

H. H. CUMMINGS.
 SHIP'S LOG.
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Patented Feb. 16, 1915.

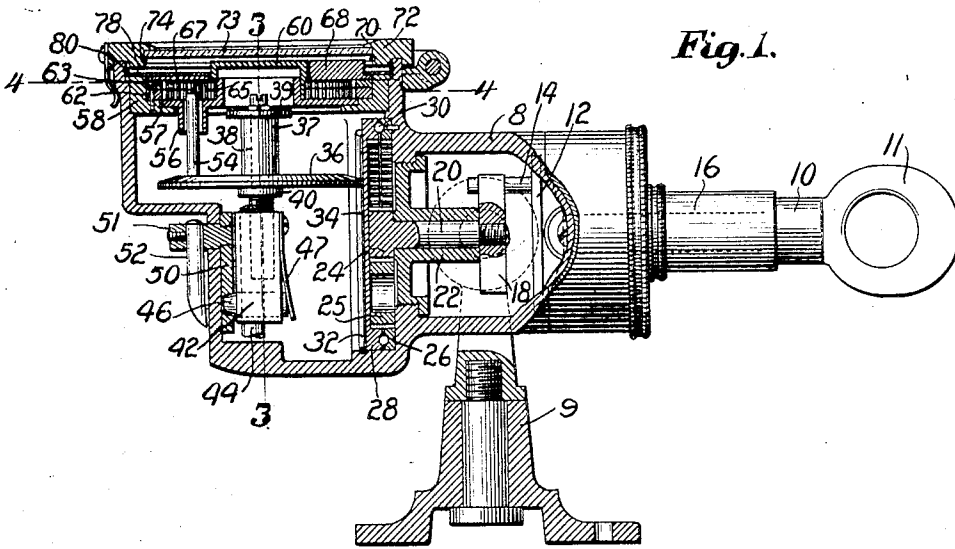


Fig. 1.

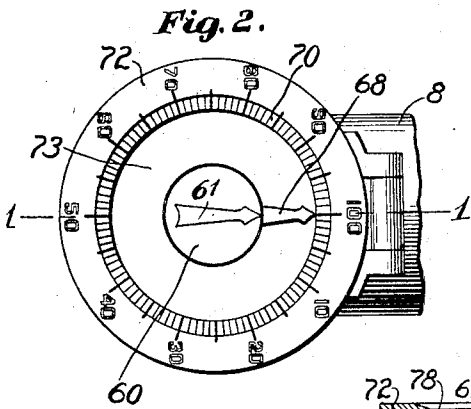


Fig. 2.

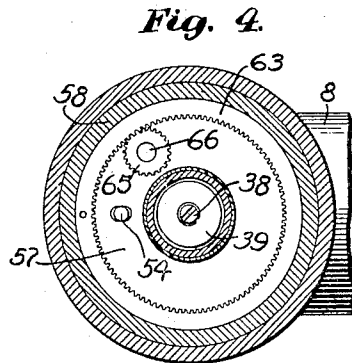


Fig. 4.

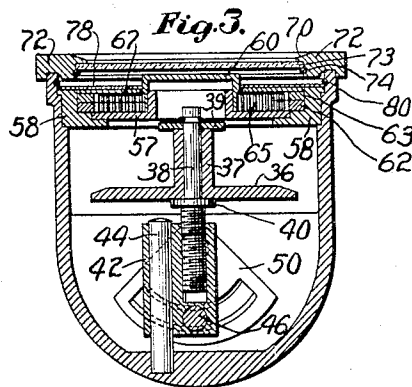


Fig. 3.

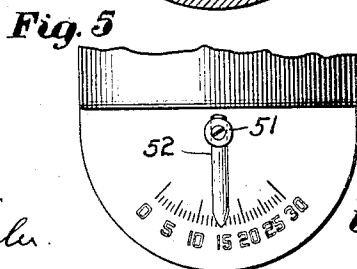


Fig. 5.

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UNITED STATES PATENT OFFICE.

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SHIP'S LOG.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY H. CUMMINGS, a citizen of the United States, and a resident of Newton, in the county of Middlesex and State of Massachusetts, have invented an Improvement in Ships' Logs, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

This invention pertains to ships' logs; and is designed to provide improvements in construction and organization which shall render a log simple in its operating mechanism, extremely accurate and readily adjustable.

The character of the invention can be best appreciated by reference to the accompanying drawings which show, merely for purposes of illustration, one of the embodiments of which the invention is susceptible.

In the drawings: Figure 1 is a side elevation, partly broken away, on a line 1-1 of Fig. 2, of a ship's log embodying this invention; Fig. 2, a plan view of the dials of the log shown in Fig. 1; Fig. 3, a vertical section on the line 3-3 of Fig. 1; Fig. 4 is a horizontal section on the line 4-4 of Fig. 1; Fig. 5 is a fragmentary end view, viewed from the left in Fig. 1.

The log comprises a main casting 8, appropriately trunnioned horizontally and pivoted vertically on a bracket 9 adapted to be mounted on the taffrail. Supported in any practicable manner at one end of the casting 8 is a shaft 10, having an eye 11 to which is attached the cable (not shown) having at its other end the usual fly or rotator. As is well understood in the art, the fly is rotated as it is towed through the water, thereby rotating its attached cable and the shaft 10 at a speed proportioned to the speed of the vessel.

At the inner end of the shaft 10 is fixed a disk 12, having a finger 14 which drives the mechanism of the log. The shaft 10 is preferably journaled in a casing 16, removably secured on the end of the casting 8. The driving finger 14 abuts against and rotates a radial arm 18 fixed at the end of a shaft 20 suitably journaled in bearings on a disk 22 which threads into a part of the casting. On the inner end of the shaft 20 is formed a pinion 24 engaging a floating pinion 25 meshing with the internal gears

of a stationary annulus 26 and a movable annulus 28, the latter having one more tooth than the former. Ball bearings 30 are interposed between the two annuli and the annulus 28 is held in place by a circular spring clip 32 seating in an adjacent part of the casting 8. The annulus 28 has a circular face plate or disk 34, preferably integral therewith, which as presently explained supplies the driving member of a disk and roller friction transmission.

The system of gearing above described preferably greatly reduces the speed of the shaft 10 to a slow speed of rotation of the disk 34.

Engaging the disk 34 by roller friction, and driven thereby, is a disk 36, having a hub 37 mounted upon a stud 38 and confined against axial movement on said stud by collars 39 and 40, fixed on the stud. At its other end the stud 38 threads into a block 42 which (Fig. 3) is freely pivoted on a pin 44. A plug 46, having a sliding fit in a seat in the block 42, is pressed toward the left in Fig. 1, by a spring 47 carried on the block, this arrangement tending to rock the block 42 horizontally on its pin 44 so as to hold the disk 36 firmly but yieldingly in engagement with the driving disk 34.

Referring to Fig. 3, the plug 46 fits in a slightly eccentric cam slot in a quadrant 50, fast to a shaft 51 which projects to the exterior of the casting 8 and has fixed thereto an index 52. By turning the index 52, its shaft and the quadrant 50, the plug 46 is cammed vertically so as to move the block 42 upwardly or downwardly on its pin 44. This serves as a self-locking means to adjust the driven disk 36 toward and from the axis of the driving disk 34, in order to vary the speed of transmission, to compensate for decreased efficiency in the driving rotation of the towed fly occasioned by slipping of the latter as the speed of the vessel increases. That is to say, when a vessel is going at high speed, as is well understood, there is greater tendency for the fly to slip through the water without effectively rotating than is true at a low speed. Accordingly, without a compensating adjustment the accuracy of the log indications would decline with an increase in speed of travel. The index 52 constituting a grasping member, exterior to the casting 8 and readily accessible and observable, cooperates with a

graduated scale having thereon different speeds of travel of the vessel. The index 52, being turned to register with any given graduation, adjusts the variable speed transmission devices so that the driven speed of the log mechanism is changed sufficiently to compensate for the varying efficiency, *i. e.* to compensate for the degree of slipping in the drive by the fly prevailing at the speed indicated on the scale. Fixed upon the disk 36 is a vertically disposed pin 54, projecting into a depending sleeve 56 preferably integral with a disk 57 having an annular seat on a ring 58 preferably stationary in the casting 8. Mounted upon the disk 57 is a removable thimble 60, having upon its top an index 61 which indicates the movement of the disk 57. Fixed to the ring 58, and therefore normally stationary in the casting 8, is an internally toothed annulus 62; and superposed thereupon is a second internally toothed annulus 63, the latter having one more tooth than the former. Meshing with both said annuli is a pinion 65, journaled on a stud 66 projecting upwardly from the driven disk 57. Thus the orbital movement of the pinion 65, meshing with the stationary annulus 62 and the movable annulus 63, rotates the latter through the distance of one tooth for each complete revolution of the disk 57. Pinned to the movable annulus 63 so as to rotate therewith is a dial disk 67, having thereon (Fig. 2) an index 68 which cooperates with a scale 70 provided on a hinged lid 72, said scale being graduated in one hundred parts. The gearing between the disk 57 and the disk 67 is such that for each revolution of the former (turning the index 61 once completely around) the index 68 is moved through a hundredth part of a revolution, that is, from one graduation to the next. Thus, if a complete revolution of the disk 57 indicates a knot of travel of the vessel, each graduation of the scale 70 would also indicate a knot and a complete trip of the index 68 around the scale 70 would indicate one hundred knots of distance. The hinged lid 72 has a circular, transparent panel 73, held in its seat by a spring clip 74. The movable annulus 63 preferably merely rests with sliding contact upon the annulus 62; and it may be held in its proper position by a thin, annular plate 78 resting thereon and retained in place by a spring clip 80.

It may frequently occur that the fly or rotator, in handling, may have one of its blades broken, bent, distorted or otherwise affected, so as to vary its efficiency and interfere with its accuracy as regards its intended relation with the log mechanism which it propels. An error in the record of distance traversed, arising from such causes, may be detected with considerable accuracy by comparison of the record with the calcu-

lated distance traveled obtainable from bearings of latitude and longitude taken from time to time.

One feature of the present invention pertains to an adjustment for a log mechanism whereby any change in efficiency due to mutilation of the fly may be compensated so as to eliminate the effect of the mutilation upon the indicated log record. To illustrate this feature of the invention, the described embodiment utilizes the variable speed transmission between the driving disk 34 and the driven disk 36. By lifting the hinged lid 72 and removing the thimble 60 access may be had, through a central aperture in the disk 57, to the slotted head of the stud 38 which threads into the block 42. It will be remembered that said stud 38 carries fixed collars 39 and 40, between which is journaled the hub 37 of the disk 36. Accordingly, by turning the stud 38 through its slotted head it may be vertically adjusted so as to move the disk 36 toward and from the axis of the driving disk 34, thereby varying the speed of transmission. The desired extent of variation in the speed of transmission may be ascertained by checking up the indicated record of distance traveled with the calculated distance. Thus, if the former is less than the latter the stud 38 and its disk 36 should be adjusted upwardly to increase the speed of transmission; and vice versa.

It will be seen that the invention comprises a valuable method of regulating ships' logs which, for illustration, consists in comparing recorded distance with calculated distance, and varying speed transmission in the log mechanism to compensate for error.

It is to be understood, of course, that the invention is not limited to the specific details of construction, organization and mode of operation hereinbefore set forth since, as will appear to those familiar with the art, the invention may be variously embodied and the features thereof may be used in numerous combinations and subcombinations, and may be employed also separately to advantage.

Claims:

1. In a log mechanism, the combination of driving means, driven indicating means driven by said driving means, and means operative to change the transmission of motion between said driving and driven means to compensate for varying efficiency of the fly at different speeds, the last-mentioned means including an automatically-acting locking device for preventing accidental change in adjustment.

2. In a log mechanism, the combination of driving means, driven means, a casing therefor, a grasping member exterior to said casing, and means actuated by said grasping member to cause change of ratio of revolu-

tion between said driving and driven means with varying speeds of travel of the towed fly, the last-mentioned means including a locking device for locking said driving and driven means in the desired driving relation while permitting adjustment under the influence of said grasping member.

3. In a log mechanism, the combination of driven indicating means; driving means; a casing inclosing said driving and driven means; speed changing means to vary the relative operation of the driving and driven means at different speeds of travel; and indicator means external to said casing cooperating with the speed changing means to indicate adjustments appropriate to respective speeds of travel.

4. In a log mechanism, a combination of fly-controlled driving means; driven indicating means; means to adjust the transmission of motion therebetween to suit variations in effectiveness of the fly control at different speeds of travel; and indicator means having graduations representing units of travel per interval of time to indicate appropriate adjustments for different respective speeds of travel.

5. In a log mechanism, the combination of driving means; driven indicating means; driven by said driving means; means to vary the relative operation of the driving and driven means to compensate for loss of efficiency in the driving means; and means to vary the relative operation of the driving and driven means to compensate for inaccuracy resulting from injury to the driving means.

6. In a log mechanism, the combination of driven indicating means; driving means; a connection between said driving and driven means; and means to vary the operative relation of said driving and driven means by adjustment of said connection, including an index and self-locking means actuated by said index for shifting said connection.

7. In a log mechanism, the combination of driven indicating means; driving means; a connection between said driving and driven means; and means to vary the operative relation of said driving and driven means by adjustment of said connection, including a manually shiftable cam having its cam-path transverse to the direction of said adjustment, and means actuated by said cam for shifting said connection.

8. In a log mechanism, the combination of

driven indicating means; driving means; a connection between said driving and driven means; and means to vary the operative relation of said driving and driven means by adjustment of said connection, including a manually shiftable cam having a curved track, and means engaging said track for shifting said connection.

9. In a log mechanism, the combination of driven indicating means; driving means; a connection between said driving and driven means; and means to vary the operative relation of said driving and driven means by adjustment of said connection, including a manually shiftable cam, and spring-pressed means engaging said cam for shifting said connection.

10. In a log mechanism, the combination of driven indicating means; driving means; a connection between said driving and driven means; and means to vary the operative relation of said driving and driven means by adjustment of said connection, including a manually shiftable cam, means actuated by said cam for shifting said connection, and a spring tending to hold said cam in fixed position.

11. In a log mechanism, the combination of driven indicating means; driving means; an axially shiftable driving connection between said driving and driven means; and means to vary the operative relation of said driving and driven means by axially shifting said connection, including an axially shiftable spindle upon which said driving connection is loosely mounted, and means to restrain said driving connection against axial movement relative to said spindle.

12. In a log mechanism, the combination of driven indicating means; driving means; an axially shiftable driving connection between said driving and driven means; and means to vary the operative relation of said driving and driven means by axially shifting said connection, including an axially shiftable screw-threaded spindle upon which said driving connection is loosely mounted; and a member with which said spindle has screw-threaded engagement.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HENRY H. CUMMINGS.

Witnesses:

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EVERETT S. EMERY.