

W. DIETER,  
GYROSCOPIC DEVICE,  
APPLICATION FILED APR. 3, 1915.

1,148,154.

Patented July 27, 1915.

Fig. 1.

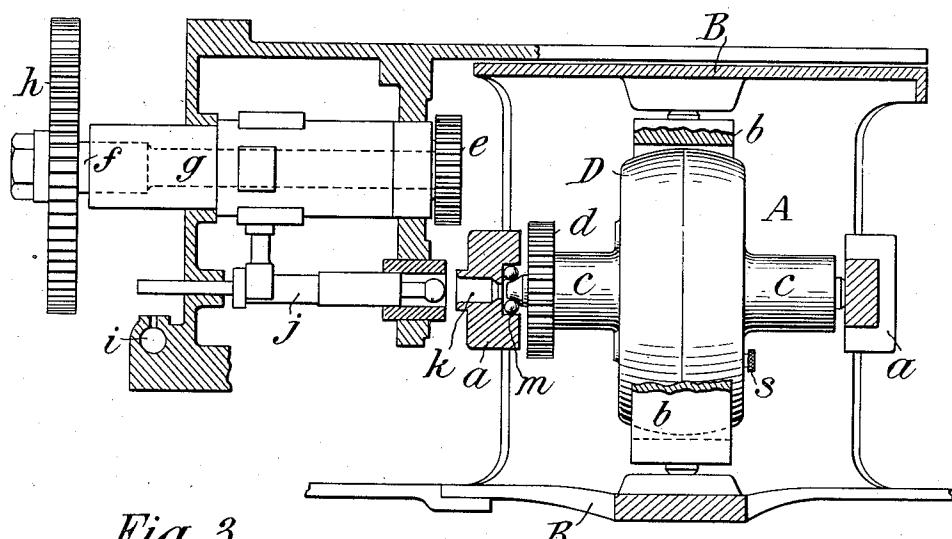


Fig. 3.

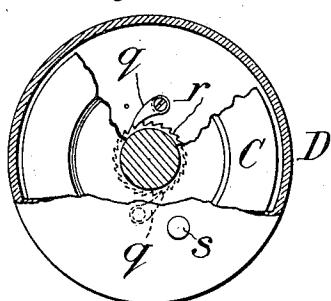
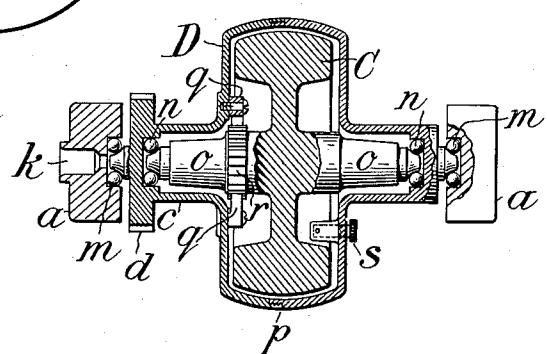


Fig. 2.



INVENTOR

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# UNITED STATES PATENT OFFICE.

WILLIAM DIETER, OF NEW YORK, N. Y., ASSIGNOR TO E. W. BLISS COMPANY, OF BROOKLYN, NEW YORK, A CORPORATION OF WEST VIRGINIA.

## GYROSCOPIC DEVICE.

1,148,154.

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*To all whom it may concern:*

Be it known that I, WILLIAM DIETER, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city 5 and State of New York, have invented certain new and useful Improvements in Gyroscopic Devices, of which the following is a specification.

This invention relates to gyroscopes such 10 as are used for controlling the steering of automobile torpedoes and for other analogous purposes. In such gyroscopes the fly-wheel is spun up at the outset by any suitable impelling means, such as an air-im- 15 pelled turbine, and is then set free and permitted to spin during such time as may be requisite. It is desirable to prolong as much as possible the effective period during which the fly-wheel remains spinning. To 20 this end it is desirable to eliminate the retarding effect of the atmosphere by causing the fly-wheel to spin in a vacuum. It has been found that under otherwise equal conditions the gyroscopic fly-wheel spun in a 25 vacuum will maintain an effective speed for three or four times as long a period of time as when spun in the open air.

The present invention aims to construct a 30 gyroscope which will enable this advantage to be availed of.

Figure 1 of the accompanying drawings shows a gyroscope and its spinning apparatus as used in the Bliss-Leavitt torpedo, the view being a vertical section partly in elevation; Fig. 2 is a vertical transverse section through the gyroscope, the plane being the same as in Fig. 1; Fig. 3 is a transverse section showing the casing and fly-wheel partly broken away.

Referring to Fig. 1, the gyroscope A has 40 its rotative member pivoted, in ball bearings as is customary, in an inner gimbal ring *a* which is shown as occupying a horizontal plane, and which in turn is pivoted 45 in the usual manner on a horizontal axis in an intermediate gimbal ring *b*, the latter being pivoted on a vertical axis to a supporting frame B. The hub portion *c* of the gyroscope is shown as carrying a gear or 50 pinion *d* which at the time of spinning is engaged by a pinion *e* on a shaft *f* which is inclosed in a sliding sleeve *g*, and this shaft carries a turbine *h* which in its operative 55 position receives jets of air from a nozzle *i* for spinning the turbine and through the

gearing spinning the gyroscope. A bolt *j* has a ball end which enters a socket *k* for holding the gimbal rings stationary during spinning. So far as described this is a customary construction and involves no novelty, and may be replaced by any other known or suitable gyroscope-spinning mechanism.

The present invention will now be explained with particular reference to Figs. 65 2 and 3.

The fly-wheel C instead of being exposed as usual, is inclosed in a casing or shell D, on which latter are formed the hub portions *c c*, which hub portions have pivots turning 70 in the ball bearings *m* in the gimbal ring *a*. The fly-wheel has axial portions *o o* within such hub portions *c c* and pivoted therein by means of ball bearings *n n*, as clearly shown in Fig. 2. The shell D incloses the fly-wheel 75 so as to leave a free space between. The shell may be variously constructed, it being feasible to make it in halves having a screw joint at *p*. In order that the spinning of the shell D through its pinion *d* shall also spin up the 80 inclosed fly-wheel, any suitable intervening connection may be provided, that shown consisting of pawls *q q* loosely pivoted within the shell and engaging a ratchet wheel *r* attached to the fly wheel. The shell D is 85 provided at *s* with any suitable valve or cap whereby connection may be made with an exhaust pump for exhausting the air from within the shell to produce the desired 90 vacuum.

In operation, the pump connection is made and the air exhausted from within the shell and the pump disconnected, the valve connection *s* being then tightly capped over to preserve the vacuum. This preparation 95 having been made, the gyroscope is then prepared for spinning, and in operation is spun up in precisely the ordinary manner. In so doing the rotation imparted by the spinning device to the shell D is transmitted through 100 the pawls and ratchet to the fly wheel, so that the latter spins up at the same rate and to the same speed. After unlocking, the gyroscope functions in the ordinary and well known manner. The only difference is that instead of the speed running down with the same rapidity as when spinning in air, it falls much more slowly, so that an effective speed is maintained for probably three or 105 four times as long. The shell being exposed 110

to retardation by the surrounding air, soon begins to lag behind the fly wheel, and this is permitted by the pawls, which click idly over the ratchet teeth as the latter turns 5 faster than the pawls.

The invention may be modified in many ways, as will be apparent to those skilled in mechanical design, but without departing from the essential feature of the invention.

10 I claim as my invention:—

1. A gyroscope comprising a fly wheel, a rotatable shell or casing inclosing the fly wheel and adapted to be exhausted of its contained air, and means for simultaneously 15 rotating the shell and fly wheel.

2. A gyroscope comprising a fly wheel, a rotatable shell or casing inclosing the fly wheel and adapted to be exhausted of its contained air, and means for rotating the

shell, the shell and fly wheel having reciprocally engaging means whereby the rotation of the shell shall rotate the fly wheel. 20

3. In a gyroscope, a fly wheel, a shell inclosing it adapted to be exhausted of its air, and a ratchet and pawl connection between the shell and fly wheel. 25

4. In a gyroscope, a fly wheel, a shell inclosing it adapted to be exhausted of its air, ball bearings between the fly wheel pivots and the shell, and a gimbal ring in which 30 the shell is pivotally mounted.

In witness whereof, I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM DIETER.

Witnesses:

FOSTER M. RHODES,  
P. MULLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."