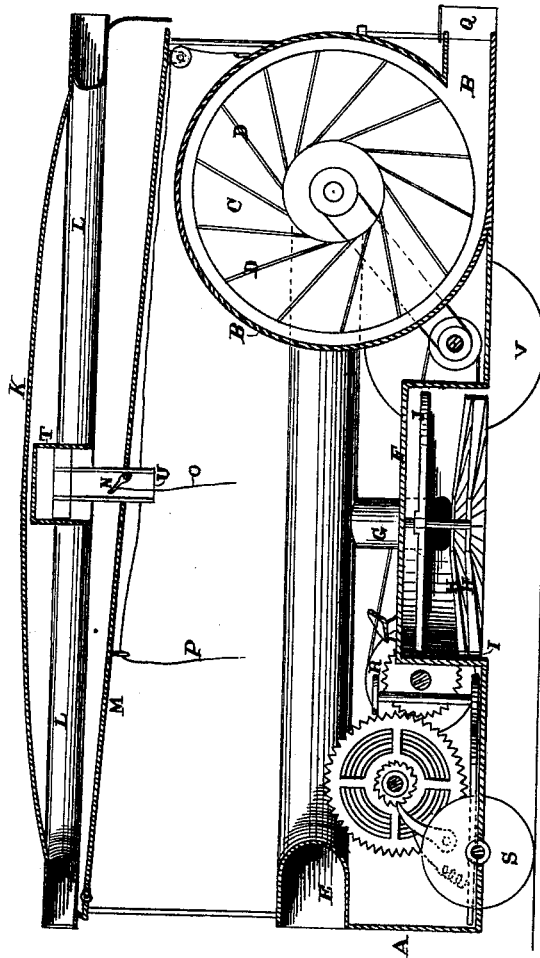


J. B. WARD.
AERIAL MACHINE.

No 195,860.

Patented Oct. 2, 1877

Fig. 1.



Witnesses
Geo. H. Strong
Jno. L. Bonnel

Inventor
John B. Ward
By Dewey & Co
Attys

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Fig. 2.

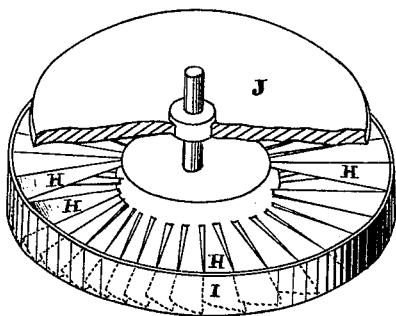


Fig. 3.

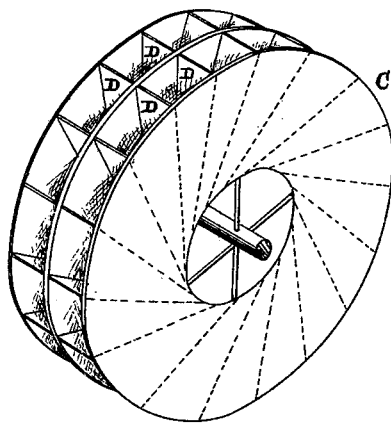
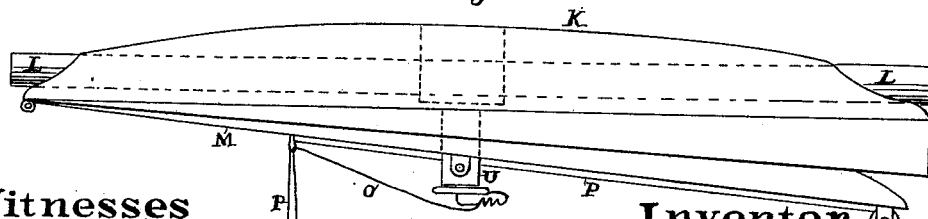


Fig. 4.



Witnesses
Geo. H. Strong.
Jno. L. Bone

Inventor
John B. Ward
By *Dewey & Co.*

Atty's.

UNITED STATES PATENT OFFICE.

JOHN B. WARD, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN AERIAL MACHINES.

Specification forming part of Letters Patent No. **195,860**, dated October 2, 1877; application filed May 23, 1877.

To all whom it may concern:

Be it known that I, JOHN B. WARD, of the city and county of San Francisco, and State of California, have invented an Aerial Machine; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings.

My invention relates to certain improvements in aerial machines; and they are more especially applicable to a machine for which Letters Patent were granted to me December 19, 1876, No. 185,465.

My invention consists in certain details of construction, which will be more fully described by referring to the accompanying drawings, in which—

Figure 1 is a longitudinal vertical section of the machine. Fig. 2 is a view of the elevating propeller or screw and gyroscopic wheel. Fig. 3 shows the construction of the gyroscopic fan-blower. Fig. 4 represents the inclined plane and its adjusting devices.

A is the body of my aerial vessel, having at its rear the propelling device, consisting, in the present case, of a fan-blower, B. The blower-wheel is, in this invention, made with a gyroscopic wheel, C, the weight of which at a high velocity will assist to preserve the equilibrium of the machine. This wheel or gyroscope is provided with the vanes or fans D, which are secured to or pass through it, so as to extend out upon each side. These fans or vanes are set at an angle of fifteen degrees, so as to give the most favorable angle for the exit of the air. The ingress-tubes E are similar in their arrangement to those described in my former patent; but in the present case each one supplies one side or half of the blower.

My elevating device consists, also, in my present machine, as in the former one, of a propeller or screw wheel, which is centrally situated and operates within a case, F. This case is closed at the top, and tubes G lead from the supply-tubes E into this case just above the propeller-wheel. This wheel is constructed in a peculiar manner, and consists of a series of vanes, H H, placed one above the other, and around the same central shaft. The second series of vanes take the air from the first as it passes through them, and the number may be indefinitely increased, so as to greatly increase the power,

while by mounting them as shown very little additional space is occupied. These vanes may be made adjustable, as is desired. A rim, I, surrounds the propeller-vanes, as shown. Above the propeller-wheel, and situated just above the level of the supply-tubes G, is placed the gyroscopic wheel J, which is mounted upon the same shaft, and is made heavy, so that when running at a high rate of speed it will act, in conjunction with the gyroscopic wheel C, to preserve the equilibrium of the vessel and prevent its being upset, and this will be more effectually done by this arrangement than when the gyroscopic and propeller wheels are combined in one.

My elevating, guiding, or directing plane for the apparatus consists of a frame or roof, K, arched at the top, and made considerably deeper at the rear than at the front. Large air-tubes L L extend through the upper part of this frame, and allow air to flow through while the machine is in motion, and thus reduce the surface which is presented to retard the motion, while at the same time a maximum of supporting-surface is presented, because the upper half of each tube acts in this capacity.

The plane M is hinged to the front of the frame K, and its rear end is made movable vertically, so that it may be adjusted to different angles. This plane is cushioned upon the air which is confined in the oscillating cylinder T, which is fitted into the frame K, above the center of the plane M. The piston-rod U of this cylinder is hollow, and a valve, N, in this piston-rod is controlled by a cord, O, so that the air may be allowed to escape at pleasure, and allow the plane to rise to the upper part. When this is done, the deep rim at the rear of the frame K is presented to the air as the machine moves through it, and serves to check its motion and assist it to alight. Valves or disks may be so connected with this plane that they will close the tubes, and thus offer a further resistance to the air. A second cord, P, is employed to bring the plane down to its position again when desired. By means of this elastic air-cushion the shock of alighting will be greatly reduced, as the slightest touch will cause the air to act upon the plane and force it downward, so as to relieve the shock.

The steering device consists of a double rudder, Q, moved by a horizontal yoke suitably

connected, so as to be turned by a steering-wheel, R, within reach of the operator. The rudders operate upon each side of the discharge from the propelling-blast, as in my former patent. The front steering-wheel S, which is in use while the machine is moving upon the ground, is mounted within a horizontal rim having a gear upon its outer edge, and a pinion upon a vertical shaft which carries the hand-wheel serves to turn it in any desired direction.

The driving mechanism for my machine is represented by gearing, pulleys, and springs; but in an actual machine I shall employ an engine made of light material, as aluminum, either employing air or air and steam in combination as a motor, in a manner which will be the subject of a future patent. The bearing-wheels V, I have, in the present case, placed within the hull of the vessel, so that only the lower half will be exposed to the action of the air through which the machine is passing, and whatever friction may be developed will be in favor of the progress of the machine, by reason of the direction of the rotation.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The gyroscopic wheel C, turning upon a horizontal axis, in combination with the double set of vanes D, forming a fan-blower, said vanes being set at an angle, as shown, and operating in combination with the supply-openings E and discharge, substantially as herein described.

2. The compound screw, consisting of a series of radial vanes, H H, surrounding the same center, and placed in line with and above each other, so as to form continuation of the first, substantially as and for the purpose described.

3. The guiding or directing plane M, hinged to the front of the frame or rod K, and provided with the air-cylinder T to contain air, upon which it is cushioned, substantially as herein described.

4. The directing-plane M, with its air or cushion cylinder T, in combination with the hollow piston-rod and the escape-valve N, substantially as and for the purpose herein described.

5. The frame or case K, made deeper at the rear than at the front, so that the plane M may stand at an incline, or be forced upward into the frame and expose the rear rim, substantially as described.

6. The frame or case K, in combination with the air tubes or passage L L, passing longitudinally through it to reduce resistance and increase the supporting-surface, substantially as herein described.

In witness whereof I have hereunto set my hand and seal.

JOHN B. WARD. [L. S.]

Witnesses:

GEO. H. STRONG,
FRANK A. BROOKS.