2 Sheets--Sheet 1.

P. B. FERNANDEZ.

Aerial and Marine Gyrator.

No. 161,772. Patented April 6, 1875.

Fig. 1.

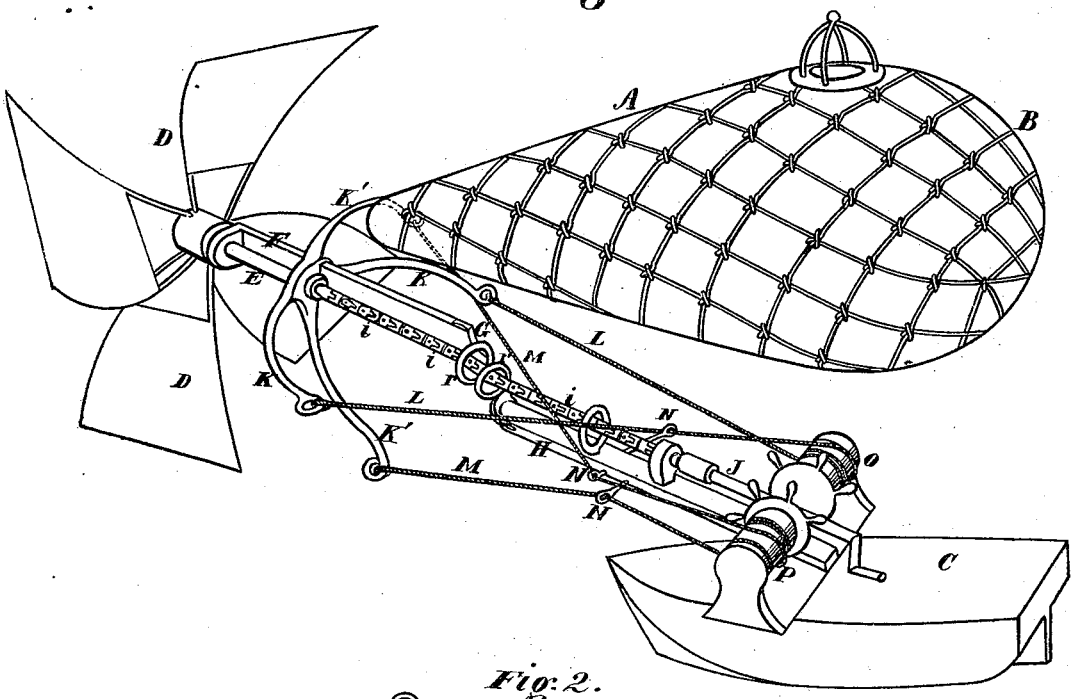
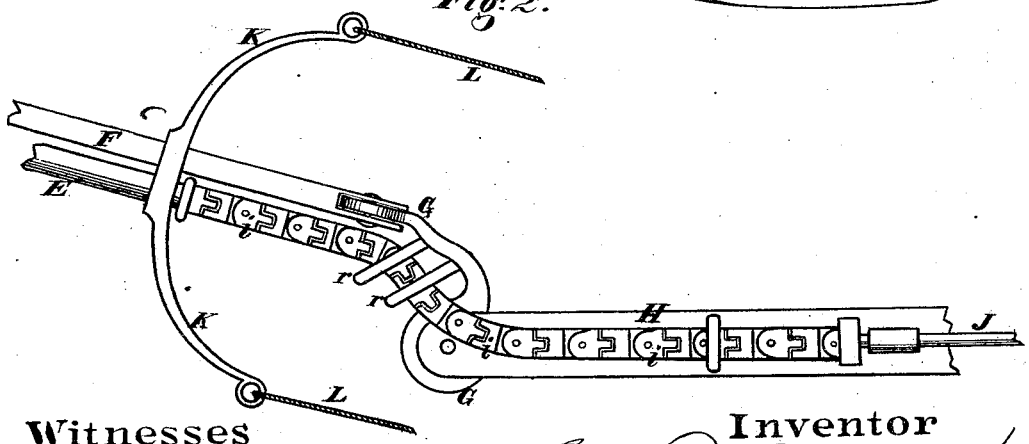


Fig. 2.



Witnesses
Geo. H. Strong
Jno. L. Boone

Inventor
Peter B. Fernandez
by Dewey & Co
Attys

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

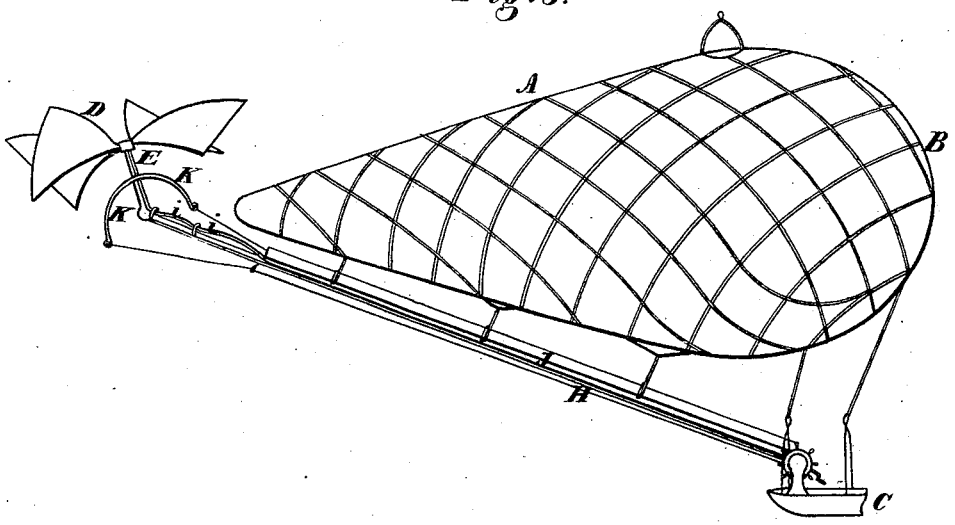
2 Sheets--Sheet 2.

P. B. FERNANDEZ.

Aerial and Marine Gyrator.

No. 161,772. Patented April 6, 1875.

Fig. 3.



Witnesses
Geo. H. Strong
Jm. L. Boone

Inventor
Peter B. Fernandez
by Dewey & Co
Attys

THE GRAPHIC CO. PHOTO-LITH. 39 & 41 PARK PLACE, N.Y.

UNITED STATES PATENT OFFICE.

PETER B. FERNANDEZ, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN AERIAL AND MARINE GYRATORS.

Specification forming part of Letters Patent No. **161,772**, dated April 6, 1875; application filed February 2, 1875.

To all whom it may concern:

Be it known that I, PETER B. FERNANDEZ, of San Francisco city and county, State of California, have invented an Aerial and Marine Gyrator; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention without further invention or experiment.

The object of my invention is to provide a novel device and arrangement of mechanism by which I am enabled to govern and direct the motions of a propeller-wheel, whether it be used in the air or water, so that it can be rotated at any angle; and by this means the balloon or vessel with which it is connected can be gyrated or turned in any direction, and within a very short space, or steered without a rudder. My invention also relates to a novel construction of the gasometer and the manner of attaching the car and propeller, and their relative positions, so that the weight of the car shall be suspended from the most buoyant part of the gasometer, while the propeller shall be operated in front of the smaller and less buoyant end, where its action will be most easily felt, and where, also, it will break the force of the head wind. In order to drive my propeller with facility in any of its positions, I employ a peculiar jointed shaft, which extends from the propeller to the motive-power within the car.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1, Sheet 1, is a view of my device with the operating mechanism made large in proportion to the bottom. Fig. 2, Sheet 1, is an enlarged view of the flexible shaft and joint. Fig. 3, Sheet 2, shows a more just proportion of parts and the method of turning the propeller.

A is the gasometer or balloon of my aerial apparatus, and it is made of an elongated conical form, having its front end reduced to as near a point as possible, while the rear end has a hemispherical head, B. The suspending netting is so arranged that the balloon will stand with its major axis horizontal, and the car C is suspended beneath the larger and more buoyant portion of the gas-holder. This will retain it in this position unless changed by the action of the propeller D. This propeller may be made in any suitable form, but I have found that, by curving the blades, so that their front presents a convex surface, I can obtain good results. The propeller is mounted upon a short rigid shaft, E, which turns in boxes upon a frame or bar, F. The rear end of this bar is connected by a hinge-link, G, admitting of motion in any direction, with the forward end of an inclined bar, H, which extends down to the car, and by means of which the whole device is suspended along the lower side of the gasometer. The short shaft E is driven by means of a suitable power within the car; and, in order to admit of a free movement of the propeller, by means of the universal joint G, it will be manifest that a flexible connecting-shaft must be employed at that point. This shaft I make by using short sections *i* similar in size to the rigid part of the shafting. These sections are made so as to be hinged together, each section having the sections at its opposite ends bending at right angles to each other, so as to form a strong shaft, which will at the same time work freely and smoothly whatever angle the propeller may stand at. Guides *r r* at the universal joint support the flexible part of the shaft. The portion of the shaft J which extends from near the joint G down into the car may be made rigid. In order to move the frame F and the propeller with facility, I employ four arms, K, which project from the frame F, and are slightly curved backward. Each arm has an eye at its outer end, to which cords L L M M are secured, and lead through fair leader N down to two windlasses or drums, O and P, as shown. These drums are suitably mounted upon the front end of the boat or car, and the cords L L are lead to one drum, passing around it in opposite directions, so that, when one cord is pulled the other will be slackened off, and one of the arms K will be drawn down, while the other will be allowed to move in the opposite direction. In the same manner the cords M M will operate upon the arms K′ K′, so that, by moving either or both pairs of arms more or less, the pro-

peller can be made to stand at any desired angle, and, by means of the flexible shaft, it will be seen, that it can be easily rotated. It will also be manifest that the same arrangement can be applied to move the propellers of vessels, in which case the drums will be so arranged as to allow their operating-shafts to pass water-tight into the hold of the vessel, and the flexible shaft must also pass through a stuffing-box.

In the formation of my gasometer for an aerial machine, I propose to make a horizontal diaphragm, extending through from end to end. The space above this diaphragm will contain gas, while the space below may be filled with air. Whenever the gas expands, I allow it to enter the lower compartment and drive out the air, but when it contracts into the upper compartment air will be again admitted to the lower one, so as to keep the gasometer always distended.

In attaching the propeller to a submarine vessel, water and air would take the place of air and gas in the aerial machine for the purpose of raising or depressing the vessel.

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

1. The gasometer A, made conical, as shown, and having the car C suspended beneath the larger and more buoyant end, while the propeller D is placed in front of the smaller end, so that it can be turned to greater angles and control the movements of the balloon, substantially as herein described.

2. The propeller D, constructed as shown, and mounted upon the frame F, having a universal-joint connection, G, with the inclined bar H, so that it can be turned in any direction, substantially as herein described.

3. The arms K K′, extending from the frame F, and provided with the cords L and M, together with the drums O and P, placed within the car for the purpose of turning the propeller, substantially as herein described.

4. The flexible shaft, consisting of the cylindrical jointed sections *i i*, united as shown, and passing through the guides *r r* at the joint G, so as to unite the rigid shafts E and J and rotate the propeller in any position, substantially as herein described.

5. An aerial machine, consisting of the gasometer A, having the car C and propeller D attached to it relatively, as shown, and united by the inclined bar H, said propeller being so mounted as to allow it to be turned in any direction, and rotated, by means within the car, through the medium of a flexible shaft, *i i*, substantially as herein described.

PETER B. FERNANDEZ.

Witnesses:
JNO. L. BOONE,
C. M. RICHARDSON.