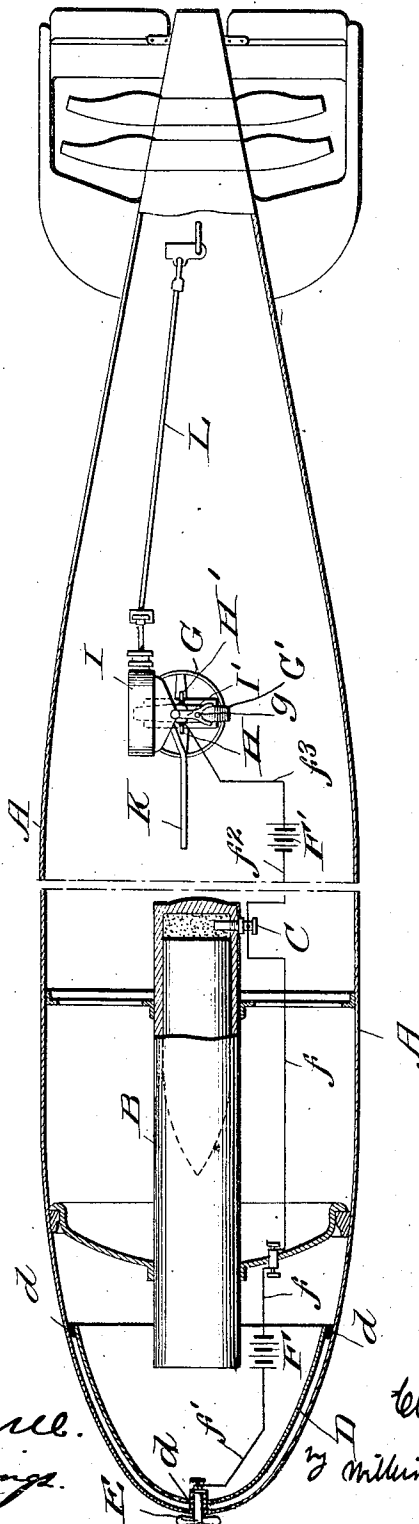


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 GYROSCOPICALLY CONTROLLED TORPEDO FIRING APPARATUS.  
 APPLICATION FILED MAY 9, 1910.

972,064.

Patented Oct. 4, 1910.  
 2 SHEETS—SHEET 1.

Fig. 1



Witnesses

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*B. B. Collins.*

Inventor

*Cleland Davis,*

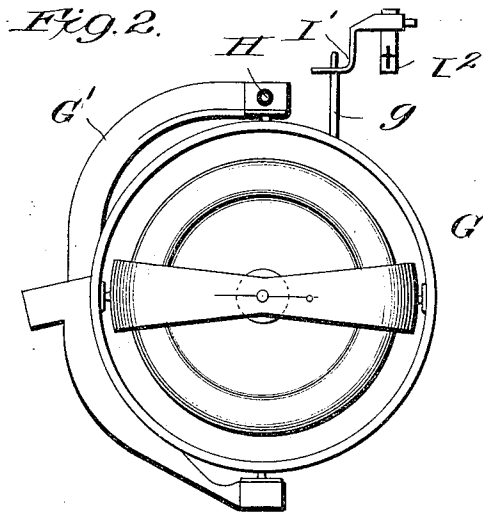
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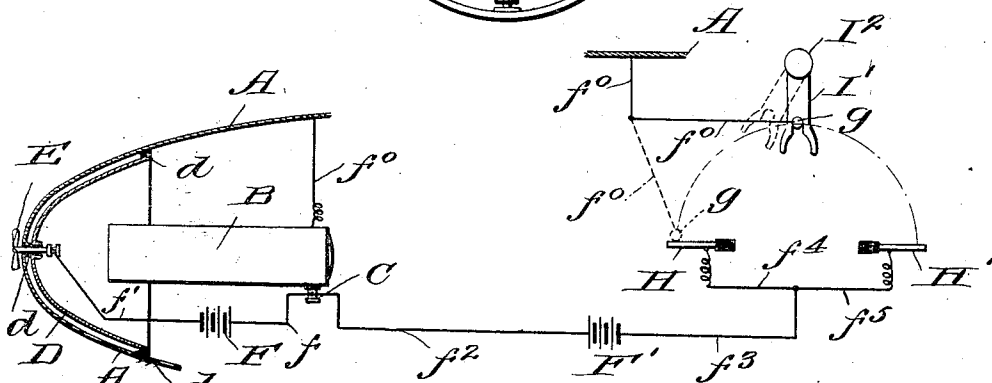
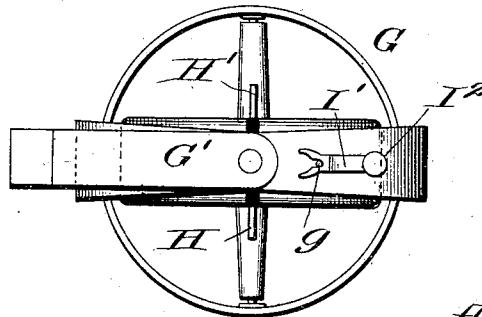
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2 SHEETS-SHEET 2.



*Fig. 3.*



Witnesses  
*Geo. A. Byrne.*  
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*Fig. 4.* Inventor *Cleland Davis,*  
by *William Fisher Witherspoon,*  
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# UNITED STATES PATENT OFFICE.

CLELAND DAVIS, OF THE UNITED STATES NAVY.

GYROSCOPICALLY-CONTROLLED TORPEDO-FIRING APPARATUS.

972,064.

Specification of Letters Patent.

Patented Oct. 4, 1910.

Application filed May 9, 1910. Serial No. 560,171.

*To all whom it may concern:*

Be it known that I, CLELAND DAVIS, lieutenant-commander, U. S. Navy, a citizen of the United States, stationed at Washington, in the District of Columbia, have invented certain new and useful Improvements in Gyroscopically-Controlled Torpedo-Firing Apparatus; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to improvements in automatic firing apparatus for torpedoes, and while specially designed for use in torpedoes carrying a gun constructed according to the inventions shown in my patent applications, Serial Number, 383,814, filed July 15, 1907; and 398,479, filed October 21, 1907; they may also be adapted to firing the high explosive charge of an ordinary automobile torpedo, such as the Whitehead or Bliss.

According to this invention, I add to the means shown for firing the torpedo gun by electricity, disclosed in my Patent Number 914,371, granted March 2nd, 1909, independent means operated by a gyroscope for automatically firing the torpedo or the torpedo gun when the automobile torpedo swerves beyond a predetermined angle from its original course.

It is well known, even in ships acting singly, that a torpedo with a war head on is liable to return to the ship from which it was fired. Such instances have been had occasionally and although so far no accidents have actually happened, there is always a danger of such; and this danger is largely increased when launching torpedoes in fleet formation, when the torpedo, returning owing to the gradual continuous deflection is liable to strike one of the ships of the fleet firing said torpedo. To protect against this, I provide an arrangement operated by the action of a gyroscope, in which when the torpedo swerves through a predetermined angle, say 90°, from its original course, an electrical contact is made by said gyroscope, completing a circuit through an electric primer and firing the gun or torpedo. For this purpose a separate gyroscope may be used, but since all modern automobile torpedoes are provided with the Obry attachment, it will be more convenient to use the

gyroscope already placed in the torpedo not only for the original purpose of steering the torpedo, but for the additional purpose of firing the same should the torpedo escape from the control of the steering mechanism governed by said gyroscope.

My invention will be understood by reference to the accompanying drawings in which the same parts are indicated by the same letters throughout the several views.

Figure 1, shows a sectional diagram through an automobile torpedo most of the complicated mechanism contained therein being omitted, and the center of the torpedo being cut away, as shown; Fig. 2, is an elevation of the gyroscope used in the Obry gear; Fig. 3, is a plan view of the gyroscope shown in Fig. 2; and, Fig. 4, is a diagram showing the electric connections.

A represents the shell of the torpedo in which is mounted the gun B. The said gun, of course, being in electrical connection with said shell. C represents an electric primer for firing said gun.

D represents an inner shell in the head of the torpedo, insulated from the outer shell and from the priming device E by suitable insulation *d*. The action of this priming device is fully described in my Patent Number 914,371, granted March 2nd, 1909, entitled "Firing means for torpedoes," and it will not be further described herein.

F represents an electric battery, such for instance, as a dry cell battery, whose terminals are connected by the wire *f* to the primer C, and by the wire *f'* to the pin E. A similar battery F' is provided, connected by the wire *f*<sup>2</sup> to said primer C and by the wire *f*<sup>3</sup> and wires *f*<sup>4</sup> and *f*<sup>5</sup> to the insulated pins H and H', respectively, which are carried by the frame G' of the gyroscope G. The frame of this gyroscope will accordingly be electrically connected to the shell of the torpedo.

I represents the steering engine, which is controlled by the forked arm I', connected to the steering engine valve I". The pin *g* carried by the outer ring of the gyroscope G normally projects into this fork and since the gyroscope tends to maintain its plane of rotation, if the torpedo swerves to the right or left, this forked arm will be rocked to the right or left by said pin, causing the engine to push or pull the steering rod L, and moving the steering rudders in one direction or

the other, all as is well known in the torpedo art. It will be noted that when the torpedo swerves through a large angle from its original course, this pin *g* will become disengaged from said fork and the steering engine and the gyroscope will no longer control the steering of the torpedo, and its course, therefore, is liable to be very erratic and to prove a source of danger to friendly vessels, as aforesaid.

Now by providing the insulated pins *H* and *H'* connected to the battery *F'*, as aforesaid, if the torpedo swerves to the right or left through a sufficient angle, the fork *I'* will disengage itself from the pin *g* and one or other of the insulated pins *H* and *H'* will be swung, through the lateral motion, of the torpedo, into contact with the pin *g* and will complete the circuit from the battery *F'* through the primer *C*, the conductor *f'*, pin *H* (or *H'*), wires *f<sup>1</sup>* (or *f<sup>2</sup>*), and *f<sup>3</sup>* to the battery *F'*, completing the circuit and firing the primer, as shown in Fig. 4. In this diagram, the conductors represented by *f<sup>0</sup>* are really parts of the skeleton or machinery of the torpedo.

In the diagram shown in Fig. 4, I have shown the torpedo as swinging through about 90° before the pin *g* will strike either the pin *H* or *H'*; but these pins *H* and *H'* may be set at an acute or obtuse angle with the pin *g*, if desired, so that the gyroscope will be automatically caused to fire the torpedo when it is swerved through a greater or less angle from its original course, as may be desired. It will thus be seen that I provide means whereby the torpedo will be fired on striking the enemy, or whereby it will be automatically fired when it has so swerved from its course as to be a source of possible danger to the friendly ship or fleet.

As before stated, a special gyroscope may be used for controlling the firing attachment, but it is preferable to use the one already installed for controlling the steering engine, not only to save the expense and inconvenience of duplicating parts, but also because when this gyroscope is doing its duty controlling the steering rudders it is not needed in the firing mechanism; but when, owing to the swerving of the torpedo from its original course it has outlived its usefulness in controlling the steering engine,

then it still serves to fire the torpedo when this swerving becomes excessive.

I do not mean to limit the invention to any particular form or arrangement of firing mechanism, but

I claim broadly as my invention:—

1. The combination with a torpedo carrying an explosive charge, of a gyroscope mounted in said torpedo, and means actuated by said gyroscope for firing said charge when the torpedo is deflected through a predetermined angle from its original course.

2. The combination with a torpedo, provided with an explosive charge, and an electric primer adapted to fire said charge, of a gyroscope, an electric battery, an electric connection between said gyroscope and said electric primer, and means controlled by said gyroscope for closing said electric circuit when the torpedo is swerved through a predetermined angle from its original course, substantially as described.

3. The combination with a torpedo provided with an explosive charge and an electric primer adapted to fire said charge, of an electric battery and an electric circuit through said primer, with means for automatically closing said circuit when the nose of the torpedo strikes the target, a second electric battery connected to said primer and gyroscope, an electric circuit connecting said primer and said gyroscope, and means controlled by said gyroscope for closing said second electric circuit when the torpedo is swerved through a predetermined angle from its original course.

4. The combination with a torpedo provided with an explosive charge, an electric primer for exploding said charge, a steering engine and an Obry gear for operating said steering engine of an electric battery with an electric circuit connecting said primer and said Obry gear, and means controlled by said Obry gear for closing said electric circuit when the torpedo swerves through a predetermined angle from its original course.

In testimony whereof, I affix my signature in presence of two witnesses.

CLELAND DAVIS.

Witnesses:

T. A. WITHERSPOON,  
R. M. PACKER.