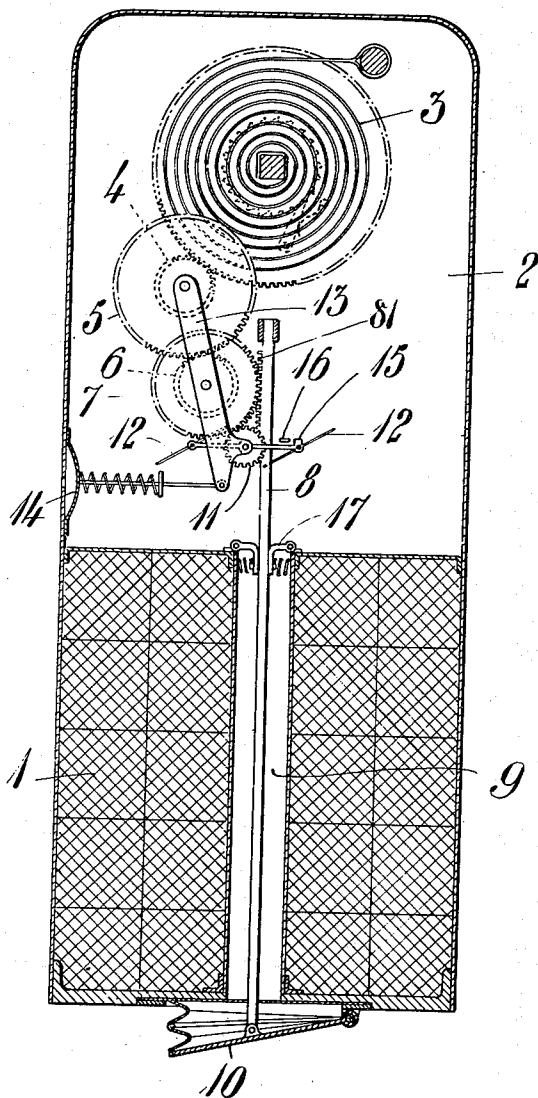


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 SUBFLOATING BODY, SUCH AS A MINE, TORPEDO, AND THE LIKE.
 APPLICATION FILED SEPT. 26, 1914.

1,169,523.

Patented Jan. 25, 1916.



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UNITED STATES PATENT OFFICE

NILS WILHELM UHR, OF GOTTENBORG, AND JOHAN HJALMAR SANDBERG, OF STOCKHOLM, SWEDEN, ASSIGNORS TO ARON ANDERSSON, OF STOCKHOLM, SWEDEN, AND THOR CARLANDER, OF GOTTENBORG, SWEDEN.

SUBFLOATING BODY, SUCH AS A MINE, TORPEDO, AND THE LIKE.

1,169,523.

Specification of Letters Patent.

Patented Jan. 25, 1916.

Application filed September 28, 1914. Serial No. 863,658.

To all whom it may concern:

Be it known that we, NILS WILHELM UHR, a citizen of the Kingdom of Sweden, residing at Gottenborg, Sweden, and JOHAN HJALMAR SANDBERG, a citizen of the Kingdom of Sweden, residing at Stockholm, Sweden, have invented new and useful Improvements in Subfloating Bodies, Such as Mines, Torpedoes, and the like, of which the following is a specification.

The present invention relates to subfloating bodies, such as mines, torpedoes, and the like, which, after having been launched, are adapted to perform an oscillating movement about a position of equilibrium below the surface of the water.

In such subfloating bodies the oscillating movement of the body is maintained either by means of a depth-regulating chamber provided in the body and adapted to be filled and emptied alternately under the control of a hydrostat or by means of a screw likewise controlled by a hydrostat. To empty the depth regulating chamber or to operate the screw a source of power is provided which in known apparatus of this kind consists of a gas producer, a gas accumulator, a source of electric energy or the like. It is however, a matter of fact that the sources of power heretofore used for the purpose stated above are not sufficiently reliable inasmuch as they change their weight during storing or during operation, on account whereof the position of the subfloating body in the water cannot be predetermined with a sufficient degree of exactness. In order to obviate the said inconvenience we provide according to the present invention in the subfloating body or the like a spring motor which acts upon a piston, bellows, screw or the like under the control of a hydrostat so that the subfloating body is caused to alternately ascend and descend in the water. Such a motor will always maintain its weight constant and accordingly no disturbing alteration of the total weight of the body can take place during its storing or during its operation.

In the accompanying drawing we have shown one embodiment of our invention. The figure shows diagrammatically a longitudinal section of a mine constructed in accordance with the invention.

Referring to the drawing, 1 designates the chamber containing the explosive charge.

2 designates another chamber separated from the chamber 1 and containing a spring motor 3 connected by means of toothed wheels 4, 5, 6, 7 with a longitudinally movable rod 8 the upper end of which is formed as a rack 81. This rod 8 is placed in a channel 9 extending through the chamber 1 and is connected to a bellows 10 by means of which the entire volume of the subfloating body can be increased or decreased. To a toothed wheel 11 meshing with the wheel 7 is secured an air-brake 12 having, preferably, adjustable wings.

The toothed wheels 6, 7, 11 are supported by a lever 13 swingably mounted on the shaft of the toothed wheels 4, 5 and connected to a well known hydrostat 14 which acts on the lever 13 so as to bring the wheel 7 in or out of engagement with the rack 81. In order to stop the spring motor when the wheel 7 is out of engagement with said rack, a projection 15 is provided on the air-brake, said projection striking, when the wheel 7 is disengaged from the rack, a fixed abutment 16 which thereby prevents further movement of the air brake and thus of the spring motor. The rod 8 is guided at the upper end of the channel 9 by spring actuated levers 17 which are placed in such position that they retard the inward movement of the rod 8.

The mine described above operates as follows: The mine is adjusted in any suitable manner so that it will descend in the water, when the bellows are contracted, but will ascend in the water, when the bellows are pressed outward. Before the launching the bellows are contracted and the spring motor is wound completely and stopped in the manner above described. The mine, when launched, will thus begin to descend immediately. When the mine has descended to a certain depth, the hydrostat 14 is actuated by the water pressure, thereby causing the toothed wheel 7 to engage the rack 81, and, at the same time, bringing the projection 15 out of engagement with the abutment 16 so that the spring motor is released. Under the influence of the spring motor the rod 8 will now move downward the speed of this movement being previously adjusted by

means of the braking device 12. The bellows 10 are thus pressed outward, thereby increasing the entire volume of the mine so that the mine becomes lighter than the water displaced, ceases to sink and commence to move upward.

When the mine in its upward movement has passed the depth where the hydrostat was pressed inward by the water pressure, 10 the hydrostat is pressed outward by its spring, thereby causing the lever 13 to be moved out of engagement with the rack 8, which will thus be released, while at the same time the spring motor will be stopped 15 in the manner above described. Under the influence of the water pressure the bellows 10 are now contracted, the rod 8 being, consequently, moved upward. As already set forth, this movement of the rod 8 will be retarded on account of the braking action of 20 the guiding members 17 so that the mine will get time to ascend to a certain height above the depth, where the hydrostat was actuated, before the volume of the mine has decreased 25 to such a degree that the mine again commences to descend. The play just described will then be repeated until the energy of the spring motor is exhausted.

The construction of the mine may be 30 modified in different manners by the equivalents of the form shown. Thus for instance other means than the bellows may be used to effect the variations of volume of the mine, and the oscillating movement thereof 35 such as for instance a piston reciprocating in the channel 9 or a screw, and in the latter case a rotary shaft is provided instead of the rod 8 the rotation of said shaft taking place under the control of the hydrostat when the 40 subfloating body reaches its uppermost or lowermost positions in the water.

The principal feature of the invention consists in the arrangement of a spring motor as the driving device.

45 Having now described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a subfloating body adapted to perform an oscillating movement about a position of equilibrium below the surface of the 50 water, the combination of a spring motor, means acted upon by said motor to cause the

body to move up and down in the water, and a hydrostat controlling the operation of the spring motor. 55

2. In a subfloating body adapted to perform an oscillating movement about a position of equilibrium below the surface of the water, the combination of a spring motor, means acted upon by said motor for varying 60 the volume of the subfloating body, and a hydrostat controlling the operation of the spring motor.

3. In a subfloating body adapted to perform an oscillating movement about a position of equilibrium below the surface of the 65 water, the combination of a hydrostat, a spring motor, bellows actuated by said motor and the outside water, and means connecting said spring motor and bellows under 70 the control of the hydrostat.

4. In a subfloating body adapted to perform an oscillating movement about a position of equilibrium below the surface of the 75 water, the combination of a hydrostat, a spring motor, means for varying the volume of the body by constant weight thereof, and means for connecting said volume varying means with the spring motor under the control 80 of the hydrostat.

5. In a subfloating body adapted to perform an oscillating movement about a position of equilibrium below the surface of the 85 water, the combination of a hydrostat, a spring motor, means for varying the volume of the body by constant weight thereof, a longitudinally movable rod connected to said volume varying means and adapted to be connected with the spring motor under the control of the hydrostat, and means for 90 guiding said rod and retarding the inward movement thereof.

In testimony that we claim the foregoing as our invention, we have signed our names in presence of two subscribing witnesses.

NILS WILHELM UHR.
JOHAN HJALMAR SANDBERG.

Witnesses of N. W. Uhr:

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