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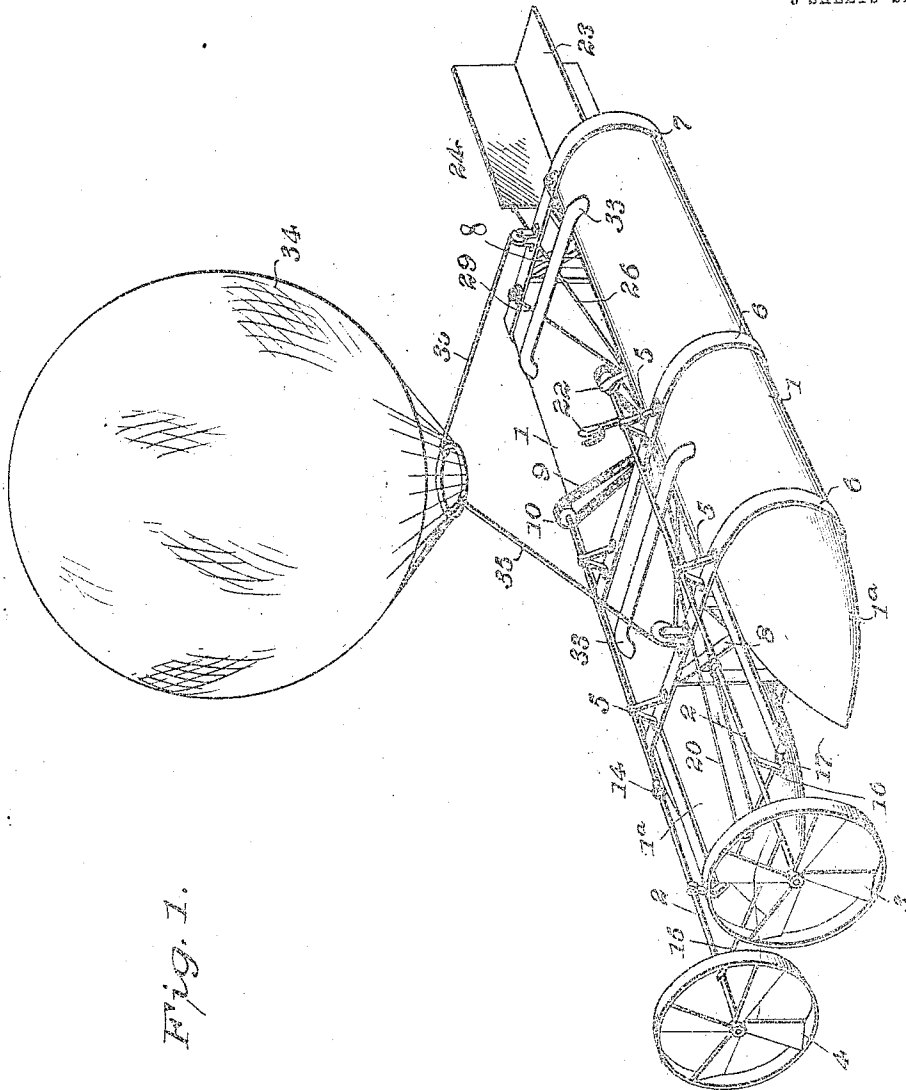


Fig. 1.

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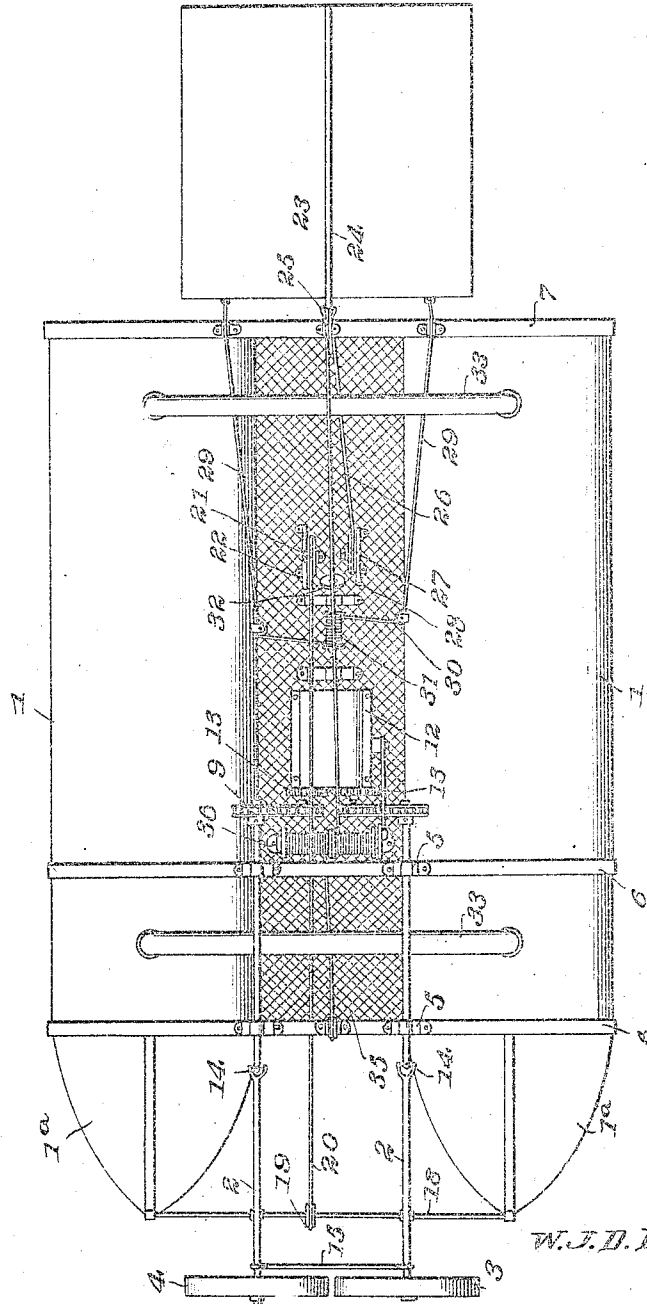
APPLICATION FILED AUG. 7, 1909.

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3 SHEETS—SHEET 2

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Fig. 2.



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Fig. 3.

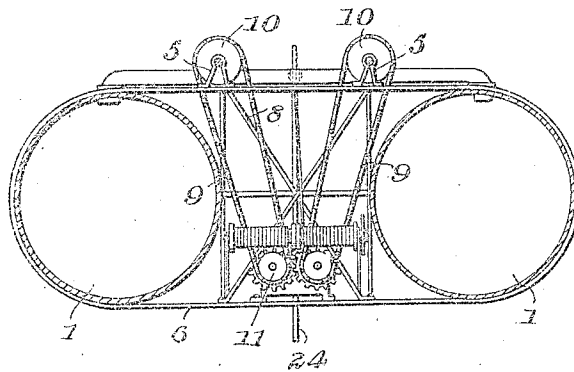
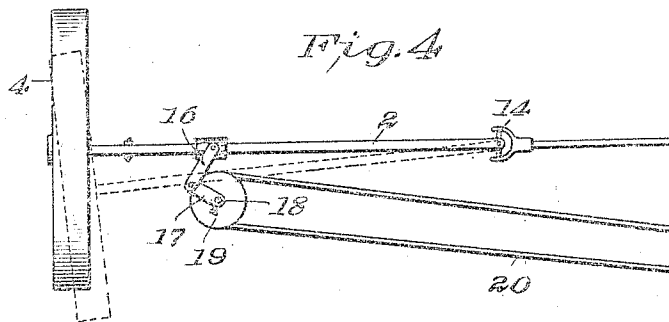


Fig. 4.



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UNITED STATES PATENT OFFICE.

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AIRSHIP.

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Specification of Letters Patent.

Patented Jan. 3, 1911.

Application filed August 7, 1909. Serial No. 511,750.

To all whom it may concern:

Be it known that I, WILLIAM J. D. BRADFORD, a citizen of the United States, residing at Killeen, in the county of Bell and State of Texas, have invented certain new and useful Improvements in Airships, of which the following is a specification.

This invention comprehends certain new and useful improvements in air ships of the dirigible type, and the invention has for its primary object an air ship of this character which will embody novel and useful means for ascending and alighting.

A further object of the invention is an air ship of this character embodying a plurality of cylindrical gas containers so connected together that the pressure will be at all times equalized. And the invention also has for its object a dirigible air ship which will be light, strong and durable and capable of being easily steered to the right or left, or up and down, the device embodying propellers at the front of the main or body portion of the air ship, and a rudder at the rear of such body portion, the propellers being moved upwardly or downwardly so as to cause the air ship to rise or descend, and the rudder at the stern being also capable of being shifted to the right or to the left and up and down so as to assist in the steering operation. And the invention also has for its object, a machine of this character, all of the parts of which including the driving means may be under the control of one driver.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts that I shall hereinafter fully describe and claim.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings in which:

Figure 1 is a perspective view of a flying machine or air ship constructed in accordance with my invention; Fig. 2 is a top plan view of the body portion; Fig. 3 is a transverse sectional view; and, Fig. 4 is a longitudinal view illustrating the means for adjusting the propeller shafts.

Corresponding and like parts are referred to in the following description and indicated in all the views of the accompanying drawings by the same reference characters.

The main or body portion of my improved air ship embodies two cylindrical containers 1 that are ranged alongside of each other with a space between for the car to support the motor and steering apparatus which are supported thereon preferably below the center of gravity of the containers so as to assist in maintaining the stability of the apparatus. The details of the car are not herein shown as they form no part of my present invention. The containers 1 are preferably tapering at their bow or forward ends as indicated at 1^a.

2 designates the propeller shafts. In the present instance, these are two in number and they extend longitudinally as shown projecting beyond the forward ends of the cylindrical containers 1 and being provided at their forward ends with propellers 3 and 4 which are arranged to turn in opposite directions. The rear ends of the propeller shafts 2 are journaled in bearing brackets 5 that are preferably secured to the front and intermediate of the frames 6 serving to strengthen the structure. There is also a rear frame designated 7. These front connecting frames 6 and rear connecting frame 7 are preferably strengthened by diagonal braces 8 as clearly illustrated in the drawings.

The propeller shafts 2 may be driven in any desired way. In the present embodiment of the invention, they are rotated by means of belts 9 passed over pulleys 10 secured to the rear extremities of the shafts and over corresponding pulleys 11 secured on the shafts of the motor 12 which may be of any desired construction or type. In order to turn the shafts 2 in opposite directions, the shafts of the motor are provided with meshing pinions 13.

I propose to raise and lower the propellers 3 and 4 so as to effect an upward or downward movement of the air ship, and for this purpose the propeller shafts 2 are constructed in front and rear sections connected together by universal joints 14. The forward sections of the propeller shafts 2 are connected together by a cross-rod 15 and are also connected by links 16 to the cranks 17 of a transversely extending shaft 18. This crank shaft is journaled to rotate about its longitudinal axis, as indicated in the drawing, and carries at an intermediate point, a wheel 19. Cords or cables 20 pass around this wheel 19 and extend rearwardly to the

interior of the car where they are secured to an actuating wheel 21 arranged to rotate about a horizontal axis and operated by a hand lever 22 provided with a detent designed for locking engagement with a quadrant. By swinging the hand lever 22 it is clear that the propellers 3 and 4 will be inclined upwardly thereby causing the air ship to ascend as it is propelled in a forward direction, and a reverse movement of the hand lever 22 will cause the propellers 3 and 4 to drop so as to impart a downwardly inclined movement of the air ship. The rear rudder of the air ship is composed of two bisecting planes 23 and 24 one of which is arranged horizontal and the other vertical as shown. The two planes 23 and 24 are together hingedly connected to the rear of the machine as indicated at 25 so that the entire rudder may be swung horizontally or vertically. In order to effect the up and down movement of the rudder, the plane 24 has connected to it at opposite sides of the plane 23 cords or cables 26 which extend through openings in the rear frame of the body portion of the air ship and pass around and are secured to an actuating wheel 27, the same being provided with a hand lever 28 like the hand lever 22. In order to move the rudder to the right or to the left, the plane 23 has secured to it on opposite sides of the plane 24, corresponding cords or cables 29 which also pass forwardly through guide openings formed in the rear frame of the machine and around pulleys 30, the cords being connected at their forward ends to a longitudinally extending drum 31, the shaft of which is provided with a steering wheel 32. The wheels 22, 27 and 32 are all set close to each other side by side so that the driver may easily manipulate all of them.

In order that the pressure within each container may be at all times equal to the pressure within the other, the two cylindrical containers 1 are connected together, preferably both front and rear by pipes or tubes 33 arranged to establish communication between the interior of both containers. In connection with the main body portion of my improved air ship, I have preferably provided a spherical container 34 which is used primarily in ascending and alighting. Cables or ropes 35 are connected at one end to the lower end of the spherical container 34 and extend downwardly in a forwardly and rearwardly inclined direction respectively, the said ropes passing through guide openings at the front and rear of the main body portion and being both secured to a transversely extending drum 36 arranged to be operated from the main motor 12.

In the practical operation or use of my improved air ship, in order to make an ascent, the cylindrical containers are inflated

just enough to suspend their own weight and that of the burden to be carried at the earth's surface or sea level but not sufficiently to rise of themselves. The spherical container 34 is then inflated sufficient to raise the machine to the desired altitude. While the machine is anchored, the spherical container 34 is allowed to ascend to the desired height, where it loses a portion of its lifting power and then by means of the drum the lines 35 are wound in causing the main body portion of the machine to ascend slowly and steadily. Finally when the desired height is reached, the propellers are put in motion and the desired course is taken. In making a descent the lines in the spherical container are allowed to unwind from the drum 36 thus allowing the main body portion of the machine to descend to the earth where it is anchored, and the spherical container is then brought down by means of the cables or lines 35 being wound on the drum.

From the foregoing description in connection with the accompanying drawing, it will be seen that I have provided an improved construction of air ship which will make the operation of ascending and alighting a safe and steady one and which also embodies comparatively few and simple parts which are strong and durable and so assembled and arranged that the machine may be easily started both up and down or to the right or left, the course being maintained without any undue undulations, and without any danger of tilting laterally to any degree.

Having thus described the invention, what is claimed as new is:

1. In a dirigible air ship, the combination of a body portion, propellers carried thereby, shafts on which said propellers are mounted, said shafts being constructed in forward and rear sections having a universal joint connection with each other, the rear sections being journaled on the body portion, a transversely extending rod journaled in the body portion and arranged to rotate about its longitudinal axis, a crank connection between the rod and the forward sections of the propeller shafts, and means for turning said rod.

2. In a dirigible air ship, the combination of a body portion, propellers carried thereby, shafts on which said propellers are mounted, said shafts being constructed in forward and rear sections, having a universal joint connection with each other, the rear sections being journaled on the body portions, a transversely extending rod journaled in the body portion and arranged to rotate about its longitudinal axis, a crank connection between the rod and the forward sections of the propeller shafts, a wheel mounted on said rod, cables connected to the wheel and extending rearwardly therefrom,

and a hand lever arranged to pull on said cables to rotate said rod in one direction or the reverse.

3. In a dirigible air ship, the combination
5 of a body portion, a propeller carried thereby, a shaft on which said propeller is mounted, said shaft being constructed in forward and rear sections having a universal joint
10 connection with each other, the rear sections being journaled in the body portion, a transversely extending rod journaled in the body portion, a crank connected to said rod, a link connected to the crank and forward sec-

tion of the propeller shaft, a pulley mounted on said rod and secured thereto; a cable extending around said pulley and extending rearwardly therefrom, and means carried by the body portion and connected to said cable to turn the pulley and rod.

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

WILLIAM J. D. BRADFORD. [L. S.]

Witnesses:

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