

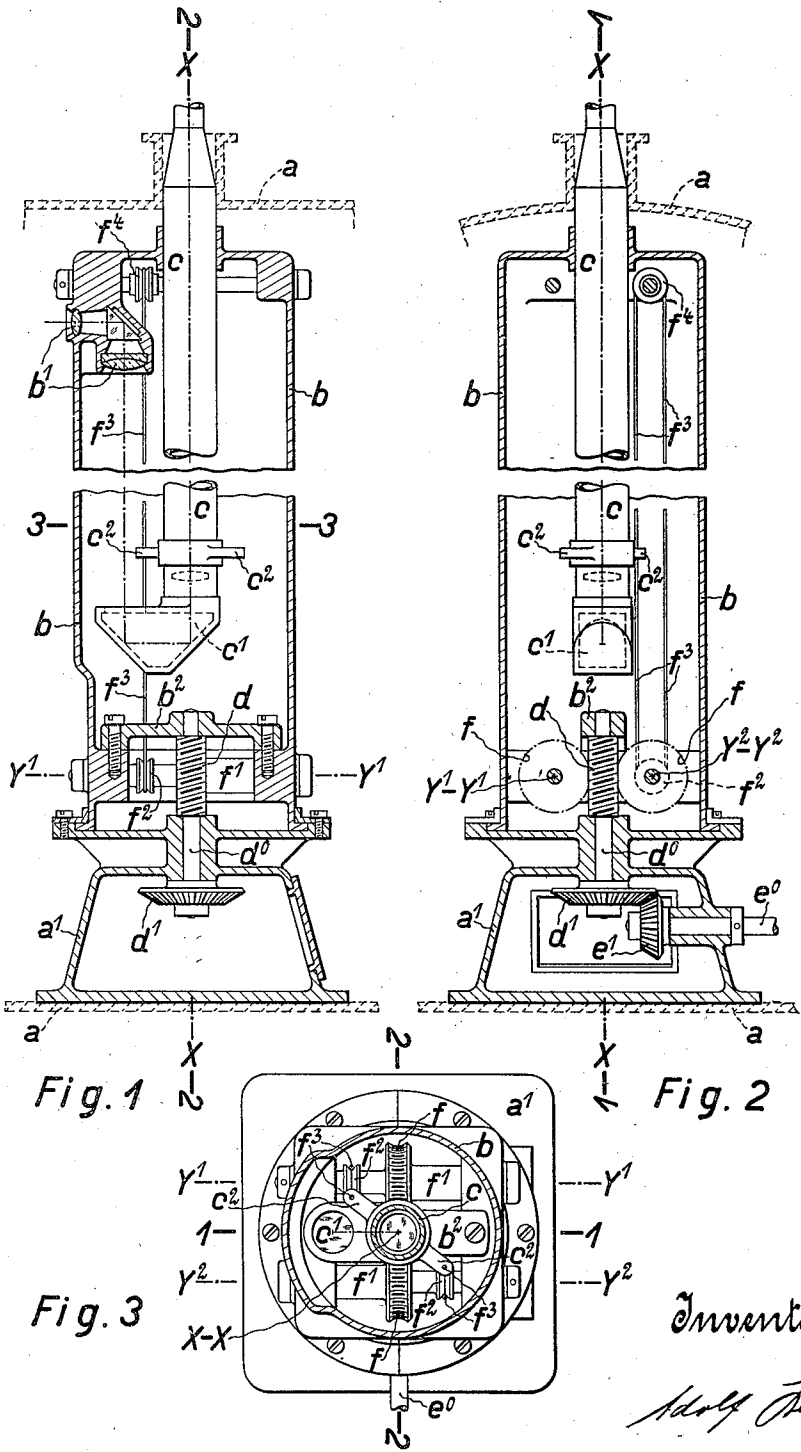
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SUBMARINE PERISCOPE

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Inventor:

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SUBMARINE PERISCOPE.

Application filed June 19, 1923. Serial No. 646,361.

To all whom it may concern:

Be it known that I, ADOLF STEINLE, a citizen of Germany, and residing at Jena, Germany, have invented a new and useful Submarine Periscope (for which I have filed an application in Germany July 29, 1922), of which the following is a specification.

The present invention relates to a submarine periscope whose ocular is fitted to a casing rotatably supported on the boat's hull in which casing a tube containing the entrance reflector of the periscope is so disposed as to participate in rotations of the casing and as to be displaceably disposed relatively to the casing in the direction of its axis coinciding with the axis of rotation of the casing.

For periscopes of this kind it has been suggested to construct a gearing in such a way that the displacements of the tube may be effected by a motor rigidly set up in the boat's hull without the motion of displacement and of rotation of the periscope affecting each other. According to the invention there is obtained a gearing which is considerably more simplified than those hitherto suggested if the demand that the motion of displacement and of rotation are independent of one another be restricted to such an extent as to warrant the independence at least approximately. This restricted demand is fulfilled if the gearing which serves for displacing the tube contains a worm wheel supported on the casing and engaging in a worm, whose axis coincides with the axis of rotation of the casing. The worm may either be supported on the boat's hull or on the casing or both on the boat's hull and the casing. If provision be made that in the gearing which serves for actuating the worm wheel, inclusive of the motor serving for the actuation, the friction is slighter than in the worm gearing, the worm participates in any displacements of the casing. The independence of the motions is then entirely warranted.

The annexed drawing shows a constructional example of the invention. Fig. 1 is a longitudinal section on line 1—1 of Fig. 2, Fig. 2 is another longitudinal section on the line 2—2 of Fig. 1, Fig. 3 is a cross section on the line 3—3 of Fig. 1.

On a base a^1 assumed to be rigidly connected to the boat's hull a a casing b is supported rotatably about an axis $X-X$. For

simplicity's sake the actuation for the rotation is not shown in the drawing. Within the casing b there is supported displaceably in the direction of the axis $X-X$ a tube c which contains the entrance reflector (not visible in the drawing) of the periscope and which is provided at its lower end with a reflecting prism c^1 which transmits the luminous rays emerging from the tube c in the downward direction to an ocular b^1 disposed at the upper part of the casing b . A worm d is supported on the base a^1 and on a cross head b^2 , screwed to the casing b , in such a way that its axis coincides with the axis of rotation $X-X$. A bevel wheel d^1 supported on the worm-shaft d^0 engages in a bevel wheel e^1 supported on the base a^1 , the shaft e^0 of the bevel wheel e^1 being assumed to be coupled to a motor. In the worm d engage two worm wheel gearings f which are fitted each to the nave f^1 of a rope pulley f^2 . The two rope pulleys are rotatably supported on the casing b in such a way that their axes Y^1-Y^1 and Y^2-Y^2 are parallel to each other and lie on different sides of the axis $X-X$. Over each of both rope pulleys f^2 runs an endless rope f^3 which rests upon a pulley f^4 supported on the top of the casing b . The tube c is suspended at the two ropes f^3 by means of a cross bar c^2 .

The periscope is drawn in and out by actuating the worm d from the shaft e^0 . If the friction in the worm gearing be greater than in the gearing actuating the worm, of which gearing only the bevel wheels d^1 and e^1 are shown in the drawing, in the event of a rotation of the casing b about the axis $X-X$ the worm wheel gearings f drive the worm which entails a slight rotation of the gearing d^1 , e^1 . . . inclusive of the motor shaft but does not affect the lifting motion of the tube c . If the conditions of friction be inverse, i. e. if with a rotation of the casing b the worm remains unaffected, the worm wheel gearings f experience owing to their meshing with the worm d a slight rotation about their axes Y^1-Y^1 and Y^2-Y^2 respectively, which rotation is, however, so insignificant that both rotation and displacement may practically be considered independent of each other.

I claim:

1. In a submarine periscope a casing, means for rotatably supporting this casing

- on a boat's hull, an ocular fitted to this casing, a tube adapted to contain at its upper end an entrance reflector and having its axis coinciding with the axis of rotation of the casing, the tube being displaceably disposed relatively to the casing in the direction of these axes, means for coupling the casing and the tube for joint rotation, and a gearing adapted to displace the said tube in the said direction and containing at least one worm wheel rotatably disposed on the casing and a worm engaging in this worm wheel, the axis of which coincides with the axis of the casing.
2. In a submarine periscope a casing, means for rotatably supporting this casing on a boat's hull, an ocular fitted to this casing, a tube adapted to contain at its upper end an entrance reflector and having its axis coinciding with the axis of rotation of the casing, the tube being displaceably disposed relatively to the casing in the direction of these axes, means for coupling the casing and the tube for joint rotation, and a gearing adapted to displace the said tube in the said direction and containing at least one worm wheel rotatably disposed on the casing and a worm engaging in this worm wheel, the axis of which coincides with the axis of the casing, the friction in the worm wheel and the worm being greater than that of the other parts of the gearing.

ADOLF STEINLE.