

March 30, 1943.

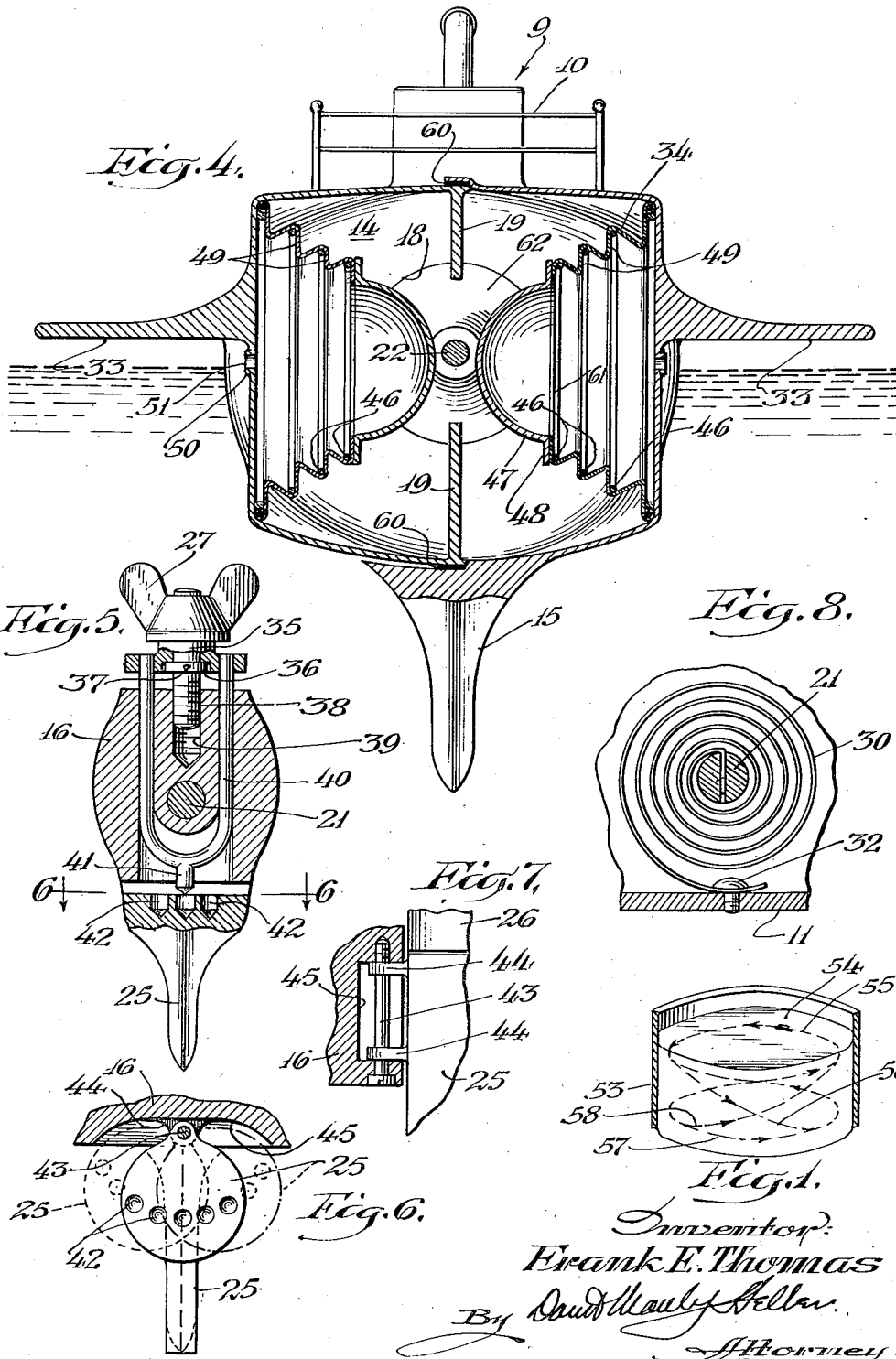
F. E. THOMAS

2,315,461

TOY SUBMARINE

Filed Feb. 16, 1942

2 Sheets-Sheet 1



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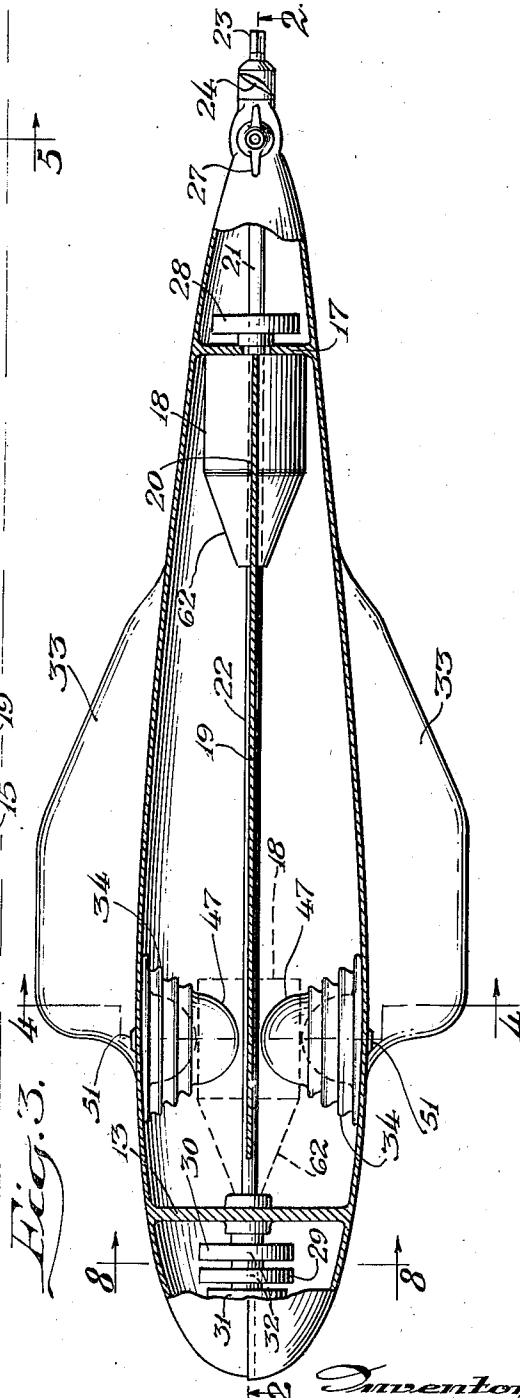
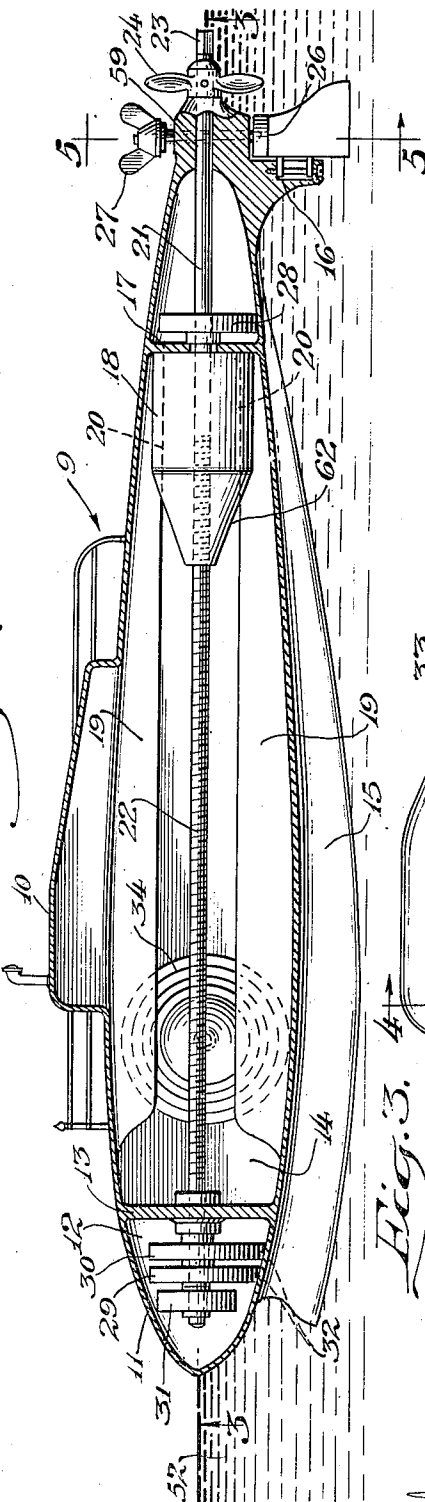
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,315,461

TOY SUBMARINE

Frank E. Thomas, Chicago, Ill.

Application February 16, 1942, Serial No. 431,070

6 Claims. (Cl. 46—94)

This invention relates to certain new and useful improvements in miniature or toy submarine craft, the primary object of the invention being to provide means for motivating the submarine in the following manner; the invention is adapted to float on the surface of the water, and is further adapted to make several circuitous movements on the surface, and after a predetermined time it will be caused to submerge whilst subjected to the same circuitous operation moving in a spiral fashion until a certain depth or submerged distance is attained; thence continuing at the submerged position in circuitous movement for a predetermined time, whence it will be caused to incline and move in an upward spiral direction without disturbance of the said circuitous movement, until it finally comes to rest on the surface of the liquid in which it completes its cycle afloat.

Another object of my invention is to provide suitable motivating means for propelling the said craft in the said circuitous path of travel as aforementioned, which is of a simple and practical construction, efficient in its operation, and which will lend itself to manufacture economically in quantity production.

Other objects and advantages resident in my invention will become readily apparent from a study of the accompanying drawings and the ensuing description in which like numerals are utilized to designate like parts, and in which:

Fig. 1 is a perspective view showing the circuitous path which my invention is susceptible of performing after being placed on the surface of the water, ready for initial operation.

Fig. 2 is a partial longitudinal cross-sectional view on the line 2—2 of Figure 3, partially showing the invention in elevation.

Fig. 3 is a longitudinal cross-sectional view on the line 3—3 of Figure 2.

Fig. 4 is a longitudinal cross-sectional view on the line 4—4 of Figure 3.

Fig. 5 is a longitudinal cross-sectional view on the line 5—5 of Figure 2.

Fig. 6 is an enlarged fragmentary transverse cross-sectional view on the line 6—6 of Figure 5.

Fig. 7 is a transverse cross-sectional view on the line 7—7 of Figure 2.

Fig. 8 is a longitudinal cross-sectional view on the line 8—8 of Figure 3.

Referring, more particularly, to the drawings in Figures 2 and 3, the numeral 9 designates generally my invention and it is comprised of a superficial construction 10 to simulate a dummy arrangement of the upper deck

of a submarine when the same is afloat. The hull is, generally, designated 11 and is comprised of two half portions nesting together as shown in Figure 3, and sealed at the nesting point by a gasket of rubber or other resilient material generally designated 60. Screws preferably are used for holding the two halves together; the screws are not indicated. Several screws may be used in order to permit assembly and dismounting in order to repair the same whenever it may be necessary.

The hull 11 is provided with ribs 13 and 17 which in conjunction with the bearing portion 59 provides a suitable three point bearing for the shaft 21. The shaft 21 has a substantial portion thereof threaded as indicated at 22 with a very fine thread on which operates the nut 18 having slotted portions 20 slidably in alignment with the slides 19 located in compartment 14 so as to maintain the nut in a movable position horizontally. The nut is suitably threaded, having a tapered or conical cam portion 62, and is adapted to move horizontally back and forth. On each side of the boat there are one or more openings 51 in alignment with a pocket portion of a bellows type of construction generally designated 34. The said openings 51 being located preferably on the water level or liquid level 52 when the hull 11 is in floating position, so that it permits water to seep in thru the opening 51 and fill the pocket 34.

The shaft 21 is preferably driven by a series of springs 29 and 30 located in the compartment 12, and also a fly wheel 31 in order to store momentum thus giving a balanced and uniform speed. The fly wheel not only tends to preserve the momentum but as well functions as a governor assuring uniform operation of the power driven member 21. The springs are secured in place and are attached to the shaft at their central points and being preferably of a flat spiral type, are attached to the hull 11 of the submarine by screws 32. The bottom portion of the submarine has preferably a guide fin 15 and the sides have two fins 33 in order to stabilize the craft when floating and also when in submersion.

The ribs 17 and 13 provide perfect stops and limit the travel of the nut 18, as well as act as a safety factor to prevent over-winding the springs 28, 29 and 30; for, when the springs are wound by a key which has a square socket to fit the square shank 23 of the shaft, the nut is retarded to the position indicated in Figure 2. When the nut abuts the rib 17 it is at such a

point where the spring tension has not reached its limit, thus the nut abutment controls the further winding of the spring and thus acts as a factor of safety. The shaft carries the usual form of propelling means 24 on the outside, secured to the shaft 21 by a pin, or screw, or any other suitable means, and the craft is further provided with a rudder support rib 16 to which the rudder 25 is pivotally secured; the rudder 25 having an enlarged portion 26 adapted to be drilled with a series of drilled openings 42 (see Figure 5).

The wing-nut 27 is secured to a bolt 35 which is suitably threaded as at 38 and fits into the threaded opening 39. The said bolt 35 is secured to a flange member which in turn is attached to the U-shaped bolt 40 having the extension 41 adapted to engage any one of portions 42, thus adapting the rudder to be fixedly secured at various angles (see Figure 6) and to permit setting the boat so that it may continue in a certain circuitous path of operation. The bolt 35 has secured thereto a washer member 36 by virtue of pin member 37 and it is the province of this construction to permit engagement and disengagement of the extension 41.

At Figure 7 is an enlarged fragmentary illustration showing that the hull is provided with a support rib 16 having a recessed portion 45 to which the rudder 25 is rotatably secured by virtue of the fillister head screw 43, in order to permit articulation of the rudder by virtue of its lugs 44.

In Figure 4, an enlarged view indicates the particular structure of the bellows shaped means 34, which are provided with a series of nesting portions 49 of reduced diameter tapering toward the hemi-spherical flanged element having a spherical portion 47 and a flange 48 this being made preferably of metal or of a rigid material. The bellows shaped member is preferably held in normal position as indicated in Figure 4 by virtue of the conically tapered spiral spring 46. The bottom portion of the bellows 61 is preferably rubberized or reinforced with a resilient material so that when the bellows members are compressed, the surface 61 will effect a sealing action with respect to the opening 51, thus expelling the water and maintaining the interior of the craft devoid of water.

The operation is as follows: The spring elements are charged by winding the shaft 21 as heretofore described. This causes the nut 18 to be brought to the position shown in Figure 2. In this position the springs 28, 29 and 30 are fully charged and the vessel is adapted to float inasmuch as the pockets of the bellows element 34 are filled with air. The rudder 25 is set at a suitable position so as to allow the vessel to make a circuitous path depending on the size the vessel in which it is caused to operate. The operation then commences. The water begins to enter the openings 51 of the valve bushings 50 while the vessel is moving in a circuitous path on the surface, this continues until the pockets 34 are filled with water, whence the front portion of the craft because of liquid filling pockets 34 is caused to dip downward operating continuously while the craft begins to submerge. When it reaches a certain depth of submersion, it continues its circuitous path at that point, meantime the nut 18 is advancing on the threaded portion 22 until its conical portion contacts the hemispherical portions 47 of the bellows 34, when they are caused to compress the said bellows thus

expelling the liquid therefrom, hence causing the craft to begin to spiral toward the surface, and continue its circuitous path on the surface until the energy of the springs 28, 29 and 30 is fully consumed, whence the cycle of operation may be once again repeated. The pockets 34 are placed nearer the prow of the craft to facilitate submersion and ultimate rising of the craft to the surface.

Figure 1 illustrates in perspective an approximate cycle of operation if the craft with springs wound full were to be placed in a glass or transparent container 53 filled with a transparent liquid, the craft would first complete one or more circuitous laps 55 on the surface 54 whence when pockets 34 are completely filled with water it would follow one or more spiral turns 56 until a balanced point of submersion 57 is reached, thence move several laps at the said level 57 and when the mechanism causing the pockets to be compressed will cause the craft to rise one or more spiral turns 58 and ultimately complete one or more circuitous laps in the plane of the surface of the liquid 54.

Altho, I have described, rather succinctly, the nature and operation of my invention, and because it is susceptible of many modifications, alterations, and improvements therein, I reserve the right to all such alterations, modifications and improvements which come within the scope and spirit of my invention, as well as within the embodiments of the accompanying drawings, and the purview of the foregoing description; my invention to be limited only by the subjoined claims.

Having thus disclosed and revealed my invention what I claim as new and desire to secure by Letters Patent is:

1. In a device of the character described, collapsible submerging means adapted to submerge the said device, comprising, bellows located on opposed sides within the said device, and a screw fed cylindrical nut having conically-shaped portions adapted to collapse the said collapsible submerging means.

2. In a device of the character described, collapsible submerging means adapted to submerge the said device, and motivating means adapted to propel the said device and to collapse the said collapsible submerging means, the said collapsible submerging means comprising, bellows located on opposed sides within the said device, and a screw fed cylindrical nut having conically-shaped portions adapted to collapse the said collapsible submerging means.

3. In a device of the character described, in combination, collapsible submerging means, motivating means adapted to propel the said device, and to collapse the said collapsible submerging means, and rudder means articulately and adjustably secured to the said device adapted to confine the same to varying orbits or circuitous paths, the said collapsible submerging means comprising, bellows located on opposed sides within the said device, and a screw fed cylindrical nut having conically-shaped portions adapted to collapse the said collapsible submerging means.

4. A device of the character described, comprising, hull means, motivating means mounted rotatably in said hull means, collapsible submerging means mounted within the said hull means, and threaded means mounted on the said motivating means and adapted to collapse the said collapsible submerging means.

5. A device of the character described, com-

prising, hull means, motivating means mounted rotatably in said hull means, collapsible submerging means mounted within the said hull means, threaded means mounted on the said motivating means and adapted to collapse the said collapsible submerging means, and rudder means articulately and adjustably secured to the said hull means.

6. A device of the character described, compris-

ing, hull means, motivating means mounted rotatably in said hull means, collapsible submerging means mounted within the said hull means, threaded means mounted on the said motivating means and adapted to collapse the said collapsible submerging means, and horizontal and vertical stabilizing fin means located on the said hull.

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