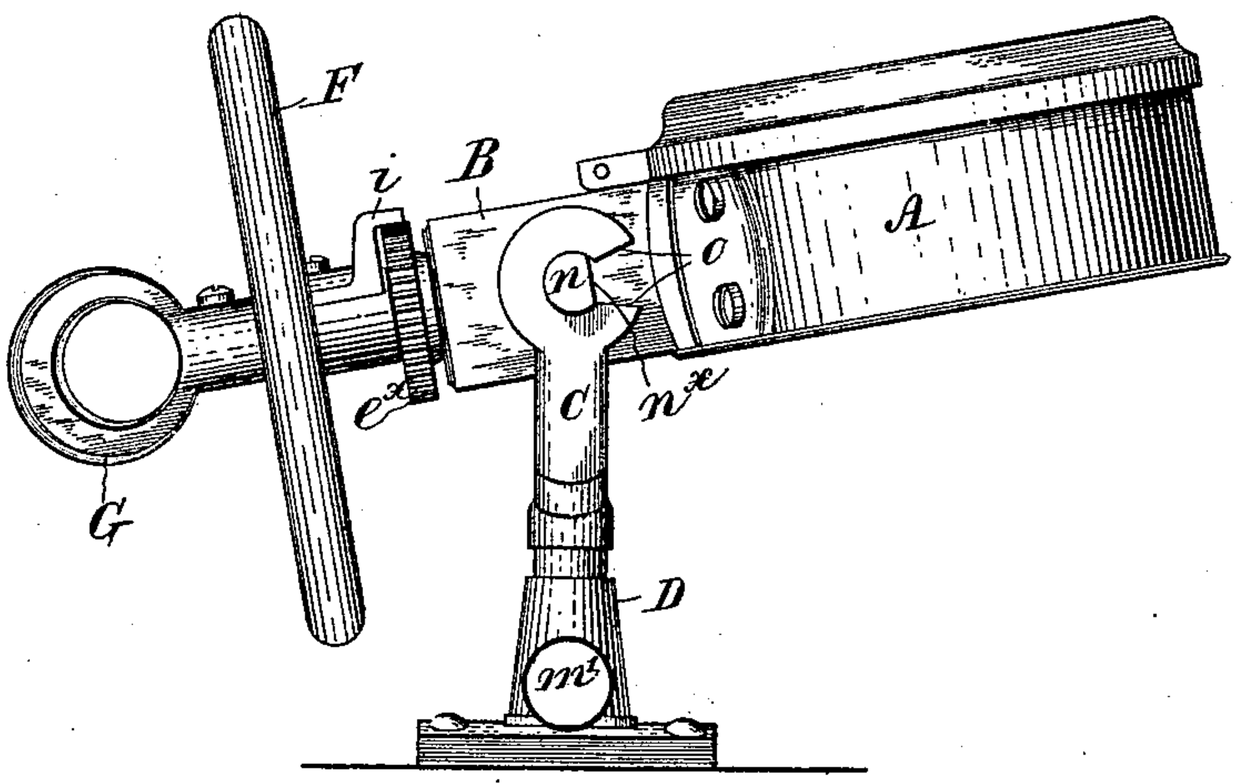
(No Model.) 2 Sheets—Sheet 1.

J. S. NEGUS.

SHIP'S LOG.

No. 481,241. Patented Aug. 23, 1892.

FIG. I.



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(No Model.)

2 Sheets—Sheet 2.

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FIG. 2.

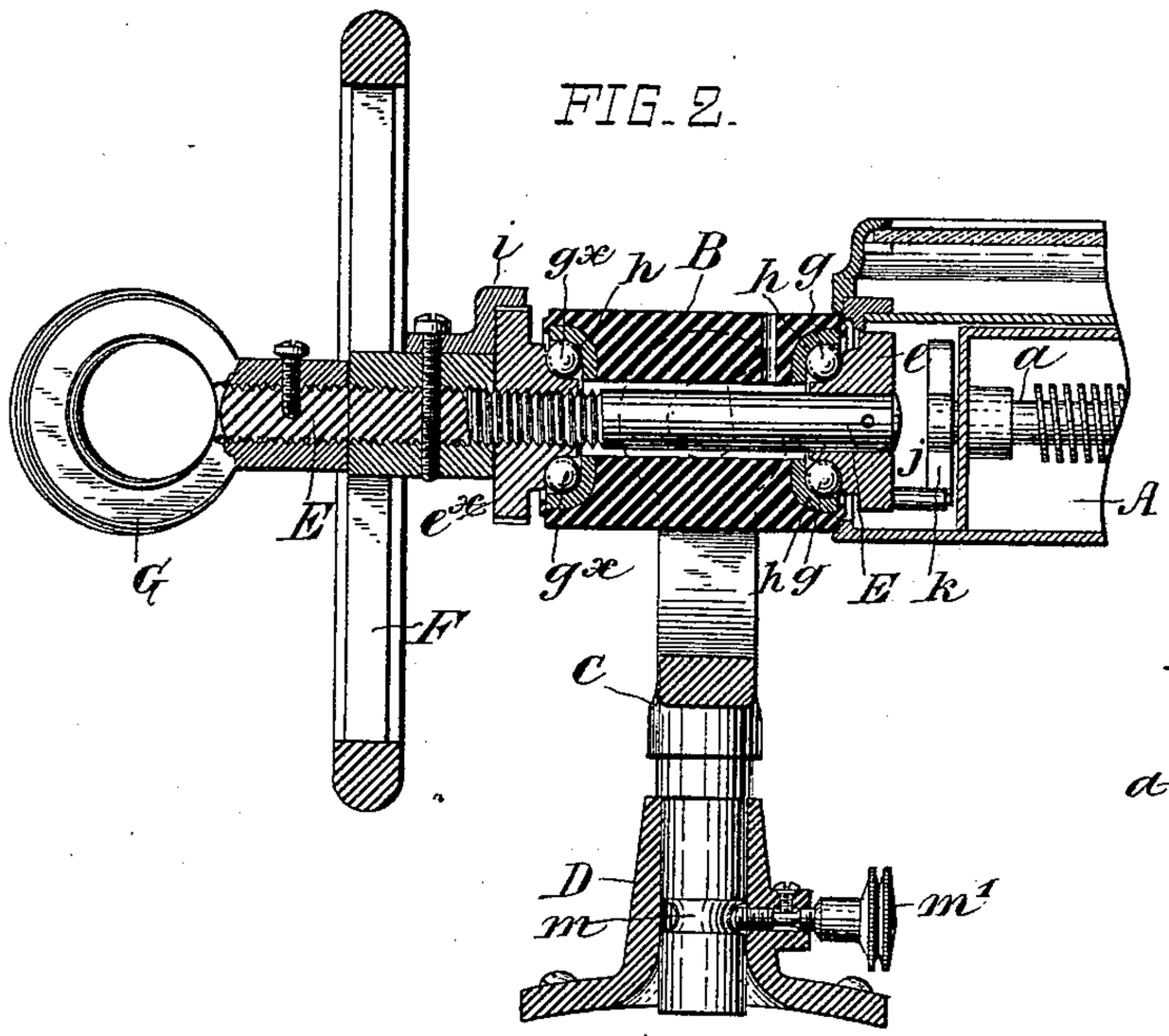


FIG. 2ª.

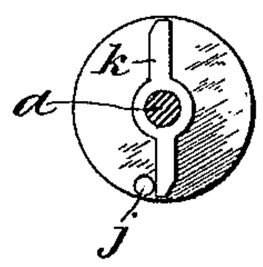
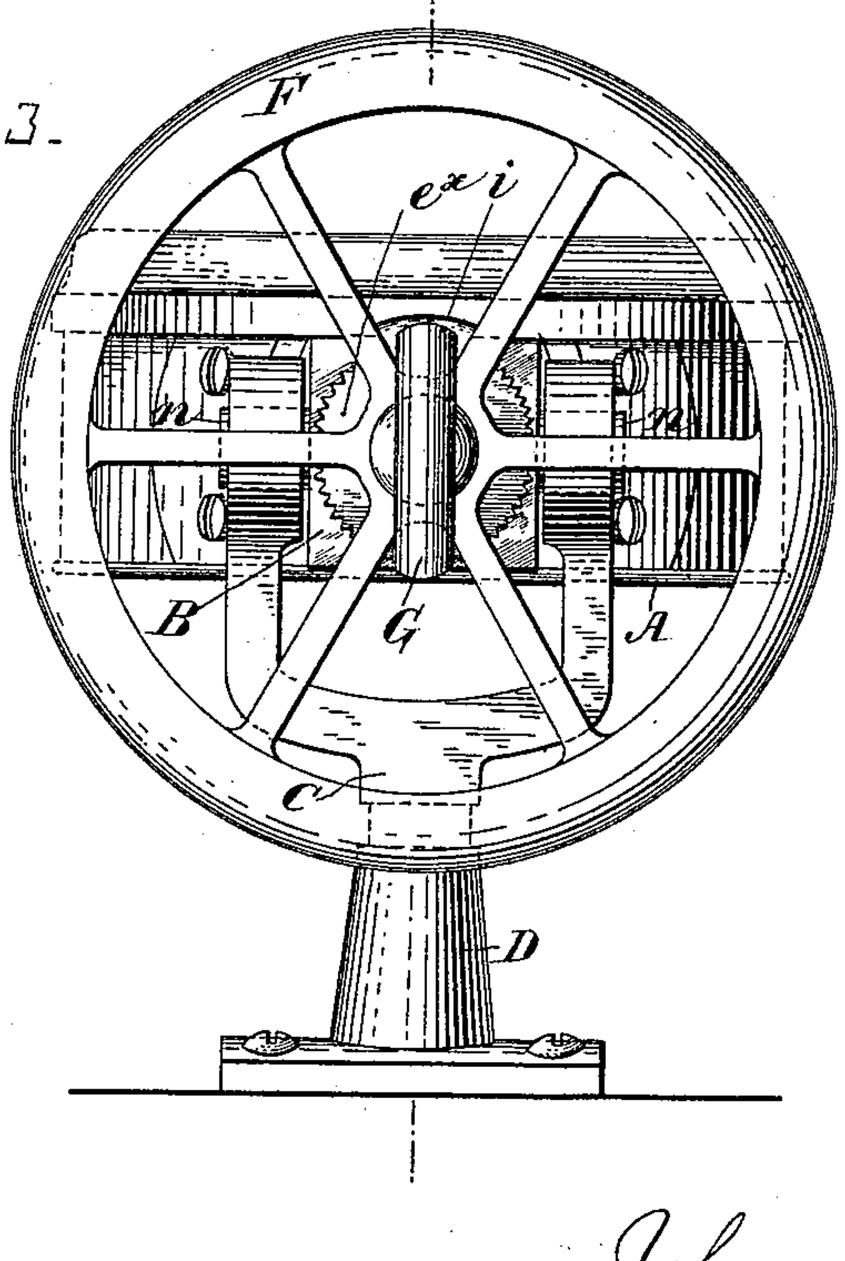


FIG. 3.



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UNITED STATES PATENT OFFICE.

JOHN S. NEGUS, OF BROOKLYN, NEW YORK.

SHIP'S LOG.

SPECIFICATION forming part of Letters Patent No. 481,241, dated August 23, 1892.

Application filed April 22, 1892. Serial No. 430,181. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. NEGUS, a citizen of the United States, and a resident of Brooklyn, Kings county, New York, have invented certain Improvements in Ships' Logs, of which the following is a specification.

My invention relates to that class of ships' logs wherein a registering mechanism on board the moving vessel indicates the rotations of a propeller or rotator in the water through the medium of a rope or line. When logs of this character are used in rough water, the motion of the vessel and the lateral swerving of the rotator-line put the latter under varying strains and cause it to whip or lash about, thereby subjecting the spindle of the registering mechanism, to which the line is secured, to severe side draft in addition to the direct "pull" of the rotator. Under these conditions the rotative force of the rotator is applied through the line to said spindle with great irregularity, causing the latter to "race" or rotate with excessive rapidity at times and at other times to nearly or quite stop, and this tendency is greatly increased by the heavy side draft and consequent increase in friction to which the spindle of the log as ordinarily constructed is frequently subjected. Some attempt has been made in constructing such logs to lessen the friction which resists rotation of the spindle when a direct longitudinal pull is applied thereto, antifriction-rollers being interposed between the bearing-surfaces, but so far as I am aware no attempt has been made to lessen the friction and wear produced by the lateral or oblique strains applied to the spindle; and the object of my invention is in part to provide an antifriction-bearing at its inner end to reduce the friction due to the direct longitudinal pull and another antifriction-bearing at its outer end to reduce the friction due to lateral or oblique strains.

Other features of the invention relate to the mounting of the log in swivel-bearings.

My invention will be fully described hereinafter, and its novel features carefully defined in the claims.

In the accompanying drawings, which illustrate a ship's log embodying my improvements, Figure 1 is a side elevation of log or of that portion embodying my improvements. I have not deemed it necessary to show the rotator and its line, as they may be of the usual kind. Fig. 2 is a longitudinal vertical section of the log on a somewhat larger scale than Fig. 1. This view shows only a part of the case containing the registering mechanism. Fig. 2ª is a detail view of the driver of the registering mechanism. Fig. 3 is a front or end elevation of the log, as seen from the left in Fig. 2.

A represents the case, which contains the registering mechanism, which latter, being of the usual kind, is not illustrated fully. In Fig. 2, *a* is the driving worm-shaft of this mechanism, and from this the train and index are driven.

B is a bearing-block secured to the case A and mounted on trunnions in the fork C, which is rotatively mounted in a socketed base D.

E is the spindle of the log, which passes through the block B and bears on its outer end a balance-wheel F and a ring or eye G, to which the rotator-line is secured.

The manner of providing antifriction-bearings for the spindle E in the block B is an important feature of my invention, and this I will now describe with especial reference to Fig. 2. On the inner end of the spindle E is secured a collar or bearing-head *e*, which has an annular concave track on its face, and between this track and a similar concave track formed in the inner end of the bearing-block B are placed steel balls *g*. These balls and their tracks form an antifriction-bearing to reduce or eliminate the friction which opposes rotation of the spindle when a direct pull is exerted by the rotator. At the other or outer end of the block B the spindle E is provided with a similar antifriction-bearing designed to reduce or eliminate the friction which opposes rotation of the spindle when subjected to lateral or oblique strains. This latter bearing is formed by a collar $e^{\times}$ on the spindle, similar to or like the collar *e*, and steel balls $g^{\times}$, interposed between the concave track on this collar and a similar concave track formed in the end of the block B. The tracks in the ends of the block may be formed of annular concave plates *h*, set in recesses in the block. By inspection of Fig. 2 it will be seen that no part of the spindle E bears on

the block, the only bearing being on the two sets of balls, and it will also be noted that the bearing-collars *e* and $e^{\times}$ embrace the block and balls in such a manner as to prevent any endwise play of the spindle. Furthermore, it will be noted that any side draft or lateral strains applied to the outer end of the spindle will be transmitted outward through the balls $g^{\times}$ to the track in the block. Any undue looseness of the spindle in its bearings due to wear may be taken up by screwing the collar $e^{\times}$ inwardly upon the spindle, said collar being screwed thereon. The collar $e^{\times}$ has notches in its periphery and is held against rotation by means of a dog *i* on the boss of the wheel F, adapted to engage one or more of said notches. The spindle E drives the worm-shaft *a* through the medium of a crank-stud *j* in the collar *e*, which engages a cross-piece *k* on the end of the worm-shaft *a*.

The stem of the fork C, where it finds a rotative bearing in the base D, has a shoulder where it rests on said base and a circumferential groove *m*, which receives the tip of a retaining-screw *m'*, as seen in Fig. 2.

Fig. 1 illustrates the construction of the mounting of the block B on trunnions in the fork. In the two prongs of the fork are formed bearings to receive the trunnions *n* on the block, and in order that the said trunnions may pass into the bearings by a lateral movement and afterward be retained in place therein an entering-slot *o* is formed in the side of each prong and opening into the bearing. This slot is somewhat less in width than the diameter of the trunnion *n*, and the latter is cut away at $n^{\times}$, so as to reduce it sufficiently to allow it to pass through the slot. The plane of the flattened face at $n^{\times}$ is arranged substantially at right angles to the axis of the bore in the block B, through which the spindle E passes. The object of this is to render it necessary to turn the instrument upright, with the bore of the block B substantially vertical, before the trunnions can be passed laterally through the slots into their bearings, and this must be done before the spindle E is secured in its bearings in the block. After the parts of the instrument are assembled and secured together, as in Fig. 1, it cannot be dismounted without previous removal of the parts necessary to allow the spindle E to be withdrawn from the block B. The balance-wheel F is concentrically mounted on the spindle E, exteriorly of the outer bearing of the latter, and its purpose is to impart an even rate of speed to the spindle under the rotative force applied irregularly thereto by the rotator-line.

As herein shown, the case A and block B are made separately, the block being secured to the case by means of screws; but this particular form is not essential and may be varied. For example, the case and block may be made integral and they may be of any suitable form.

Having thus described my invention, I claim—

1. In a ship's log, the combination, with a registering mechanism, its case provided with trunnions and the support in which said trunnions find a bearing, of the rotative operating-spindle E, provided near its inner end with a driver for said mechanism, and an antifriction-bearing to reduce the friction arising from the longitudinal strain or pull, and with a ball-bearing near its outer end to reduce the friction due to lateral and oblique strains, substantially as set forth.

2. A ship's log having its rotating spindle E provided with an antifriction-bearing near its inner end to reduce the friction arising from the longitudinal strain or pull, a ball-bearing near its outer end to reduce the friction due to lateral and oblique strains, and a balance-wheel fixed concentrically thereon.

3. The combination, with the rotator and rotator-line of a ship's log, of the block B, mounted to rock on trunnions, the register mechanism and its case, and the register-operating spindle rotatively mounted in said block and attached to the rotator-line, said spindle being provided with an antifriction-bearing near its inner end to reduce the friction arising from the longitudinal strain or pull, and a ball-bearing near its outer end to reduce the friction due to lateral and oblique strains, substantially as set forth.

4. In a ship's log, the combination, with the socketed support C, provided with trunnion-bearings having narrow openings *o* in their sides, of the block B, provided with trunnions *n*, having reduced flattened faces $n^{\times}$ substantially at right angles to the bore of said block, and the spindle E, rotatively mounted in said bore, substantially as and for the purposes set forth.

5. In a ship's log, the combination, with the socketed support C, provided with trunnion-bearings having narrow openings *o* in their sides, the block B, provided with trunnions *n*, having reduced flattened faces $n^{\times}$ substantially at right angles to the bore of said block, and the spindle E, rotatively mounted in said block, of the balance-wheel F, concentrically mounted on said spindle, substantially as and for the purposes set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

JOHN S. NEGUS.

Witnesses:
HERBERT BLOSSOM,
ROBERT MITCHELL.