

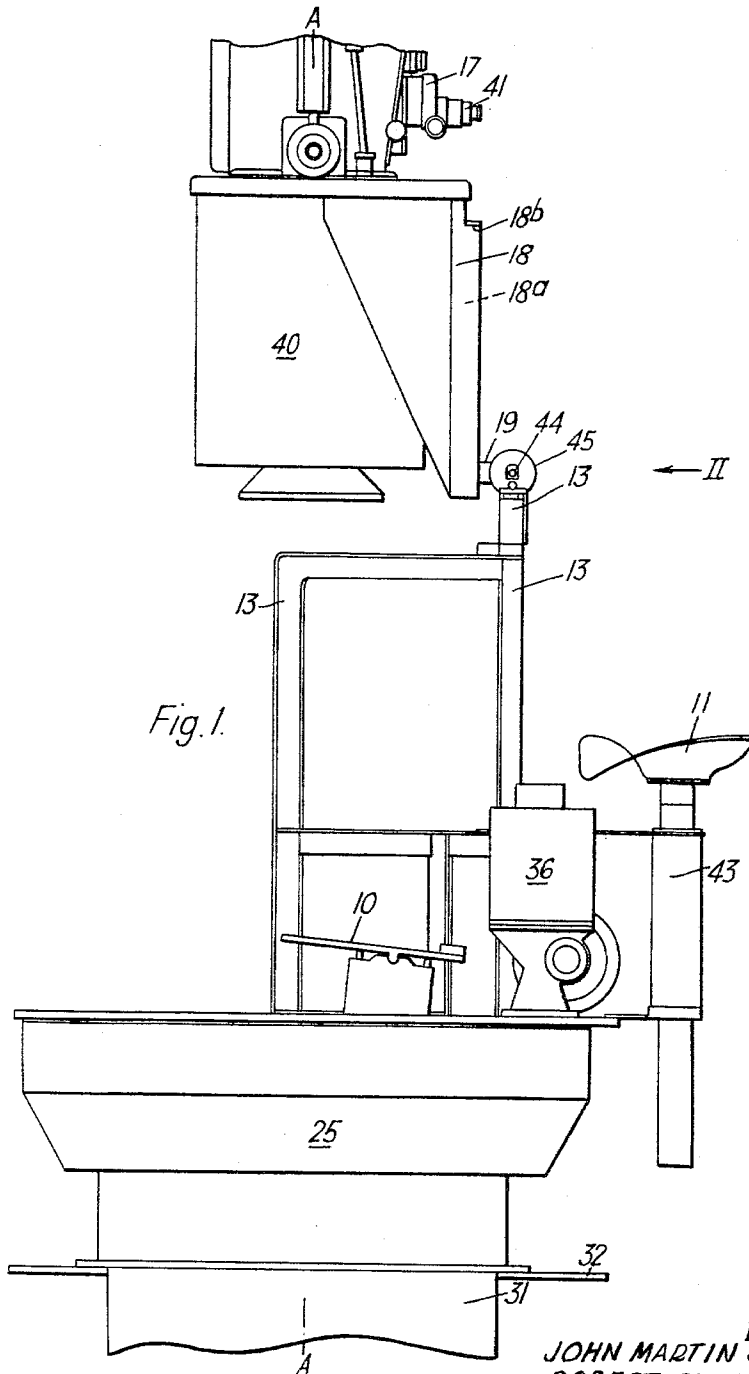
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J. M. STRANG ET AL
SUBMARINE PERISCOPES

3,229,575

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4 Sheets-Sheet 1



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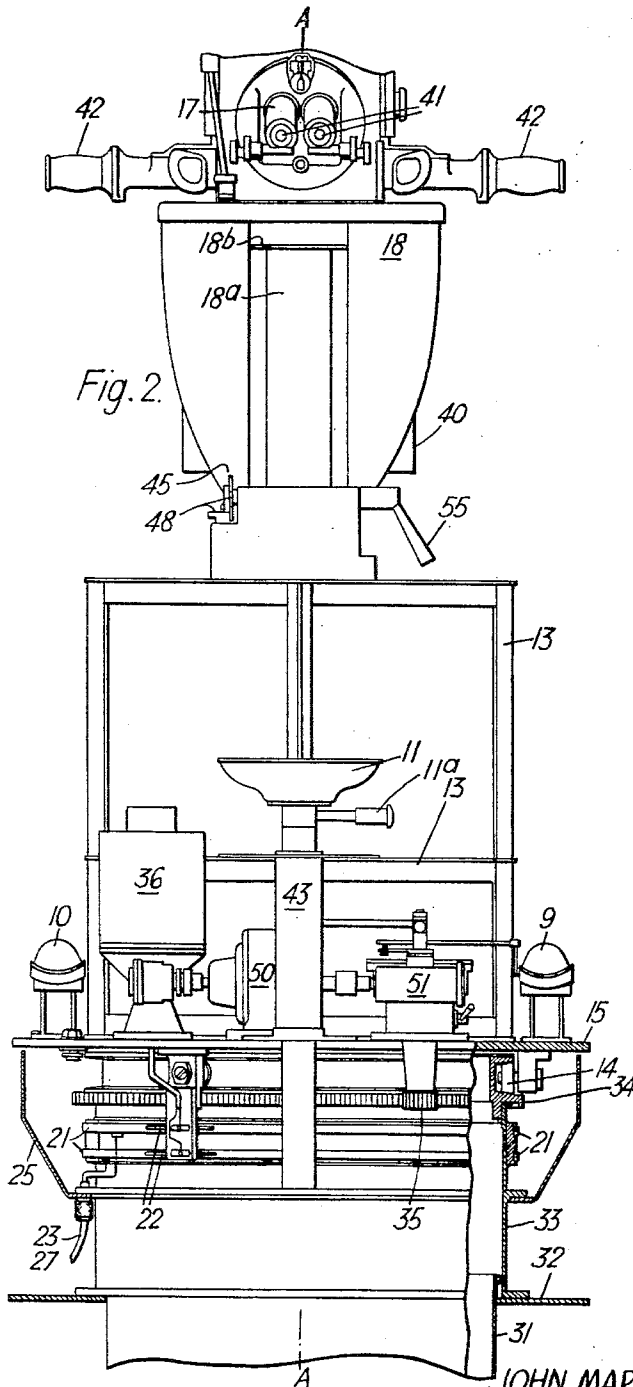
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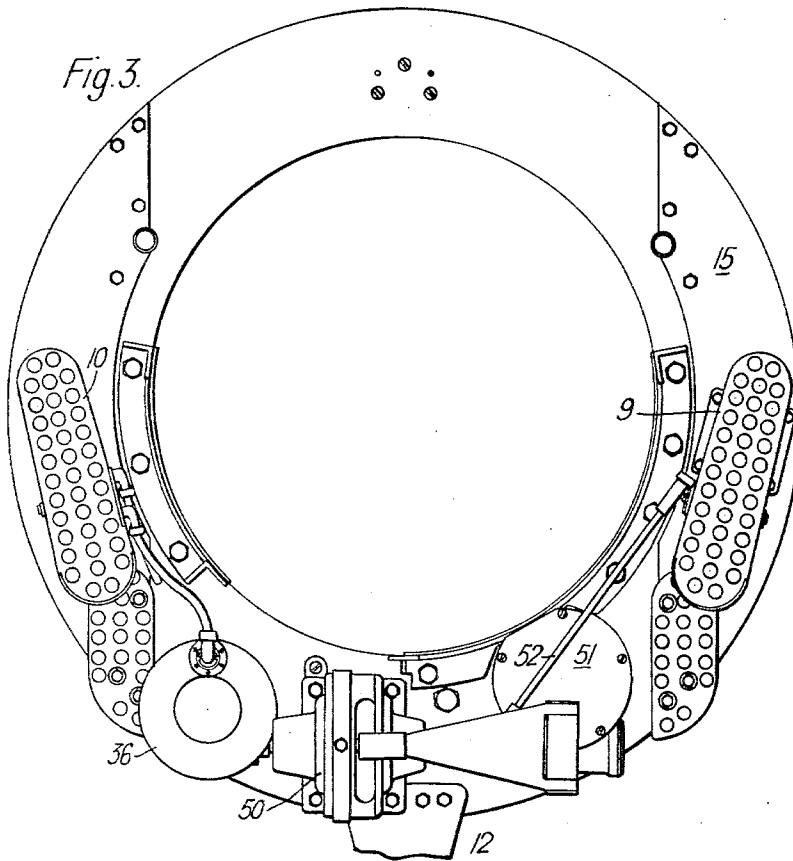
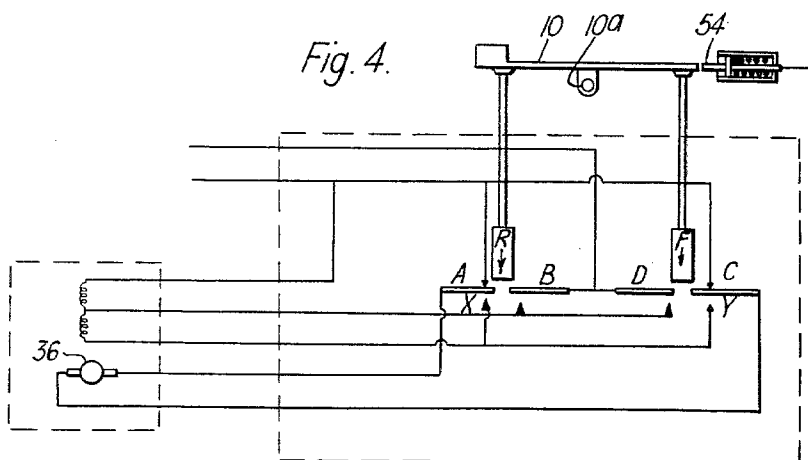
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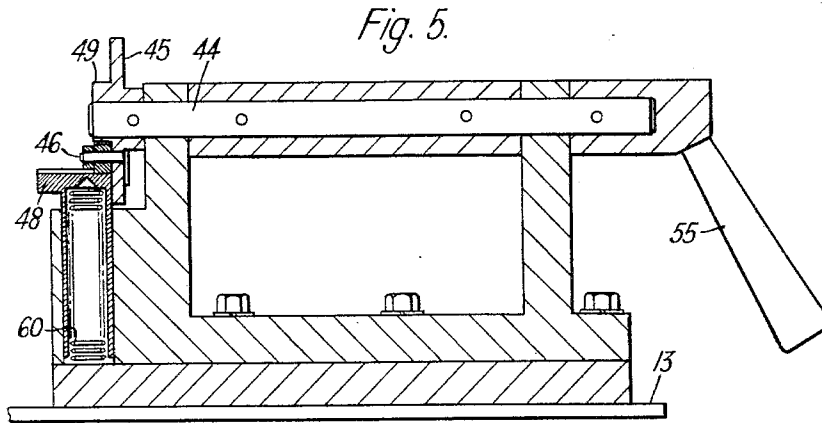
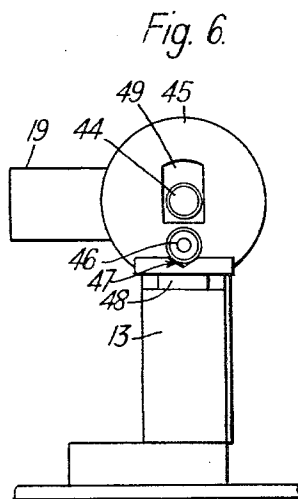
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SUBMARINE PERISCOPES

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11 Claims. (Cl. 88—69)

This invention relates to submarine periscopes.

In operation of a submarine periscope it is common to stow it when out of use in the lower part of the submarine, and to elevate it from the stowed position for use. The periscope is heavy, and when in use it has continually to be turned from side to side about its vertical axis, i.e. rotating in azimuth (normally called "training"), while from time to time it may be necessary slightly to raise or lower the periscope in the direction of its axis. The observer has to keep watch when using the periscope over long periods of cruising.

An object of the invention is to provide apparatus which will relieve the strain on the observer and will be relatively simple in construction and operation and will occupy a relatively small space.

The present invention is in combination a submarine periscope, a turntable having a mounting for an observer's seat, means for turning said turntable wholly or partly around the periscope, and a detachable driving connection between turntable and periscope.

More specifically the invention is in combination with a submarine periscope, a mounting for a seat, power driven means for turning said mounting around the axis of the periscope, control means operable by the observer to control said power means, a driving connection between said mounting and the periscope so that the periscope is caused to turn about its axis in unison with said mounting, and a release device adapted to release driving connection between said mounting and the periscope when it is desired to effect substantial movement of the periscope in the direction of its axis relative to said mounting.

The release device preferably releases automatically, and the control means may comprise two pedals operable by the observer. The observer's seat is preferably height-adjustable.

An embodiment of the invention will now be described merely by way of example with reference to the accompanying drawings, in which:

FIG. 1 is an elevation of a seat mounting and a periscope,

FIG. 2 is an elevation in the direction of arrow II, FIG. 1, but with certain parts broken away for clearness,

FIG. 3 is an enlarged plan view corresponding to FIG. 2, but with the periscope removed for clearness,

FIG. 4 is a diagram of an electrical control circuit for the drive of the periscope,

FIGS. 5 and 6 are respectively side and end elevations of part of the driving connection.

Referring particularly to FIGS. 1 and 2, A—A is the vertical axis of the periscope. The periscope 40 is shown in the elevated or working position but can be dropped down vertically into the stowed position in a periscope well 31 below the control room deck 32 of the submarine. The periscope face plate is shown at 17 having the usual eye pieces 41 and gripping handles 42 which may be used for manually turning the periscope about its vertical axis for training on a distant object.

An annular turntable 15 is provided with its centre at the axis A—A and forms a mounting for the observer's seat 11 which is vertically adjustable in a hydraulic

cylinder 43. The turntable can be turned around the axis of the periscope by means of an electric motor 36 operated under control by the observer by pedals 9 and 10 to drive a pinion 35 engaging a fixed annular rack 34 provided with a channel in which rollers 14 run and which carry the turntable 15.

Referring to FIG. 3, the motor 36 is geared to a Kopp variable speed gear or variator 50 operating a worm reduction gear 51 on the underside of which is the aforesaid pinion 35.

Power is supplied to the electric motor from a cable 23 through brushes 22 carried by the turntable and bearing on fixed slip rings 21.

An upstanding sleeve 33 is mounted on the control deck, and the slip rings and associated electrical parts are enclosed in a splash guard 25.

The turntable carries an upstanding framework 13 having at its upper end a projection 19 engaging a vertical guide slot 18a in a depending training bracket 18 mounted on the periscope. Projection 19 (see FIGS. 1 and 6) is carried on a spindle 44 carrying at one end a flanged wheel 45 having an eccentric roller projection 46 adapted to seat in a V-groove 47 at the upper end of plunger 48 which is spring urged upwardly by a spring 60 (FIG. 5).

A stop 49 projects from the face of the flanged wheel 45 and has two stop faces shown vertically in FIG. 6 adapted to function as hereinafter explained.

Pedal 10 is pivoted about its mid part at 10a and can be pressed downwards or released at one end or the other, to start or stop and to select clockwise or anti-clockwise direction of drive, while pedal 9 controls the speed of drive through variator 50. When pedal 10 is pressed it will depress either plunger R or F (FIG. 4), each of which will start the motor 36. Thus if F is depressed contact is broken at C and then made simultaneously at Y through change-over switches. Alternatively if plunger R is depressed contact is broken at A and made at X and B.

When the turntable has started to move and it is desired to increase its speed, pedal 9 is operated. Downward movement of the forward end pulls connecting link 52 (FIG. 3) causing operation of the change speed lever on said variator 50, and thus the speed of rotation is increased. Simultaneously a Bowden cable controlled by pedal 9 is released and a spring loaded locking bolt 54 engages and locks pedal 10 so preventing reversal of the motor until the speed control pedal 9 is returned to the position corresponding to the slowest speed of the variator.

The seat 11 is preferably arranged so that it may be pulled up by the operator to an elevated position and this opens a valve to allow hydraulic liquid to support the seat in its elevated position. To lower the seat a valve is released by the operator through control 11a to enable the seat to be pushed down to the required level, and closure of the valve enables the seat to be supported at the new level.

It will be evident that the operator while sitting on the seat may operate pedals 9 and 10 to swing the turntable as required and in doing so it automatically turns the periscope in unison with it by means of projection 19.

The guide 18a allows a certain amount of upward or downward movement of the periscope but normally for cruising purposes very little height adjustment is necessary.

If, however, the periscope is moved up so that the guide 18a leaves the projection 19, it might foul the projection when the periscope is moved down again and cause damage or disalignment. Furthermore it is desired from time to time to lower the periscope for stowing into the well 31 in which case the abutment 18b on 18 would strike the projection 19.

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In either of these events should the periscope thus tend to foul the projection, the latter is permitted to move downwards out of the operative position, and on roller 46 leaving groove 47 automatic dead centering action will occur by the plunger 48 causing the projection 19 to swing through 90° until the lefthand face (FIG. 6) on 49 abuts on the plunger whereat the projection 19 will be firmly retained in place.

Alternatively, should the periscope when being raised to the operative position cause 18b to foul 19 on the way upwards, the projection is again swung upwards and by dead centering action is maintained in the vertical position by the righthand face of 49 abutting on the plunger. Handle 55 (FIG. 5) is used for manually moving the projection 19 to and from the operative position.

We claim:

1. In combination, an upright, axially movable and axially turnable submarine periscope, a seat mounting power-driven and guided around the periscope in a path concentric with the longitudinal axis thereof, and coupling means for interconnecting the mounting and periscope to turn the latter in unison with the mounting, when the latter is driven, said coupling means comprising a projection on the mounting and a member on the periscope having an axially directed slot releasably engaged by said projection and of short length relative to the length of the periscope, so that the periscope may be moved axially a predetermined distance while the projection remains in engagement with said slot.

2. The combination claimed in claim 1, in which there is a pivotal connection between said projection and mounting by which said projection is pivotal between a substantially horizontal slot-engaging position and an upright position in which it is disengaged position from the slot, and said member on the periscope has a projection-engageable abutment at one end of said slot which automatically moves the projection to its upright position, when moved past same.

3. In combination with an upright, axially turnable submarine periscope mounted so that it may be raised and lowered between a stowed position and a height-adjustable sighting position, a mounting for an observer's seat power-driven and guided around the periscope in a path concentric with the longitudinal axis of the periscope, and a pin-and-slot driving connection between the mounting and periscope by which the periscope is turned axially with the seat mounting when the latter is driven, said pin being pivotal on the seat mounting between a substantially horizontal slot-engaging position and an upright position in which it is disengaged from the slot, and said slot being provided on the periscope and being elongated longitudinally thereof to permit height adjustment of the periscope in its sighting position and an abutment being provided on the periscope at one end of the slot which automatically moves the pin to its upright position when moved past same.

4. In combination, a periscope and a mounting for an observer's seat mounted and interconnected so as to be turnable in unison around a common axis, the periscope being an upright submarine periscope which can be raised and lowered between a stowed position and a height adjustable sighting position, and said common axis being the longitudinal axis of the periscope, and the connection between the mounting and periscope comprising a member on the periscope having an axially directed slot, and a substantially horizontal projection on the mounting engaging in said slot which permits height adjustment of the periscope in its sighting position, said projection being pivotal to an upright position, and said member having an abutment at one end of said slot which automatically pivots the projection to its upright position, when moved past same.

5. In the combination claimed in claim 4 a powered drive to the seat mounting and control means for said

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drive comprising two pedals operable by the observer, one for starting and stopping said turning movement in clockwise or anti-clockwise directions, and the other for varying the speed of turning.

6. The combination claimed in claim 5, in which means is provided automatically to prevent changes in turning from clockwise or anti-clockwise directions or vice versa unless the speed of turning is at a low value.

7. The combination claimed in claim 4, in which resilient means is provided urging said projection positively to its slot engaging and disengaging positions.

8. The combination claimed in claim 5, in which said mounting comprises an annular turntable, and said powered drive comprises a driven pinion wheel on the turntable engaging a fixed annular rack.

9. In a submarine periscope assembly comprising an upright axially extendable and axially turnable periscope adapted to be supported in a submarine, a mounting for an observer's seat, power driven means for turning said mounting around the axis of the periscope in a path concentric with the periscope axis, control means operable by the observer to control said power means, and coupling means for interconnecting the mounting and the periscope to turn the latter in unison with the mounting when the mounting is turned; said coupling means comprising coacting formations on the mounting and the periscope, at least one of said formations being elongated to maintain driving connection over a limited range of height adjustment of the periscope when the periscope is in a raised position relative to the submarine, and means for releasing the driving connection between said coacting formations when the periscope is lowered into the submarine to a predetermined extent.

10. The combination according to claim 9, including means for releasing the drive between said coacting formations when the periscope is raised to a predetermined extent.

11. A submarine periscope assembly comprising an upright, axially movable and axially turnable submarine periscope, means for axially moving said periscope between a retracted stored position and an extended sighting position, a seat mounting guided for movement around the periscope axis in a path concentric with the periscope axis, power driven driving means for driving said seat mounting in said path, and releasable driving connection means intercoupling said periscope with said seat mounting over a limited range of height adjustment of the periscope when the periscope occupies its extended sighting position for turning the periscope about the longitudinal periscope axis in unison with said seat mounting when the latter is driven, said driving connection means including means responsive to axial movement of the periscope for automatically releasing the driving connection between said periscope and mounting over the range of axial movement of the periscope lying beyond the limits of said limited range of height adjustment.

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