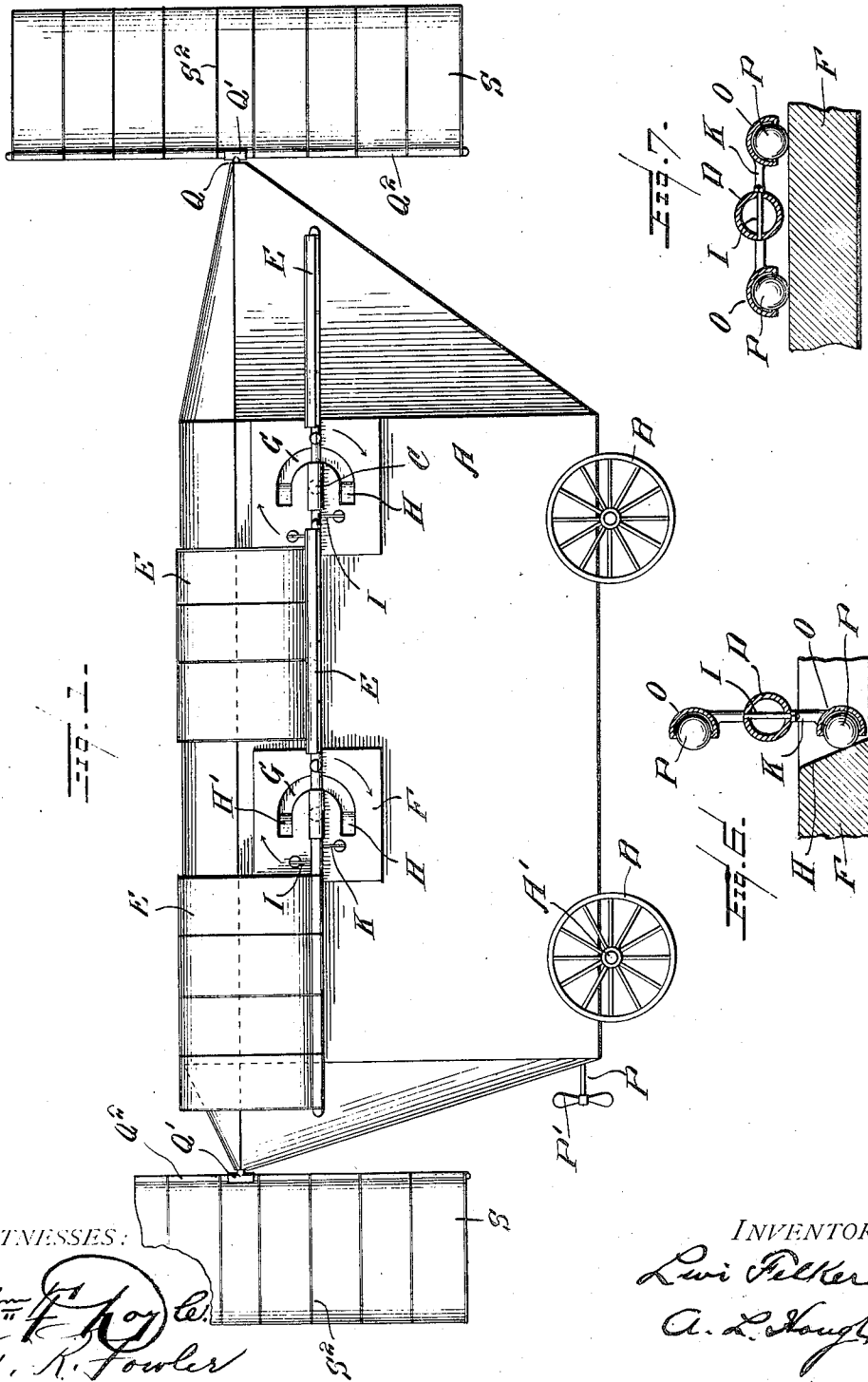


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AERIAL NAVIGATING APPARATUS.
APPLICATION FILED APR. 3, 1909.

942,629.

Patented Dec. 7, 1909.

3 SHEETS—SHEET 1.



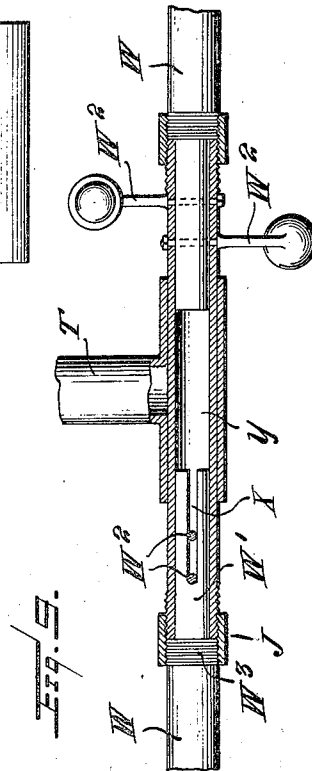
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AERIAL NAVIGATING APPARATUS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, LEVI FELKER, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Aerial Navigating Apparatus, of which the following is a specification.

This invention relates to new and useful improvements in aerial navigating apparatus adapted also for use in navigating water, land, etc., and comprises various details of construction and combinations and arrangements of parts which will be hereinafter fully described and then specifically defined in the appended claims.

My invention is illustrated in the accompanying drawings, in which:—

Figure 1 is a side elevation of the apparatus. Fig. 2 is a top plan view. Fig. 3 is a detail perspective view of two of the buoyant propelling wings with attachments. Fig. 4 is a detail sectional view through the forward end of the housing apparatus and showing means for operating and holding the rudder shaft. Fig. 5 is an enlarged detail perspective view of one end of the aeroplane rudder. Fig. 6 is a detail perspective view of means for giving a partial rotary movement to the propeller carrying wings. Fig. 7 is a similar detail view showing the parts in position at right angles to those illustrated in Fig. 6. Fig. 8 is a plan view of a slight modification of the apparatus in which it is adapted for operation by manual power, and Fig. 9 is a detail sectional view showing means for detachably connecting one of the wings to the shaft.

Reference now being had to the details of the drawings by letter, A designates the housing of the apparatus which may contain any suitable power mechanism for driving the craft and suitable axles A' having wheels B thereon. Said housing may be of any size and shape, preferably of the construction shown in Fig. 1 of the drawings, in which the ends taper in order to offer as little resistance as possible to the air or other medium through which the craft is to be propelled.

Mounted upon shafts C, which are journaled in suitable bearings in the housing, are the rods D to each of which is fastened a wing E having a skeleton frame covered with canvas and suitably braced by means of the wires E'. Each of said rods D has

other, as shown clearly in Fig. 3 of the drawings. It will be noted that each of said wings is dished slightly or concaved in order to secure a better purchase in the air as the shafts carrying said rods are rotated. In the drawings I have illustrated two of said shafts C to each end of which is fastened a rod carrying two of said wings as shown, but it will be understood that any number of shafts or wings may be employed as may be desired. Extending laterally in the sides of said housing are the flat face projections F, two of which are shown in Fig. 1 of the drawings, and sectional parts of the same being illustrated in Figs. 6 and 7. Each of said plates has a cam groove G formed therein which is of semi-circular outline and terminating at its ends in inclined walls H and H', one of which H is shown in Fig. 6 of the drawings. Projecting from the rods carrying the wings are the pins I, K, L and M, and each of said pins carries a spherical socket member O in which a ball bearing P is held in the manner shown clearly in Fig. 6 of the drawings. It will be noted upon reference to Fig. 2 of the drawings that, as said rods D are rotated by the shafts C, they overlap each other and that the two wings upon the portions which overlap are always disposed at right angles to each other, thus allowing one ring to be in operative position as it is passing down while the upwardly moving wing feathers with the air.

Mounted horizontally in suitable bearings within the housing are the shafts Q, a detail of one end of which is shown in Fig. 4 of the drawings, said shafts being hollow and provided with a T-shaped end Q' which is hollow. Mounted in said T-shaped end is a shaft Q² having a sprocket wheel thereon about which the sprocket chain Q³ passes, which chain also passes about a sprocket wheel which is fixed to the operating shaft Q⁴ to which a handle Q⁵ is fastened. A spring-pressed pawl Q⁶ is mounted upon the shaft Q⁴ and is adapted to engage perforations in the shaft Q for the purpose of holding the sprocket carrying shaft Q⁴ from rotation. A second spring-pressed pawl, designated by letter Q⁷, is mounted upon the shaft Q and is controlled by the pivotal lever Q⁸, said pawl Q⁷ being adapted to engage one or another of the holes Q⁹ formed in the inner end of the tapering portion of the housing and provided for the purpose

of preventing the shaft Q from rotating. Fixed to the shaft Q² is a rudder or aeroplane S, preferably of rectangular shape and having suitable brace wires S' fastened to the outer ends of the rods S² and to which a canvas or other material forming the rudder or aeroplane is fastened. Each end of the craft is provided with a similarly constructed rudder or aeroplane and similarly mounted as shown and described and each operated by a mechanism as illustrated in Fig. 4 of the drawings.

In Fig. 8 of the drawings, I have shown a slight modification of my invention in which manually operated mechanism is provided for driving the shaft T, said mechanism consisting of the sprocket chain T' which passes about the sprocket wheels upon the shafts T and T² and a crank arm T³ fixed to each shaft T² affording a means whereby each hand of the operator may be utilized in imparting a rotary movement to the shaft T.

In Fig. 9 of the drawings, I have shown a detail view in which means is afforded for detaching one or another of the wings. The shafts W have threaded portions W³, also contracted ends W' longitudinally slotted, as at X, and said contracted portions are adapted to telescope within the end of the tube y. Pins N² project through registering apertures in the tube y and also pass through said slots X and afford means for preventing the shafts W from rotating independently of the tube y. Threaded collars J are fitted to the threads W³ and the shaft W and engage the threads upon the circumference of the tube y. Said tube y is mounted in the hollow T-shaped member, as shown clearly in Fig. 9 of the drawings.

A propeller shaft P projects from the rear end of the craft and has a propeller P' thereon which is driven by any suitable power apparatus within the housing not shown. Said propeller is adapted to be utilized when the apparatus is to be used in water.

In operation, when the apparatus is to be utilized for navigating the air, rotary movement is imparted by any suitable power apparatus to the shafts C, causing the same to rotate in the direction of the arrows in Fig. 1. As the shaft rotates, the balls carried by the pins L and K alternately come in contact with the inclined end wall H of the semi-circular groove G, shown in Fig. 1 of the drawings, and cause each rod D to be given a quarter revolution. After the rod D is thus given a quarter revolution and the pin K or L carrying the ball which contacts with the end wall H rises out of the groove, the two balls, one upon a pin I or M as the case may be, and the ball upon the pin K or L, which ball last leaves the groove, will be thrown into horizontal positions, as shown

in Fig. 7 of the drawings, said balls rolling upon the flat surface and describe a circle intermediate the ends of the semi-circular groove, thereby securely holding the shaft from rotating in either direction and, during this interval, the wings are exerting a downward and propelling pressure upon the air. The moment one of the pins K or L comes opposite the inclined end H', which is the entrance to the groove G and as the ball carried by the other pin L or K comes in contact with the inclined end wall H, the pin which enters the groove will be thrown down to a position at right angles to the outer face of the projection F. This operation is repeated each time the shaft C makes a revolution and, as both the shafts C rotate together, the inner ends of the rods D carried thereby will overlap and the wings will assume the positions shown in Fig. 2 of the drawings, in which the two pairs are always upon the downward thrust of the wings thrown to horizontal positions, thus exerting an upward buoyant as well as a forward propelling action. As the wings rise up, they are disposed in horizontal positions, thus offering little resistance to the air.

By the manipulation of the rudders or aeroplanes through the medium of the mechanism shown in Fig. 4 of the drawings, said rudders or aeroplanes may be thrown by the universal joint connections into various positions accordingly as it may be desired to steer the craft in any direction desired. By the manipulation of the mechanism shown in Fig. 4 of the drawings, the aeroplanes or rudders may be held in any adjustable positions and conveniently shifted by the lever, pawl and sprocket mechanism.

In the modified form shown in Fig. 8, the wings are operated in the same manner as shown in Figs. 1 and 2, but in said modified form said wings are adapted to be actuated by manual power consisting of the sprocket wheels, chain and crank mechanism. When it is desired to remove one or more of the wings of the form shown in Fig. 8, it may be easily done by unscrewing the collars J, allowing the hollow shafts or rods carrying the wings to be withdrawn from the positions shown in Fig. 9 of the drawings.

In the event of the apparatus being utilized for travel upon land, the mechanism for operating the wings and rods may be thrown out of commission and power applied direct to the driving axle of the apparatus and, in the event of its use in water, the power connection is made direct with the propeller shaft.

What I claim to be new is:—

1. An aerial navigating apparatus, etc., comprising a housing, rotatable shafts mounted in suitable bearings therein, rods

rotatably connected to said shafts, wings mounted at right angles to each other upon each of said rods, pins carried by said rods and projecting at right angles thereto, ball bearings upon said pins, grooved ways having each an inclined end against which one or the other of said balls is adapted to bear to give a partial rotary movement to the rod, and aeroplane steering rudders at the ends of said housing, as set forth.

2. An aerial navigating apparatus, etc., comprising a housing, rotatable shafts mounted in suitable bearings therein, rods rotatably connected to said shafts, wings mounted at right angles to each other upon each of said rods, pins carried by said rods and projecting at right angles thereto, ball bearings upon said pins, grooved ways having each an inclined end against which one or the other of said balls is adapted to bear to give a partial rotary movement to the rod, and aeroplane steering rudders having universally adjusted connections with the ends of said housing, as set forth.

3. An aerial navigating apparatus, etc., comprising a housing, rotatable shafts mounted in suitable bearings therein, T-shaped unions connected to said shafts, rods rotatably mounted in said T-shaped unions, wings secured at right angles to each other upon said rods, pins projecting from said rod, a ball bearing upon each pin, semi-circular grooved ways upon the opposite sides of the housing and each groove having an inclined end wall adapted to contact to cause a partial revolution to be imparted to each wing carrying rod, and aeroplane rudder means for steering the apparatus, as set forth.

4. An aerial navigating apparatus, etc., comprising a housing, rotatable shafts mounted in suitable bearings therein, T-shaped unions connected to said shafts, rods

rotatably mounted in said T-shaped unions, wings secured at right angles to each other upon said rods, pins projecting from said rod, a ball bearing upon each pin, semi-circular grooved ways upon the opposite sides of the housing and each groove having an inclined end wall adapted to contact to cause a partial revolution to be imparted to each wing carrying rod, means for preventing said rods from rotation while the pins are moving between the ends of said grooved way on a flat surface of the projecting portion of the housing, and aeroplane rudders for steering the apparatus, as set forth.

5. An aerial navigating apparatus, etc., comprising a housing, rotatable shafts mounted in suitable bearings therein, T-shaped unions connected to said shafts, rods rotatably mounted in said T-shaped unions, wings secured at right angles to each other upon said rods, fingers projecting from said rods at angles thereto, a ball bearing mounted in a socket portion upon each of said fingers, laterally extending portions of the housing having flat faces which are provided with semi-circular grooved ways, each terminating in an inclined end wall against which certain of said balls are adapted to contact, as the shaft carrying said rods rotates, to cause a partial revolution to be imparted to each rod, said fingers and ball bearings serving to prevent said rod from rotation while the balls are in contact with said flat surface intermediate the ends of the grooved way, aeroplane steering rudders, and means for operating the same, as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

LEVI FELKER.

Witnesses:

A. L. HOUGH,
ANNA C. BLAKENEY.