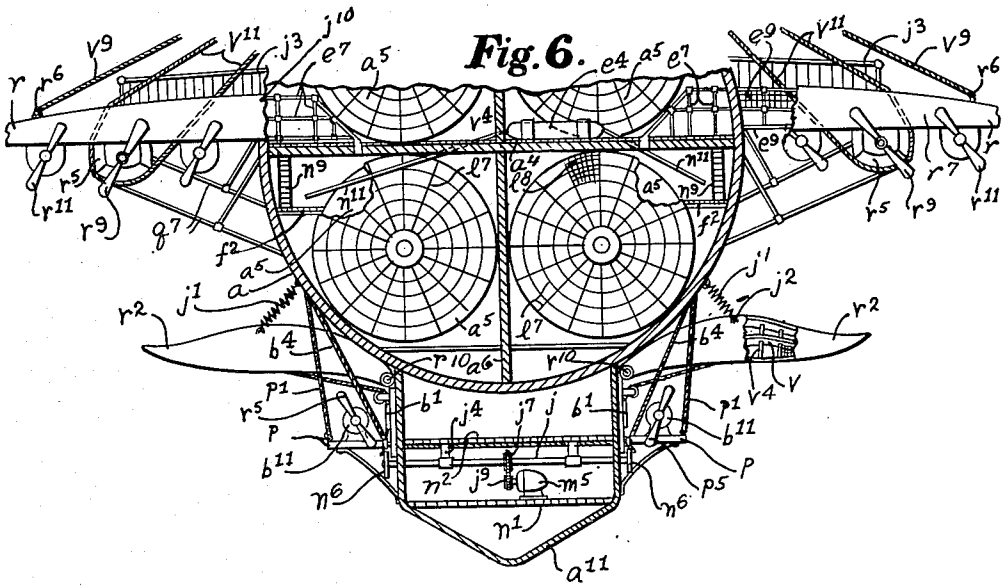
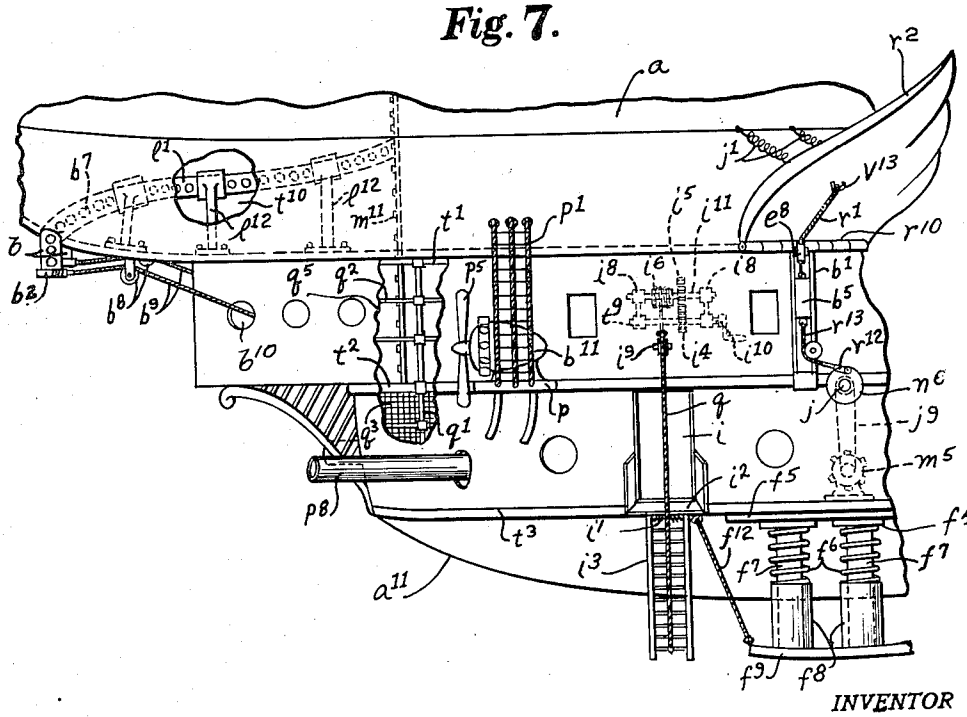


Fig. 7.



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Fig. 12.

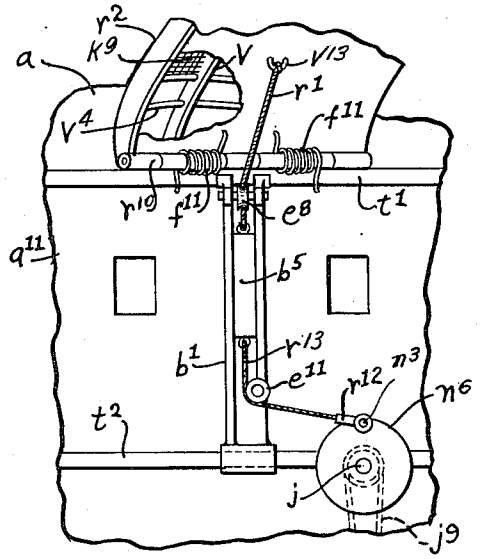


Fig. 13.

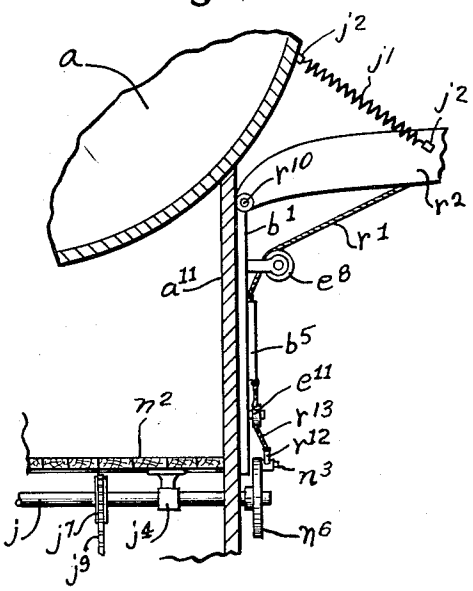
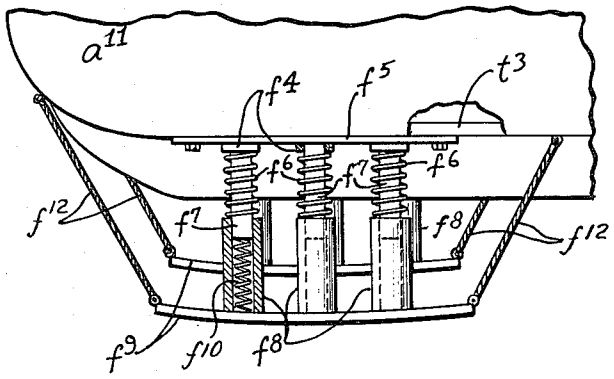


Fig. 14.



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Patented Nov. 17, 1936 2,061,075

UNITED STATES PATENT OFFICE

2,061,075

AIRSHIP

Martin Jelalian, New York, N. Y.

Application November 3, 1934, Serial No. 751,335

1 Claim. (Cl. 244—28)

This invention relates to airships, and more particularly to a propeller-driven military airship adapted to travel over and alight on land or water, and is an improvement upon a prior invention disclosed in my Patent No. 1,997,906 issued April 16, 1935.

One object of this invention is to provide an airship equipped with sets of stationary laterally spaced monoplane wings, and two sets of upper and lower opposed flapping wings hinged to the body of the craft and actuated from the interior thereof for increasing the lifting capacity of the same.

A further object is to provide an airship of the above nature having small cabins supported underneath each monoplane wing, and a large gondola or main officer's cabin underneath the main body of the airship, each of said cabins supporting power-driven propellers for driving the craft forwardly through the air at an exceptionally fast rate of speed.

A further object is to provide an aircraft of the above nature which is equipped with various types of military ordnance and is designed for minimizing the fire hazard at all parts thereof.

With these and other objects in view, there have been illustrated on the accompanying drawings, several forms in which the invention may be conveniently embodied in practice.

In the drawings:

Fig. 1 represents a side elevation of a dirigible type of airship embodying the invention.

Fig. 2 is a front elevation of the same.

Fig. 3 is a top plan view of the same, the parts being broken away to show the interior construction.

Fig. 4 is a transverse sectional view of the airship taken substantially along the line 4—4 of Fig. 3.

Fig. 5 is an enlarged perspective view of one of the upper flapping wings as viewed from the underside, parts being broken away to show the interior construction.

Fig. 6 is a slightly enlarged fragmentary detail sectional view of the airship similar to Fig. 4.

Fig. 7 is an enlarged side elevation of the forward section of the main officer's cabin.

Fig. 8 is a top view of the wing shown in Fig. 5 with portions broken away to show the interior construction.

Fig. 9 is an elevation of one of the motor units for operating one set of flapping wings.

Fig. 10 is a perspective view of the same.

Fig. 11 is a plan view of a modified form of the motor unit.

Fig. 12 is a fragmentary detail view of one of the lower flapping wings.

Fig. 13 is a transverse sectional view through Fig. 12, showing a side view of the wing operating mechanism.

Fig. 14 is a side perspective view of one of the cushion landing units attached to the underside of the main officer's cabin.

Referring now to the drawings in which like reference numerals denote corresponding parts throughout the several views, the letter a indicates a gas bag enclosing frame which may be constructed with a structural frame work a^{14} adapted to support a fine wire netting k^6 (Fig. 3) to which is secured a layer of fine tin covering the entire frame work a^{14}, thus assuring a fireproof construction. The gas bag enclosing frame a is provided with a plurality of transverse horizontal structural supports a^1, as best shown in Fig. 3, passing across the center of the ship, and are adapted to divide said ship into two semicircular compartments a^2 extending substantially the entire length thereof.

The compartments a^2 are further sub-divided by means of transverse vertical partitions a^{13} arranged as shown in Fig. 3 to provide a pair of intermediate engine room compartments l, a forward engine room compartment t^{10}, and a rear engine room compartment t^6. The compartments l are divided in the middle by horizontal platforms a^4, and the forward and rear compartments t^{10} and t^6 are similarly divided by platforms o^1 mounted on the structural supports a^1. The compartments a^2, which include the space between the engine compartments l, are divided by vertical partition walls a^6 which, in connection with the supports a^1, divide said compartment a^2 into three sets of four equal sector compartments for containing gas bags a^5, as best shown in Figs. 3, 4, and 6. The lower section of the forward engine compartment t^{10} is subdivided by superimposed horizontal platforms o^2 and o^3, as shown in Fig. 2.

Each gas bag a^5 is shown as being oval-shaped in a longitudinal direction and circular shaped on a transverse section, and is confined within a substantially heavy wire frame l^7 covered with a fine wire netting l^8 (Figs. 6 and 8). The transverse structural supports a^1 between the compartments a^2 support a fine wire netting a^3, to which is attached a covering of tin l^{11}. The vertical walls a^{13}, previously mentioned for dividing a gas bag valve compartment, are constructed of a horizontal and vertical frame work construction m and m^1 supporting a fine wire netting j^8 and a

layer of tin l^5 (Fig. 4). Thus, it can be seen from the above construction that the gas bags a^5 are each located in separate compartments of fireproof material for the purpose of preventing the fire from spreading from one compartment to another.

In each of the gas bag compartments a^2 provision is made of opposite gun platforms f^2 supported between the frame a and the wire frame l^7 of the gas bags a^5. Communication from the gun platform f^2 to the engine compartments l and the forward compartment t^{10} is provided by ladders n^9. Guns l^2, shown in Fig. 1, are adapted to be supported on the platforms f^2, and project through rectangular openings l^4 in the wall of the main frame a. If desired, the gas bags a^5, instead of being made round in transverse cross-section, may be made to the shape of the compartments; that is, substantially sector shape by merely omitting the platforms f^2, and thus increasing the gas capacity.

In order to supply the crew with water, tanks e^4 are located in compartments l, and are provided with pipe connections n^{11} leading to the vicinity of a gun platform f^2, as shown in Figs. 4 and 6. A water tank p^{11} is located in the front compartment t^{10} and has a pipe connection v^{12} leading to the lower platform o^3 (Figs. 2 and 3). A water tank p^{11} is also located in the rear compartment t^6 for the same purpose, and all the water tanks are adapted for use as fire extinguishers in case of emergency.

To increase the gliding efficiency of the airship, provision is made of two pairs of oppositely disposed stationary wings r attached to the centers of the gas-bag frame a. The stationary wings r are supported by means of shroud-like wire cables v^9 adapted to pass over the top of the frame a and are connected at their opposite end to hooks r^6 located near the outer opposite ends of the wings r. Underneath the center forward section of each wing r is secured a cabin car or gondola r^5 having a motor e^9 at the forward ends for operating the propellers r^9. Located on each opposite side of the gondola r^5, are a pair of auxiliary motors r^8 for operating propellers r^{11}.

The additional weight of the motors r^8 and the gondolas r^5 underneath the opposite wings r may be supported by means of triple stirrup cables v^{11} passing over the top of the main frame a and around the gondola r^5, as best shown in Figs. 2 and 4. The separated sections of the stirrup cables v^{11}, which are divided to pass around the gondolas r^5, are tied together and reenforced by means of connecting cross-wires e^6. Additional supports for the wings r are afforded by structural rods q^7 connected between the side of the frame a and the underside of the gondolas r^5.

Communication between the gondolas r^5 and the main frame a may be had by gangways j^3 located on the top of the wings r.

The detail construction of the stationary wings r, as shown in Fig. 6, consists of a structural light metal frame e^7 passing into the interior of the main frame a of the ship and made secure therewithin. The outer exposed end of the frame e^7 is covered with a fine wire netting e^9 for supporting on the outside a layer of fine tin r^7.

Located at the forward end of the main frame a is the main triple-blade propeller a^8 mounted on the end of a shaft a^7 extending into the main frame a and having chain and gear connection a^9 with a motor a^{12}. The motor a^{12}, as shown in Figs. 2 and 3, is located in the front compartment t^{10} and supported on the platform o^2. The rear of the frame a is fitted with the usual dirigible vertical rudders p^8 and side horizontal rudders t^{11} for guiding the ship when flying.

Main flapping wings

To assist in quickly elevating the ship, provision is made of three pairs of flapping wings k^3 centrally disposed on opposite sides of the ship and pivotally connected thereto, as by hinges r^3. As shown in Figs. 5 and 8, the wings k^3 are formed to simulate the wings of a bird by means of a frame work comprising a plurality of longitudinal ribs v, transverse tie rods v^4, and vertical tie rods v^5. A wire netting k^9 is stretched between the ribs v and tie rods v^4, to which is attached a fine tin covering v^3.

The weight of the flapping wing k^3 is supported partly by shroud cables v^{14} passing over the main frame a and having their opposite ends connected to cross-trees p^{10}, which in turn are connected at one end to a pair of tension springs v^7, the opposite ends of said spring being connected to hooks m^{10} secured in the ribs v and projecting through the back of the wings k^3. The flapping wings k^3 are actuated against the opposing influence of a pair of longitudinal tension springs m^2 and a series of compression springs a^{10} located between the flat back sections of the wing k^3 and the adjacent surface of the frame a (see Fig. 8). The tension springs m^2 are rigidly secured at their upper ends to the frame a by hooks m^3 and their opposite ends to hooks f^1 affixed to the back of the wings k^3.

The underside of the wings k^3 are further supported and stabilized by a yoke support k attached to the side wall of the frame a, as best shown in Fig. 5. The yoke support k is provided with a horizontal support having a pair of upwardly projecting arcuate plungers p^9 adapted to reciprocate in a pair of corresponding arcuate tubular members k^2 made rigid to the underside of the wings k^3. A pair of coil compression springs k^1 are fitted about the plungers p^9, and are adapted to abut between the adjacent annular end of the tubular members k^2 and a pair of collars p^7 formed integral at the lower ends of the plungers p^9.

In order to impart flapping motion to the wings k^3, each pair of opposed wings are operated from a common motor v^2 located in the engine room compartment through wing rope connections. As shown in Figs. 4 and 5, the wing rope connections f are secured to the underside of the opposite flapping wings k^3 by hooks v^8 and are adapted to pass around idler pulleys f^3 journaled on the horizontal members of the yoke supports k and pass through suitable openings l^6 provided in the side wall of the frame a.

In the interior of the compartment l the ropes f are guided over a series of pulleys o^5 (Fig. 4) journaled on shafts o^4 which are connected to the vertical frame supports m^1. The ropes f are thence passed around a pair of guide pulleys n^8 shown in Figs. 9 and 10 as being journaled to the top of a pair of inverted Y-shaped guide frames n^7 by means of small stud shafts t^9. The frames n^7 are rigidly secured upon the floor platform a^4 of the engine room compartment l in upright spaced relation. The inner adjacent surfaces of the frames n^7 are formed with a pair of guide grooves for receiving a pair of vertically reciprocating slide members r^4, the upper ends of which are made secure to the ends of the ropes f. The lower ends of the slide members r^4 are pivotally secured to a pair of pitman links v^1 having bearing connection with

a pair of fly wheels m^5, as by lateral studs v^6. The fly wheels n^5 are mounted rigidly on the opposite end of a horizontal shaft e^5 journaled in a pair of upright bearing brackets e^3 and having a chain j^5 and a sprocket j^6 connection with the power motor v^2. It will be seen from the above construction that the rotary motion of the motor v^2 is changed into reciprocating motion for flapping the wings k^3.

As shown in Figs. 2 and 3, the motor v^2 for operating the foremost pair of flapping wings k^3 is located in the forward compartment t^{10} upon the platform o^2 and is of identical construction to the above device.

As shown in Fig. 1, a pair of gun turrets k^{11} are located on the top of the fore and aft sections of the main gas bag frame a. The foremost turret k^{11} is provided with guns p^3 projecting forwardly therefrom, while the rear turret is provided with guns p^2 projecting from the rear therefrom. The turrets k^{11} are adapted to be interconnected by a gangway k^7 located at the top of the frame a and a small gangway k^8 leads rearwardly from the rear turret k^{11}, and may be connected with any suitable hatchway, not shown, leading into the interior of the ship.

Main cabin car

Located centrally beneath the main frame a and extending longitudinally thereof is a main cabin car or officer's quarters a^{11} built in the manner of a boat and adapted to land on and take off from bodies of water. As shown in Fig. 1, the cabin car a^{11} is provided with a power driven water propeller a^{15} and a rudder a^{16} for driving and steering the ship in water.

The main car a^{11} is divided into three longitudinal sections by horizontal dividing frames t^1, t^2, and t^3, as shown in Fig. 7, to which is connected vertical and horizontal structural members q^1 and q^2. A fine wire netting q^3 is connected to the structural members q^1 and q^2 for supporting a layer or covering of fine tin q^5. The longitudinal dividing frames t^2 and t^3 are adapted to support superimposed flooring platforms n^1 and n^2, as shown in Fig. 6, which serve to divide the cabin car a^{11} into an upper main officer's quarters, a middle engine room compartment, and a lower storage compartment. Shroud cables b^4 (Figs. 1 and 6) are employed to support the weight of the main car a^{11} and are adapted to pass about the main frame a and through the car a^{11} underneath the frame t^2 and associated flooring n^2.

Extending laterally from the side walls of the car a^{11} are a series of motor platforms p for supporting motors b^{11} for driving propellers p^5. The outer edges of the platforms p are supported by shroud cables p^1 connected to the side walls of the main frame a.

Located on opposite sides of the ship at the junction of the main frame a and main cabin car a^{11} are three sets of opposite minor flapping wings r^2, and pivoted to the ship by means of hinges r^{10}. As shown in Fig. 12, the wings r^2 are constructed similar to the main flapping wings k^3; i. e. with longitudinal parallel ribs v, transverse tie rods v^4, wire nettng k^9 and the usual covering of fine tin. The wings are supported and actuated against the influence of a pair of tension springs j^1 connected between the top of said wings r^2 and adjacent surface of the main frame a, as by hooks j^2. As shown in Fig. 12, a pair of additional coil springs f^{11} surrounding a portion of the hinge r^{10} are adapted to assist the springs j^1 in supporting the weight of the wings r^2.

In order to actuate the minor flapping wings r^2, each pair of opposite wings are driven from a single motor m^5 located in the engine compartment of the main cabin car a^{11} on the platform n^1 (see Figs. 6, 7, and 12). The motor m^5 is adapted to drive a horizontal shaft j through the chain j^9 and sprocket j^7 connections, said shaft j being supported from the underside of the upper platform n^2 by a pair of spaced hanger brackets j^4. The shaft j projects through opposite sides of the car a^{11} and is provided with a pair of opposed crank wheels n^6 having crank pins n^3 for journally receiving a pair of T-shaped bearing connections r^{12}. Each bearing connection r^{12} is rigidly connected to one end of a pull-rope connection r^{13} which is adapted to pass about a pulley e^{11} and have its opposite end attached to a slide b^5. The slide b^5 is vertically reciprocated in a guide member b^1 and has its upper end attached to a rope r^1 directed about a guide pulley e^8, and rigidly secured to the underside of the flapping wings r^2 by means of a hook v^{13}.

In order to receive and discharge passengers from the main car a^{11}, provision is made of retractable ladders i^3, one of which is clearly shown in Fig. 7. The upper end of the ladder i^3 has a hinge connection i^1 with the outer end of a gang platform i^2 projecting outwardly from the lower edge of the doorways i provided in the side walls of the car a^{11}. The ladder i^3 is adapted to be retracted into inoperable position by means of a flexible wire rope q connected to the lower rung of said ladder i^3 and passed upwardly and around a guide pulley i^9 into the main cabin a^{11} and connected to a winding drum i^6. The winding drum i^6 is rigid on a horizontal drum shaft i^{11} supported in a pair of spaced bearing brackets i^8. The drum shaft i^{11} carries a large gear i^5 which is intermeshed with a pinion gear i^4 keyed on a crank operated shaft i^{10} journaled in the bearing brackets i^8. When the shaft i^{10} is operated, the ladder i^3 will be drawn up to the sides of the main car a^{11} opposite the entrance way i in a vertical inaccessible position.

Communication is had between the main officer's car a^{11} and the gun turrets k^{11} located at the top of the ship by means of vertical ladders m^{11} located adjacent the vertical longitudinal walls a^6 in the main gas bag frame a (see Figs. 2, 4, and 7).

Fighting equipment is provided for the main officer's car a^{11} by means of a pair of guns p^8 projecting from the forward intermediate section of said car a^{11} and another pair of guns p^4 projecting from the upper rear section of said car, as shown in Fig. 1.

Bomb dropping devices are arranged at the fore and aft parts of the ship in the compartments t^{10} and t^6. The forward device, as clearly shown in Fig. 7, comprises a pair of raceways l^1 charged with bombs b^7 and supported by brackets l^{12}. The raceways l^1 lead to a pair of vertical bomb discharge tubes b depending from the underside of the main frame a in front of the officer's car a^{11}. The lower ends of the discharge tubes b are provided with suitable slide valves b^2 adapted to be selectively operated by pull-rope connections b^9 passing over a pair of guide pulleys b^8 and lead into the main officer's car a^{11} through openings b^{10}. The rear bomb dropping device is of identical construction with the front device.

Cushion landing devices

Three pairs of cushion landing devices are shown in Fig. 1 attached to the underside of the main car a^{11}, and serve as resilient landing devices for the airship when descending and support the same when on the ground.

A detailed view of a pair of cushion devices is shown in Fig. 14, and comprises a pair of flat support members f^5 attached rigidly to the lower longitudinal dividing frame t^3. The flat members f^5 are each provided with three depending plunger shafts f^7 telescopically fitting into a like number of upright tubular casings f^8 attached rigidly upon a pair of horizontal tread plates f^9. The telescoping action of the plunger shafts f^7 in the casings f^8 are effected against the influence of large coiled compression springs f^6 surrounding said shafts f^7 and abutted between the adjacent ends of the casings f^8 and collars f^4 on said shafts and positioned against the flat members f^5. Additional coil springs f^{10} are located within the casings f^8 and are adapted to be compressed by the descending plungers f^7. The opposite ends of the tread plates f^9 are flexibly connected to the main car a^{11} by a pair of opposed wire cables f^{12}.

In case it is desired to make the flapping movement of the main flapping wings k^{11} operate slowly instead of speedily, a modified form of power drive is shown in Fig. 11, wherein the shaft e^5 has keyed thereto and is adapted to be driven by a pair of gears n^{12} intermeshing with a pair of smaller pinion gears e^{12} keyed on a horizontal shaft e^{10}. The shaft e^{10} in turn is operated by the usual chain j^5 and sprocket j^6 connection with the motor v^{12}.

The minor flapping wings r^2 may also be arranged to be driven by gear connections so as to reduce the speedy flapping movement of the same, if desired, in the manner as described above.

While there have been disclosed in this specification several forms in which the invention may be embodied, it is to be understood that these forms are shown for the purpose of illustration only, and that the invention is not to be limited to the specific disclosures but may be modified and embodied in various other forms without departing from its spirit. In short, the invention includes all the modifications and embodiments coming within the scope of the following claim.

Having thus fully described the invention, what is claimed as new and for which it is desired to secure Letters Patent, is:

In a dirigible airship, a frame divided into a plurality of compartments, gas bags detachably secured in some of said compartments, and each provided with an outer guard wire frame, a plurality of pairs of centrally located vertically reciprocating wings arranged on the sides of said frame, the inner ends of said wings being flat and formed in the shape of a rectangle having their lower edges pivotally connected to said frame, the upper portion of said wings being provided with coiled pull spring connections with said frame, yoke shaped supports for each of said reciprocating wings secured to said frame adjacent said wings, each of said yoke shaped supports being provided with a pair of integral collars and also integral shafts extending upwardly therefrom and slidably mounted within tubular cylinders connected to the bottom of each of said reciprocating wings, coiled spring surrounding said shafts and connected to said collars and said wings, wing-actuating cables connected to said wings and passing over pulleys located between each pair of wings, and a motor mounted upon a fixed platform within a forward vacant compartment of said frame for simultaneously actuating the forwardly located opposite pair of said wings.

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