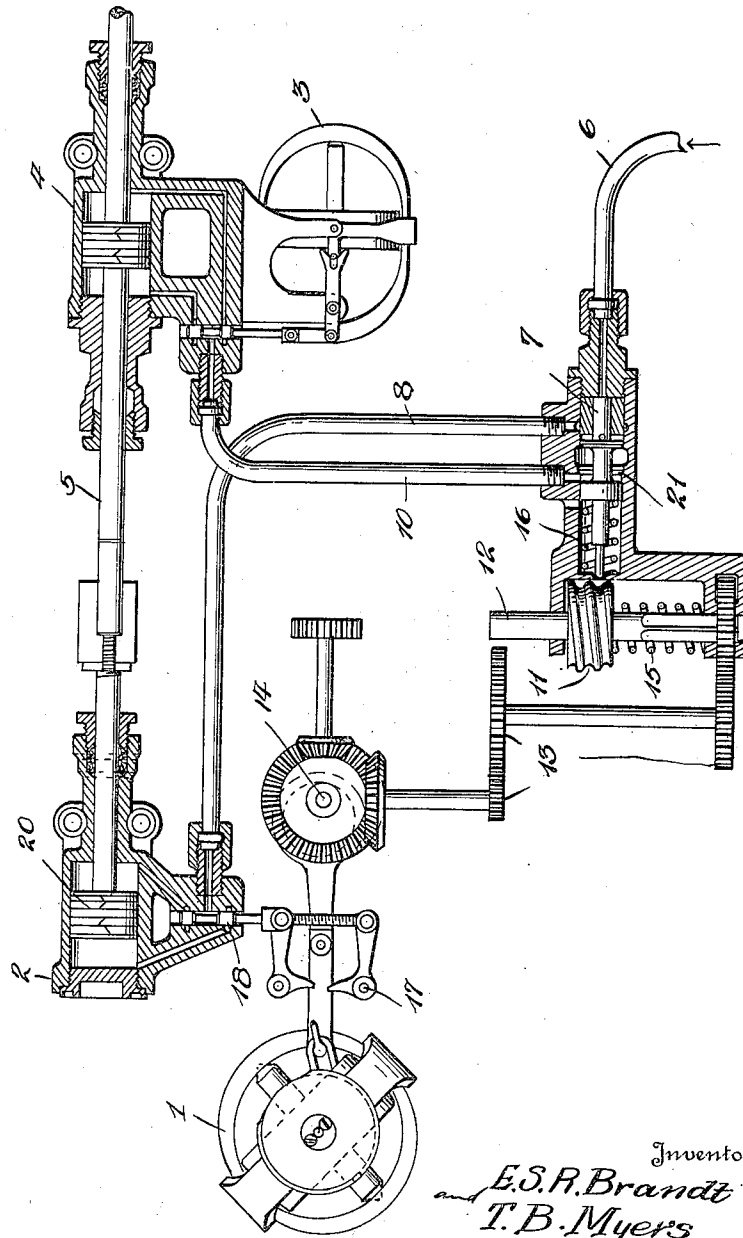


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E. S. R. BRANDT ET AL.  
TORPEDO.  
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Inventor  
E. S. R. Brandt  
and  
T. B. Myers  
*R. Blair*  
Attorney

By

## UNITED STATES PATENT OFFICE.

EDMUND S. R. BRANDT, OF NEWPORT, RHODE ISLAND, AND TOM B. MYERS, OF MARSHALL, TEXAS.

## TORPEDO.

Application filed May 7, 1921. Serial No. 467,642.

*To all whom it may concern:*

Be it known that we, EDMUND S. R. BRANDT and TOM B. MYERS, citizens of the United States, and residents of Newport, Rhode Island, have invented certain new and useful Improvements in Torpedoes, of which the following is a specification.

This invention relates to improvements in torpedoes and more particularly to the steering mechanism.

One of the objects of the present invention is to provide a simple and practical mechanism associated with the steering engine of a torpedo whereby the torpedo will be made to take a course at a predetermined angle with respect to the ship from which it is fired after a predetermined time, for instance, it may be desirable to launch a torpedo broadside with respect to the ship and after it has traveled a thousand yards to get well clear from the column in which the ship may be sailing it will then follow a course parallel to the course of the ship either forward or aft according to the setting of the mechanism.

A further object is to provide a mechanism of the above general character which may be inexpensively manufactured and installed in torpedoes now in general use without materially modifying or affecting the other elements usually positioned in the after-body.

Other objects will be in part obvious and in part hereinafter pointed out in connection with the accompanying sheet of drawings which shows a diagrammatical and partial sectional elevation of such parts of the steering mechanism of a torpedo as is necessary for those skilled in the art to fully understand the invention.

This drawing will hereinafter be described with reference to that type wherein it is proposed to employ a mechanism designed to change the course of a torpedo after it has run a distance from the point of firing say 500 or 1000 yards whereupon it takes a new predetermined course and continues on that course until exhausted. To accomplish this purpose there are preferably employed two gyros one of which is spun and unlocked parallel to the axis of the torpedo tube from which the torpedo is fired and the other is spun and unlocked at a predetermined angle with respect to the tube and parallel to the new predetermined course that the torpedo is to take. A timing mech-

anism and valve is provided which permits the first gyro to control the torpedo for a certain distance agreed upon whereupon the second gyro is given control to turn the torpedo on its new course and keep it on such course throughout the balance of the run.

In this drawing gyro 1 is adapted to control the operation of steering engine 2 while gyro 3 controls the operation of steering engine 4 both common to and acting upon a shaft 5 directly connected with the vertical steering rudder in the usual well-known manner.

These gyros are preferably located in the after-body, one behind the other and may be of any desired type, the gyro 1, however, being preferably provided with means for setting for curved fire. The air for controlling these steering engines 2 and 4 is admitted through pipe 6 to valve mechanism 7 thence through pipes 8 and 10 to the steering engines 2 and 4. This valve 7 is controlled by means of a timing mechanism preferably consisting of a drum 11 mounted upon shaft 12 rotated through a system of reducing gears 13 driven from turbine shaft 14. A return spring 15 acts upon one side of the drum for purposes hereinafter explained while a second spring 16 tends to urge the valve mechanism 7 normally towards the right as shown in Figure 1.

As the steering engines, gyros and method of control are all so well-known to those skilled in the art a detailed description thereof is believed to be unnecessary. It is sufficient to state that the pallet mechanism 17, for example, controls the admission of air by means of valve 18 to one side or the other of piston 20 causing the shaft 5 to move to the right or left thus keeping the torpedo on its course.

The operation of this device is substantially as follows:—The gyro 3 is spun and unlocked in the plane of the torpedo tube while the gyro 1 is spun and unlocked in a plane parallel to the new course the torpedo is to take. The air entering through the pipe 6 forces the valve 7 forward until its stem engages the drum 11. In this position the valve 7 covers the port to the pipe 8 stopping air supply to the steering engine 2 but air passes through the valve 7 and supplies the engine 4 through the pipe 10 allowing the gyro 3 to steer the torpedo. As the drum 11 turns it advances against

the return spring 15 until the stem of the valve 7 runs off the drum allowing the valve 7 to close against its seat 21 thereby stopping a further supply of air to engine 4 and opening the port to the pipe 8 thereby to supply air through this pipe to steering engine 2. The gyro 1 thereupon takes control turning the torpedo onto its new course and maintaining it thereon. The valve 7 remains in this closed position until the air supply of the torpedo is exhausted whereupon the return spring 16 moves the valve 7 back to cover the port to pipe 8 and disengages the drum 11. The spring 15 thereupon returns the drum to its former position. The steering engines 2 and 4 both acting upon the same shaft control the same rudder but when one is out of use no interference is caused with the operation of the other engine.

It is believed from the above that the construction, method of use and operation of the device herein shown and described will be clear to those skilled in the art. The invention is of simple and practical construction, reliable and efficient in use and operation and well adapted to accomplish among others all of the objects and advantages herein set forth.

Without further analysis, the foregoing will so fully reveal the gist of this invention that others can by applying current knowledge readily adapt it for various applications without omitting certain features that, from the standpoint of the prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalency of the following claim.

What we claim is:

In a torpedo, in combination, a shaft adapted to be connected with a vertical rudder, a plurality of engines connected with said shaft, independently operable gyros for each engine, means for supplying air to said engines, timing means and a valve for controlling the supply of air to one engine and then the other and means for restoring the timing means and valve to normal position at the end of each run.

Signed at Newport, Rhode Island, this 21 day of March, 1921.

E. S. R. BRANDT.

Signed at Marshall, Texas, this 21 day of March, 1921.

TOM B. MYERS.