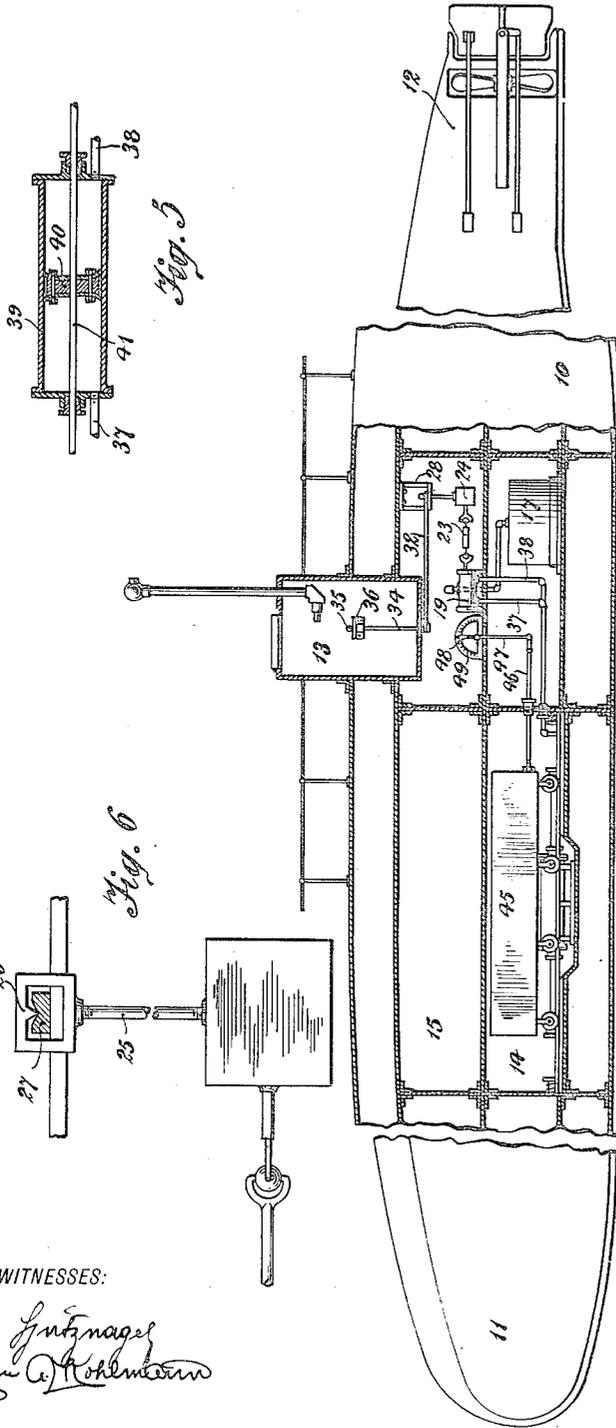


A. SCHRUMPF.  
 SUBMARINE BUOYANT CONVEYANCE.  
 APPLICATION FILED SEPT. 15, 1915.

1,188,842.

Patented June 27, 1916.

4 SHEETS—SHEET 1.



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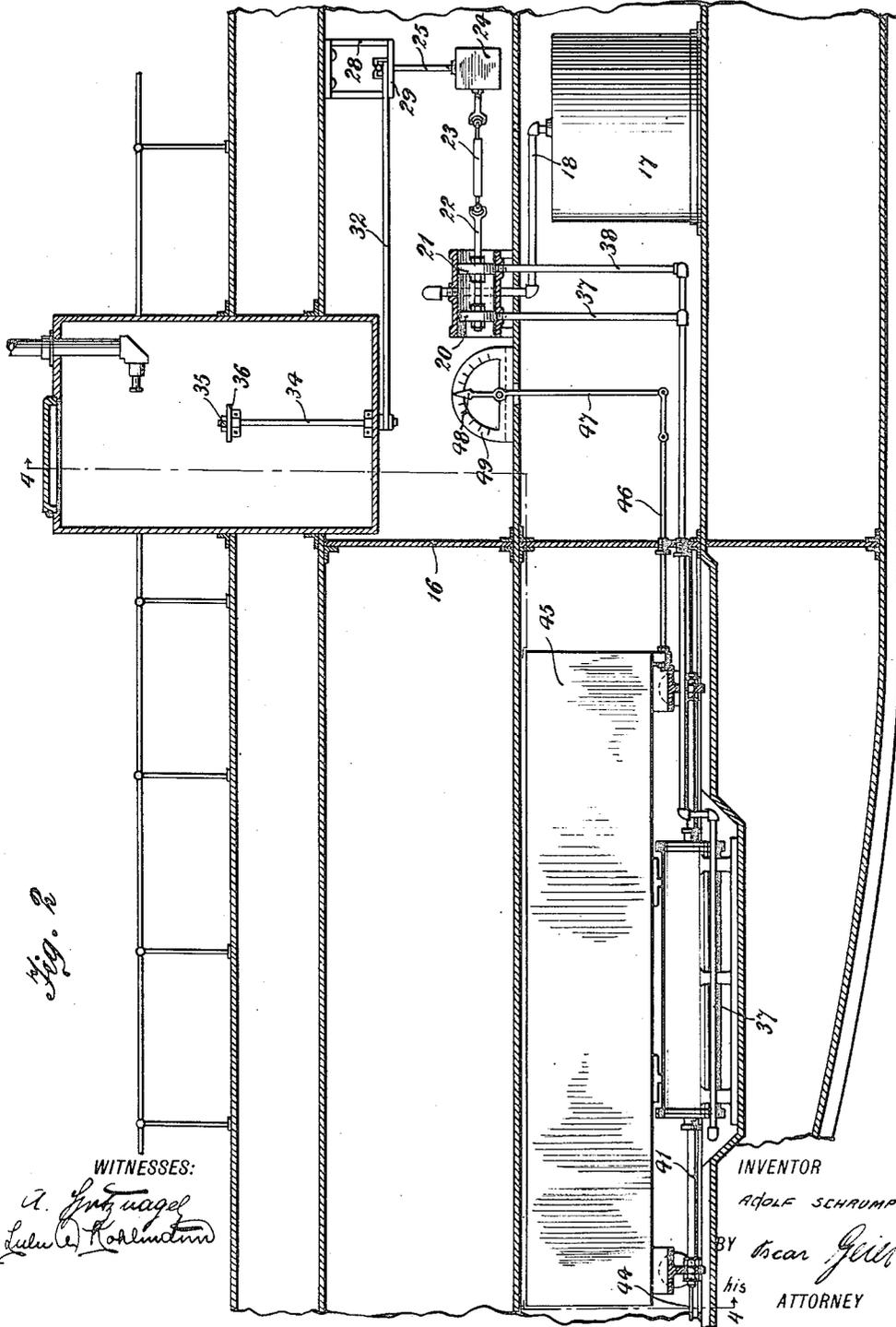


Fig. 2

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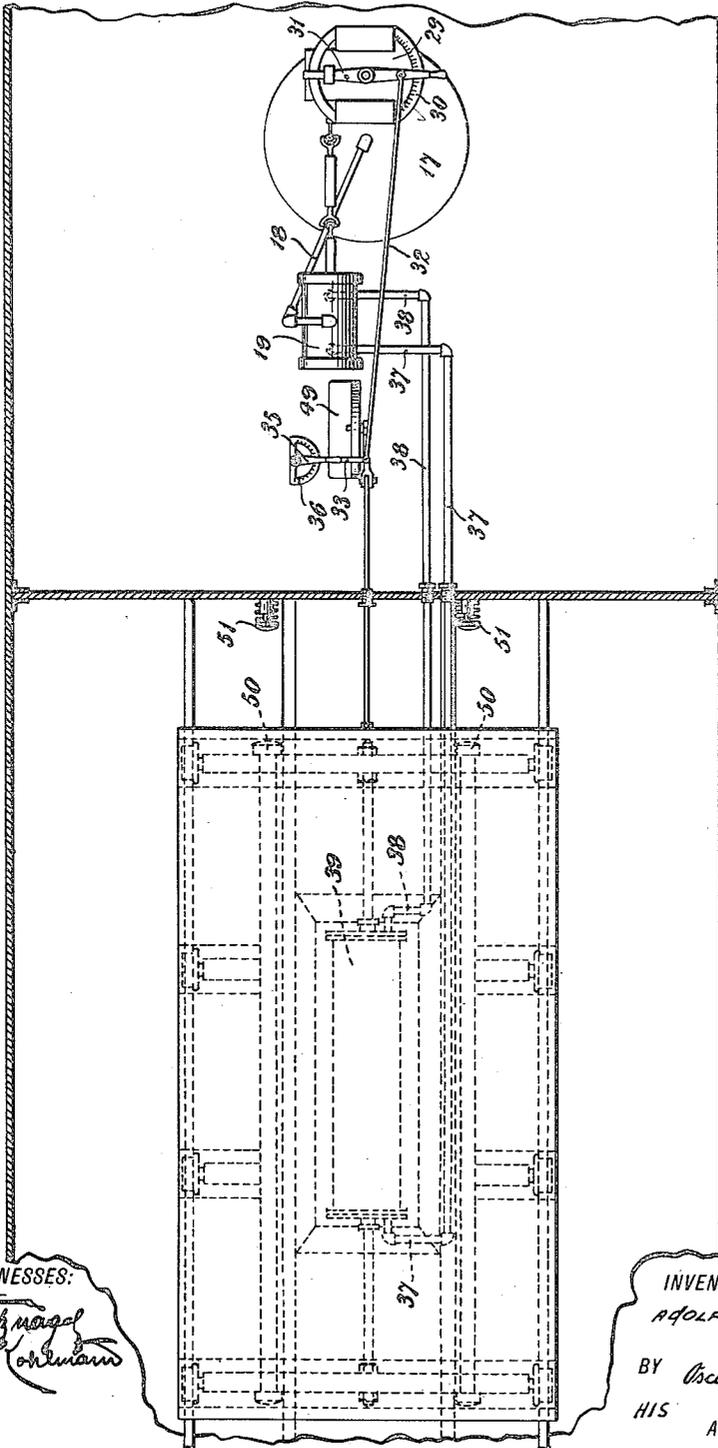
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4 SHEETS—SHEET 3.

*Fig. 3*



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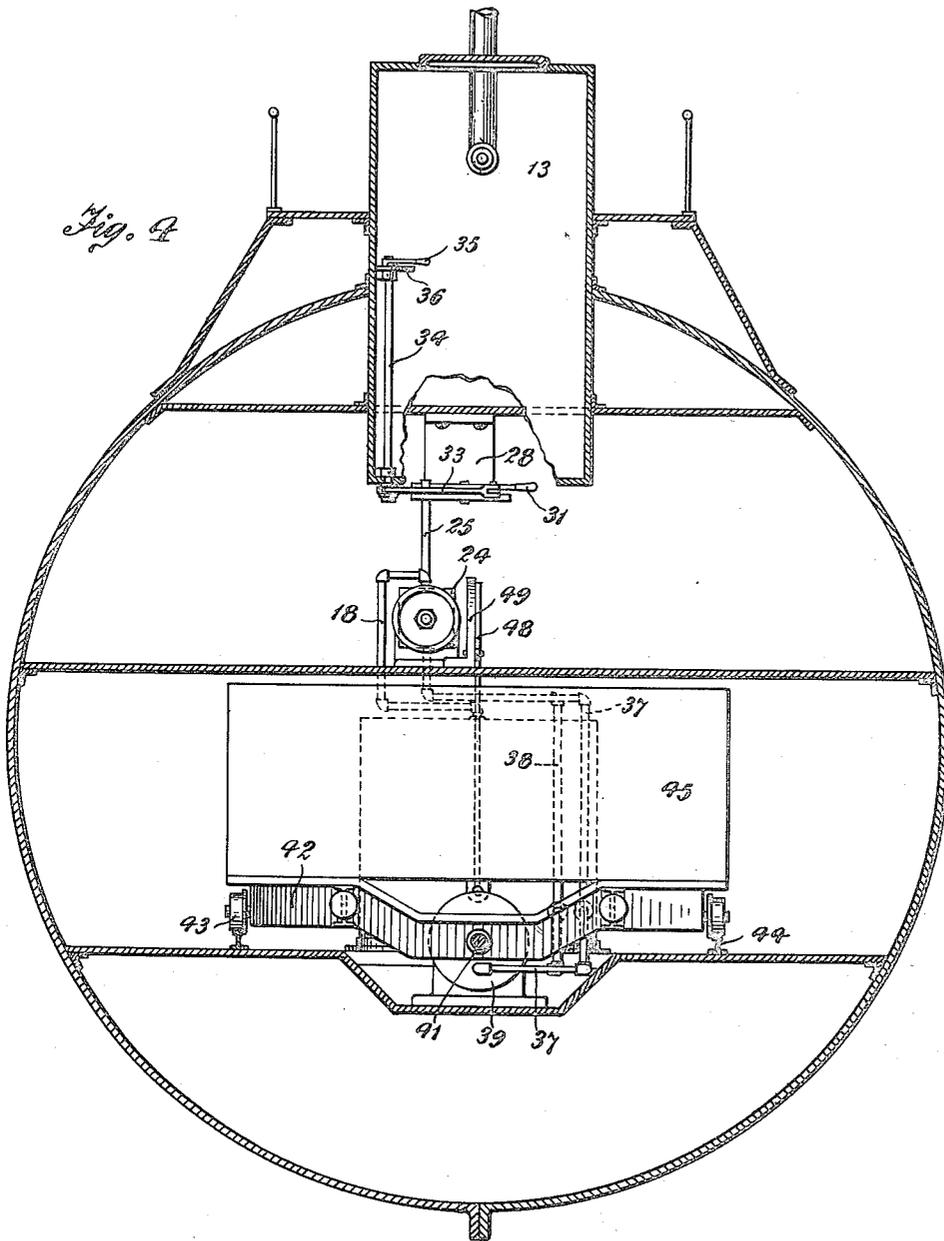
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4 SHEETS—SHEET 4.



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# UNITED STATES PATENT OFFICE.

ADOLF SCHRUMPF, OF NEW YORK, N. Y.

SUBMARINE BUOYANT CONVEYANCE.

1,188,842.

Specification of Letters Patent. Patented June 27, 1916.

Application filed September 15, 1915. Serial No. 50,746.

*To all whom it may concern:*

Be it known that I, ADOLF SCHRUMPF, a subject of the Emperor of Austria-Hungary, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Submarine Buoyant Conveyances, of which the following is a specification.

One of the essential requirements in modern submarine boats is to maintain the same in a horizontal or other desired position. This is brought about by the employment of rudders and fins, or by charging and discharging with liquid, certain ballast tanks whereby the submarine boat may be caused to change its position with respect to a horizontal plane for the purpose of raising or lowering the same.

The present invention has for its purpose to accomplish this result by shifting the center of gravity to and from a normal position. The operating means therefor are automatically controlled; they may however, be also manually controlled at will. These means comprise, in a general way, a supply of fluid under pressure, such as the torpedo firing tank, from which fluid is supplied to a valve actuated by gravity controlled means, or at will, as heretofore stated. The valve is connected by suitable ducts to an operating cylinder containing a movable piston. The piston is secured to a movable element containing a heavy weight, such as, for instance, the storage batteries of the submarine, so that a movement of the tank results in a shifting of the center of gravity and, consequently, a change of position of the entire submarine from the horizontal.

A simple embodiment of the invention is illustrated in the drawings, in which—

Figure 1 is an axial vertical cross section of a submarine, showing the invention in side elevation. Fig. 2 is a similar cross section drawn to an enlarged scale. Fig. 3 is a horizontal cross section of part of the submarine, showing a plan view of the operating parts. Fig. 4 is a vertical cross section on lines 4—4 of Fig. 2. Fig. 5 is a vertical cross section of the operating cylinder, and Fig. 6 is a side elevation of the gravity controlled means for operating the supply valve.

The shell of the submarine is indicated at 10, its bow at 11 and its stern at 12.

The conning tower is shown at 13.

A lower deck is indicated at 14 and a main deck at 15.

The dividing vertical walls are marked 16.

A pressure tank, such as the torpedo firing tank, is indicated at 17 and contains fluid under pressure. A supply pipe 18 leads to the valve cylinder 19 and particularly to the middle portion thereof, confined by the two pistons 20 and 21. The piston rod 22 connecting the two pistons extends outwardly of the cylinder 19 and, by means of a flexible link 23, is operated by the pendulum 24. This pendulum consists of a heavy weight, secured to the lower end of a pendulum rod 25, the upper end of which is provided with a knife edge 26, resting upon a bearing 27, slidable on a bracket 28, secured to one of the decks, or other support, and comprising a segmental disk 29, provided with indicating marks 30. An operating lever 31 is pivoted to the disk and, by means of a rod 32, connected to a lever 33, secured to the lower end of a vertical shaft 34, having its bearing, preferably, at one of the walls and at the bottom of the conning tower 13. The upper end of this shaft carries an operating lever 35, rotatable on an indicator disk 36, provided with similar indications as shown on the segmental disk 29.

The valve cylinder 19 shows two pipe connections, both normally covered by the pistons 20 and 21, when the submarine boat is in horizontal position. One of the pipe connections 37 leads from one end of the valve cylinder 19, and the other pipe connection 38, from the other end thereof. Both pipes connect the valve cylinder with the operating cylinder 39, which contains an operating piston 40, having a piston rod 41. Thus it will be seen that fluid under pressure can be supplied alternately to either side of this operative piston.

A truck 42, provided with rollers 43 is adapted to move along a track 44, resting upon one of the decks of the submarine and supports a container or tank 45, for holding the storage batteries of the boat, or other heavy material. The operating piston 40 is connected to the truck 42 so that the movement of the piston 40 in the operating cylinder 39, causes a corresponding displacement of the truck 42 on the track 44.

A connecting rod 46 of the truck 42, operates an indicator lever 47 having an indicator pointer 48 adapted to move relative to an indicator plate 49 so that any displacement of the tank from its normal position, can readily be seen on the indicator.

Bumpers 50 and 51 are provided on the truck and at convenient points of the submarine, in order to confine the movement of the container 45.

5 Any deviation of the position of the submarine boat from the horizontal causes the weight 24 to seek its lowermost position, so as to maintain its suspending rod 25 in a vertical direction. This, of course, results  
10 in a displacement of the pistons 20 and 21 within the valve cylinder 19. One of the pipes 37 or 38, then communicates with the space between the pistons, while the other pipe is open to the atmosphere. The pipe  
15 which communicates with the space between the pistons, immediately receives fluid under pressure and leads the same to one side of the operating piston 40 of the cylinder 39, causing a displacement of the piston and a  
20 corresponding movement of the truck 42 and its load, resulting in the shifting of the center of gravity and, consequently in a corresponding movement of the entire boat. This movement of the truck 42 and the center  
25 of gravity of the entire boat, is always under the control of the pendulum 24, resulting under normal conditions in maintaining the entire boat in a horizontal position.

30 Should it be desired to change the position of the boat, for the purpose of raising or lowering the same, the operation of the lever 31 causes a shifting of the point of suspension of the pendulum, and the pendulum, in  
35 its efforts to maintain the vertical position of the pendulum rod 25, causes a movement of the pistons in the valve cylinder, a corresponding supply of fluid under pressure to the operating cylinder 39, a movement of  
40 the container 45, a displacement of the center of gravity, and a corresponding deviation from the horizontal of the entire boat and, in conjunction with the operation of the propeller of the boat, the movement of  
45 the latter in either a downwardly or upwardly inclined plane.

While fluid under pressure is employed in the embodiment of the invention herein described and shown, to operate the mechanism  
50 for shifting the center of gravity of the submarine, mechanical or electromagnetical means may be used with like effect.

The invention is not necessarily confined for use with submarine boats but may be employed in conveyances such as air craft of  
55 any kind, and eventually, in connection with suitable propelling means, be effectively employed to maintain or alter the direction of movement of the same. The proper adaptation of this invention can readily be accom-  
60

plished without requiring the further exercise of the inventive faculty.

Having thus described my invention and set forth the manner of its construction and application, what I claim as new and desire  
65 to secure by Letters Patent, is:—

1. The combination with a buoyant submergible conveyance and a storage battery therein, of a truck upon which said battery is mounted, a track-way longitudinally disposed in said conveyance upon which said truck may travel, a fluid pressure means for actuating said truck, a valve controlling said pressure means, an oscillable element mounted upon a knife edge operatively connected  
70 with said valve and means for shifting the position of said knife edge.

2. The combination with a buoyant submergible conveyance and a storage battery therein, of a longitudinal truck carrying said battery, a supply source of fluid under pressure, means for actuating said tank through said compressed fluid, an automatic control for said actuating means, and means for manually operating said actuating  
80 means.

3. The combination with a buoyant submergible conveyance having a plurality of impervious compartments and a weight confined in one of said compartments, of a movable truck supporting said weight, a visible index indicating the position of said truck in another of said compartments, a power means for actuating said truck, an automatic control means for said power means and  
90 means for manually shifting said control means.

4. The combination with a buoyant submergible conveyance having a plurality of impervious compartments and a weight confined in one of said compartments, of a movable truck supporting said weight, a visible index indicating the position of said truck in another of said compartments, a fluid pressure means for actuating said truck,  
105 valves controlling said pressure means, an adjustably supported knife-edge, a gravity operated pendulum carried by said knife-edge, flexible connections between said pendulum and said valves, and means for shifting  
110 said knife-edge longitudinally of said conveyance.

Signed at New York in the county of New York and State of New York this 2 day of August A. D. 1915.

ADOLF SCHRUMPF.

Witnesses:

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LULU A. KOHLMANN.