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W. B. WHEELER

DIRIGIBLE BALLOON DRIVE AND CONTROL

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Fig. 1.

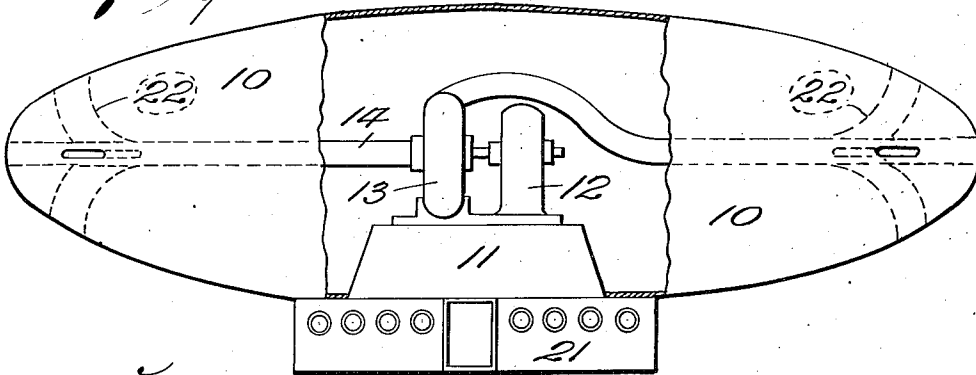


Fig. 2.

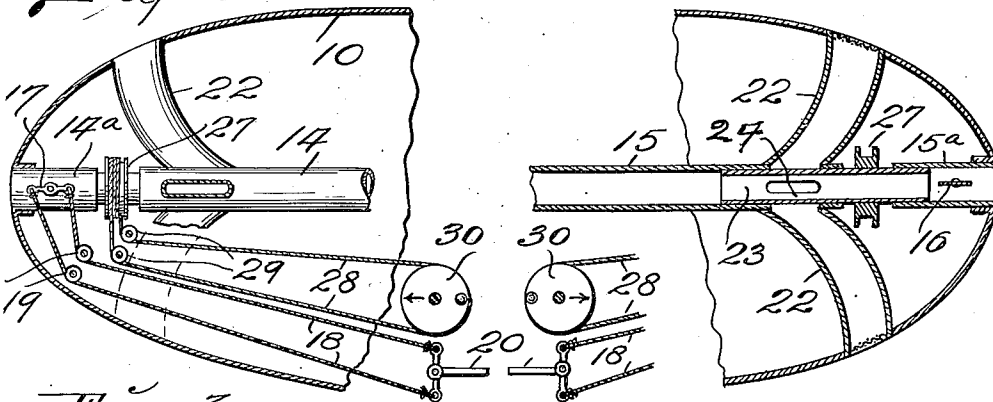


Fig. 3.

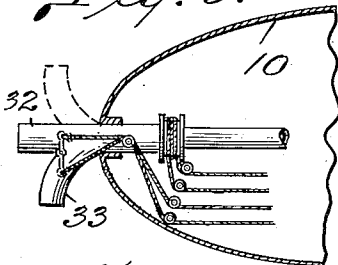
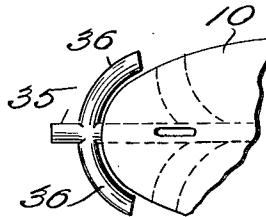
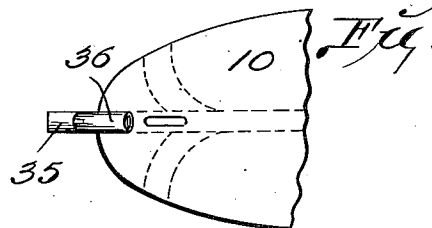
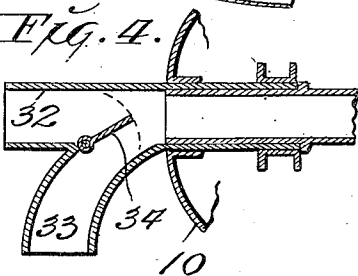


Fig. 4.



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## UNITED STATES PATENT OFFICE.

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## DIRIGIBLE-BALLOON DRIVE AND CONTROL.

Application filed October 31, 1921. Serial No. 511,667.

*To all whom it may concern:*

Be it known that I, WELLINGTON B. WHEELER, a citizen of the United States, residing at 726 Grosse Building, Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Dirigible-Balloon Drives and Controls, of which the following is a specification.

My invention relates generally to dirigible balloons and more particularly to the driving and controlling means therefor, the principal objects of my invention being to provide relatively simple, practical and efficient means for driving a dirigible balloon at a comparatively high rate of speed; and to construct and arrange said driving means so that it may be used for the positive and efficient control of the ascending, descending and lateral turning movements of the balloon.

A further object of my invention is to provide a construction that will wholly eliminate the driving propellers and steering planes and rudders that are ordinarily employed upon dirigible balloons and, further, to provide simple means that are under ready control of an operator for actuating the driving and controlling mechanism.

With the foregoing and other objects in view my invention consists in certain novel features of construction and arrangement of parts that will be hereinafter more fully described and claimed and illustrated in the accompanying drawings in which:

Fig. 1 is a side elevational view of a dirigible balloon of my improved construction and with parts broken away and in section.

Fig. 2 is a vertical section taken through the end portions of my improved dirigible balloon.

Fig. 3 is a sectional view taken through the end portion of a dirigible balloon and showing a modified form of the steering and control mechanism.

Fig. 4 is a vertical section taken through the center of the modified form of steering and control mechanism.

Figs. 5 and 6 are respectively side elevational and plan views of a further modified form of the driving and control mechanism.

Referring by numerals to the accompany-

ing drawings which illustrate a practical embodiment of my invention, 10 designates the body of a dirigible balloon that may be of the usual, or any desirable form and construction, and provided with suitable buoyant gas containers (not shown).

Located at a suitable point within the body 10 and upon a suitable base 11 is a motor 12, either electric or of the internal combustion type, and arranged adjacent thereto is a blower or suction fan 13 that is directly connected to said motor.

Leading from the inlet or suction side of the fan or blower to the forward end of the body of the balloon is an air suction pipe 14, that is preferably formed in two sections, with the shorter section 14<sup>a</sup> located in the forward end of the balloon body and spaced a slight distance away from the longer section.

Leading from the outlet side of the fan or blower to the rear end of the balloon body is an air pipe 15, preferably formed in two sections with the shorter section 15<sup>a</sup> located adjacent to the rear end of the balloon body and spaced apart from the longer section.

Arranged for operation within the pipe sections 14<sup>a</sup> and 15<sup>a</sup> are butterfly valves or dampers 16 and secured to the shafts upon which said dampers are mounted are lever arms such as 17. Connected to the ends of these lever arms are flexible members such as cords or cables 18 that pass around suitably located pulleys 19 and the opposite or inner ends of said flexible members are secured to operating levers 20 that are pivotally mounted at a suitable point, preferably within a cabin 21 that depends from the central portion of the balloon body.

Extending vertically and horizontally from the outer end portions of the longer sections of the pipes 14 and 15 are branch air pipes 22, the outer ends of which are open to the atmosphere at points on the outer surface of the balloon body near the ends thereof.

Arranged for rotation in the outer ends of the pipes 14 and 15 and in the inner ends of the shorter sections 14<sup>a</sup> and 15<sup>a</sup> are tubular members 23, and formed in each of said members is an opening 24 that is adapted to register with the open inner end of any of the adjacent branch air tubes 22 when members are rotated.

Fixed on each tubular member 23 between the long and short pipe sections 14 and 14<sup>a</sup> and 15 and 15<sup>a</sup>, respectively are small drums or pulleys 27, and passing around each pulley is a cord or cable 28 that passes over suitably located pulleys 29 and around a wheel 30 that is mounted for rotation within the cabin 21 preferably adjacent to the hand levers 20.

Each wheel 30 is provided with an operating handle and with a mark that serves as a guide to determine the angular position of the opening 24.

In the operation of my improved dirigible balloon driving and control mechanism, motor 12 is operated to drive fan or blower 13 and as a result a strong current of air is produced through the conduit comprising tubular members 14, 15, 14<sup>a</sup>, 15<sup>a</sup> and 23. By virtue of the current of air into the outer end of this conduit a partial vacuum is established directly in front of the "nose" or forward end of the balloon body and this condition, in connection with the strong blast of air forcibly expelled from the rear end of the conduit is effective in driving the balloon forwardly at a relatively high rate of speed. To control the speed of the balloon, levers 20 are manipulated to shift the position of the dampers 16 which regulate the flow of air through the conduit.

To cause the balloon to ascend, descend or move laterally during forward flight, dampers 16 are closed or partially closed and tubular members 23 are rotated by proper operation of wheels 30, so as to bring openings 24 into register with the open inner ends of certain of the branch pipes 22. Thus air may be forcibly expelled either upwardly or downwardly, or laterally in either direction from the rear end portion of the balloon body and at the same time air is drawn into the main conduit from above, below or from either side at the front end of the body. Such action causes said body to ascend, descend or turn laterally during forward flight. The body may also be caused to rotate as upon a vertical axis between its ends, or it may be caused to move bodily sidewise in either direction when approaching or leaving a landing stage or platform.

In the modified construction illustrated in Figs. 3 and 4, a tubular member 32 is arranged for rotary movement upon the end of the air conduit that extends through the balloon body and said member 32 is provided with a lateral branch tube 33. A damper 34 is arranged for operation within the member 32 so as to cut off the passage

of air straight therethrough, or through lateral branch 33.

Member 32 may be rotated so as to present branch 33 upwardly, downwardly or laterally in either direction, and when air discharges from said branch the balloon body will be correspondingly moved.

In the modified construction illustrated in Figs. 5 and 6, the ends of the main air conduit are provided with rotatably arranged tubular members 35, each of which carries a pair of oppositely disposed branch air discharge pipes 36, the latter being curved inwardly toward the balloon body. Such construction greatly facilitates the driving and control of the balloon.

Thus it will be seen that I have provided a relatively simple, practical and easily operated mechanism for driving and controlling the movements of a dirigible balloon which mechanism may be easily and cheaply installed and is very effective in performing its intended functions. Obviously minor changes may be made in the size, form and construction of the various parts of my improved driving and controlling mechanism without departing from the spirit of my invention, the scope of which is set forth in the appended claims.

I claim as my invention:

1. A dirigible balloon having a longitudinal air conduit therethrough, said conduit having adjacent each end a plurality of laterally directed branches leading to the atmosphere; single parted tubular valves coaxial with said conduit adjacent each end thereof, said valves being rotatably adapted to establish communication between said conduit and any one of said branches at their respective ends of said conduit; and means for maintaining a powerful air current through said conduit and its communicating branches.

2. A dirigible balloon having a longitudinal air conduit therethrough, said conduit having adjacent each end a plurality of laterally directed branches leading to the atmosphere; single parted tubular valves coaxial with said conduit adjacent each end thereof, said valves being rotatably adapted to establish communication between said conduit and any one of said branches at their respective ends of said conduit; means for maintaining a powerful air current through said conduit and its communicating branches; and dampers for controlling the axial intake and discharge of air from said conduit.

WELLINGTON B. WHEELER.