

UNITED STATES PATENT OFFICE.

RUSSELL THAYER, OF PHILADELPHIA, PENNSYLVANIA.

DIRIGIBLE BALLOON.

No. 887,443.

Specification of Letters Patent.

Patented May 12, 1908.

Application filed December 26, 1907. Serial No. 408,002.

To all whom it may concern:

Be it known that I, RUSSELL THAYER, of Philadelphia, in the State of Pennsylvania, have invented a certain new and useful Improvement in Dirigible Balloons, whereof the following is a specification, reference being had to the accompanying drawings.

In sailing a marine vessel, the effect of the wind pressure is controllable by utilizing the reactive effect of the water upon the vessel whereas, in ordinary balloons, there is no equivalent for the reactive effect of the water, and consequently such balloons must go with the wind unless provided with more powerful propelling means.

Therefore, it is an object of my invention to provide a balloon with means whereby a reactive force may be created and controlled local to the balloon, at the will of the operator, so as to be similar in effect to the reactive force of the water upon a marine vessel, in that by properly utilizing it, the balloon may be progressed, solely by wind pressure, in directions oblique with respect to the direction of the wind.

I have discovered that by utilizing the reactive gyroscopic force manifested upon any attempt to change the direction of the axis of a rotary body, in combination with the wind pressure upon a balloon floating in the atmosphere and carrying said body; that the movement of the balloon may be variably determined and controlled by correlation of the force developed by the gyroscope and the force of the air current. In other words, my invention provides means whereby wind pressure tending to diverge a balloon from a predetermined direction of traverse may be variably opposed by the gyroscopic effect of a rotary body carried by the balloon, under control of the operator, so that such wind pressure may be utilized to propel the balloon, in directions oblique to the direction of the wind pressure, as in ordinary marine navigation.

The gyroscopic reactive effect above contemplated is due to the fact that a rotary body tends to maintain constant its plane of rotation and consequent direction of its axis of rotation, such effect being increased or diminished in correspondence with the speed of rotation of the body. However, it is important to note that to render such reactive effect available as herein contemplated it is necessary to so mount the rotary body that its axis of rotation is free to oscillate, to a

limited extent, in a direction parallel with the direction of said axis, for, when a body rotating upon a principal axis is subjected to a force tending to produce another rotation not parallel to the former, the resultant effect is such displacement of the axis of the original rotation, with respect to its support, as is most favorable to the parallelism of the two rotations, and, such displacement is at right angles to the direction of the disturbing force.

In a balloon constructed in accordance with my invention as hereinafter described, the force due to the natural air drift, and the gyroscopic force created by controlled rotation of a suitable body carried by the balloon, may be so correlated, at the will of the operator, as to propel the balloon solely by the wind pressure, and in any direction except that directly and approximately opposed to such pressure.

I am of course aware that gyroscopes have been employed for many years and in various arts to balance or maintain the level or equilibrium of structures connected therewith, and therefore note that the gyroscope element of my invention has no such function or effect in the arrangement and operation which are characteristic of my invention as herein defined. I am also aware that it has been proposed to provide a marine vessel with gyroscopic wheels, but such wheels have been designedly arranged to maintain the horizontal planes of the vessel substantially stable, without opposing changes in the direction of traverse of the vessel. In other words, such devices of the prior art have been employed for a purpose radically different from that herein contemplated, and have been so constructed and arranged as to be incapable of the effects which are characteristic of my invention.

My invention comprises the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawings; Figure I, is a side elevation of a balloon conveniently embodying my invention. Fig. II, is an inverted plan view of the balloon shown in Fig. I. Fig. III, is a plan view of the car shown in Fig. I. Fig. IV, is a transverse sectional view of said car, taken on the line IV, IV, in Fig. III.

In said figures; the gas envelop 1, which is of circular cross section, diminishing toward its stern, is conveniently connected by the bands 2, with the main frame 3. Said