Feb. 1, 1944. I. E. HOBBS 2,340,324

OCTANT TIME AND ALTITUDE CORRELATING DEVICE

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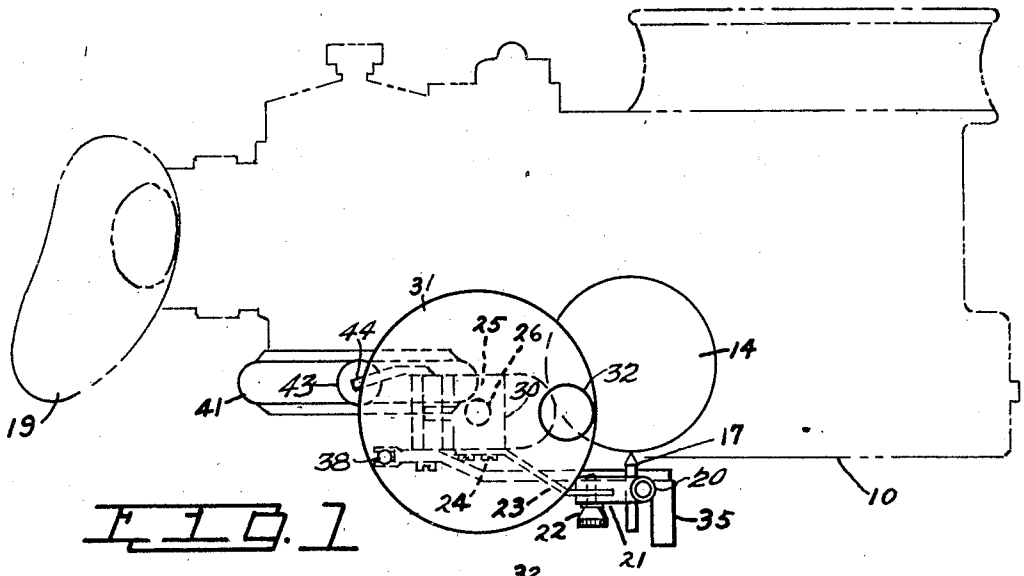

FIG. 1

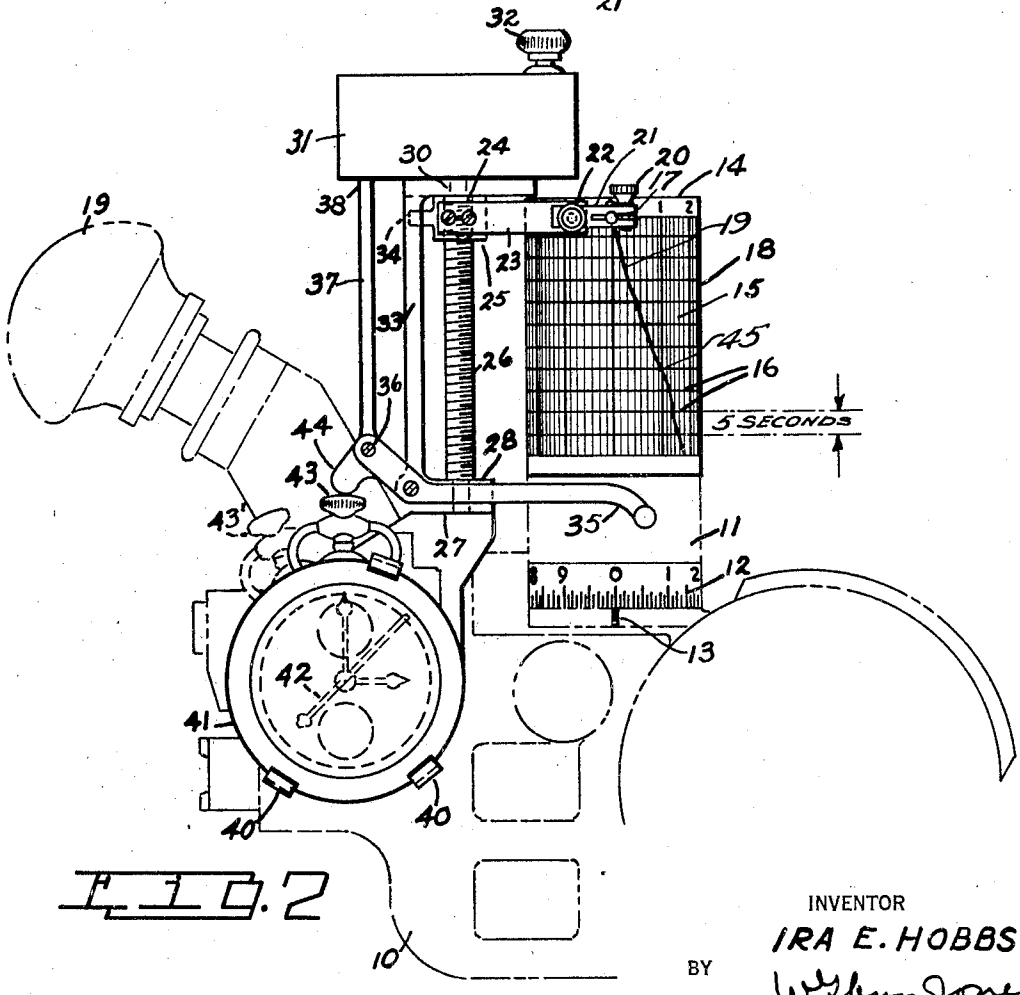

FIG. 2

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OCTANT TIME AND ALTITUDE CORRELATING DEVICE

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6 Claims. (Cl. 234—1)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

This invention relates to an octant time and altitude correlating device designed to permit automatic recording of both altitude and time when taking celestial observations with an aircraft octant. The octant to which this invention is to be applied is of the type disclosed in a patent to Carbonara, 1,970,543, dated August 21, 1934, reference to which is had for a detailed disclosure of the operation of the octant.

A further object of this invention is to provide an octant time and altitude correlating device which enables a single continuous celestial observation to be made over a period ranging up to one minute and to automatically record a continuous graph of the reading, so that when the observation is completed an average correlated time and altitude reading may be spotted on the graph and the time and altitude of the reading determined by time lines across which the graph extends.

With the foregoing and other objects in view, the invention consists in the construction, combination and arrangement of parts hereinafter described and illustrated in the drawing, in which,

Fig. 1 is a plan view of one form of time and altitude correlating device attached to an octant of the type shown in the above mentioned patent.

Fig. 2 is an elevational view of Fig. 1.

There is shown at 10 a schematic outline of the octant shown in the above mentioned patent, to which this invention has been applied. The octant 10 includes a micrometer drum 11 having graduations 12 which may be rotated over an index or lubber line 13. As an observation is made through the eye-piece 19 the micrometer drum 11 will be manually rotated back or forth, as necessary, in order to keep the observed celestial body properly in the field of view. A metal drum 14 of the same diameter as the micrometer drum 11 is mounted securely on top of the micrometer drum 11. This drum 14 is provided with longitudinal graduations 15 corresponding to the graduations 12 and with circumferential lines or graduations 16 spaced apart to indicate the time of travel of a marking pencil 17 thereover. A frosted Celluloid sleeve 18 is fastened securely over the drum 14 so that the vertical and circumferential or horizontal graduations 16 are visible therethrough, while the pencil 17 in operation will make an erasable graph line 19 on the sleeve 18 correlated to the vertical graduations 15 and circumferential time graduations 16 and readily erasable when the observation is complete.

The pencil 17 is secured by a thumb nut 20 in a pencil holder 21 secured by a second thumb nut 22 to a spring leaf 23 attached by screws 24 to a nut 25 threaded on a rotatable screw 26. The screw 26 is journaled at one end 27 in a bracket 28 mounted on the octant 10 and at the other end it extends through a foot 30 of a leg 33 and into a timing mechanism 31. This timing mechanism 31 contains a spring motor for rotating screw 26, the spring motor being powered by a manually operable winder stem 32. The timing mechanism 31 is supported on the foot 30 of leg 33. The leg 33 also cooperates with a tail 34 extending from the nut 25 to cause the nut 25 to move longitudinally on the rotatable screw 26 during operation.

Pivoted on the bracket 28 is a control lever 35 to which is linked at 36 a clock trip 37 having an end 38 extending into the timing mechanism 31 to start and stop it. A toe 44 extends downwardly from the lower end of clock trip 37. Mounted on the side of the octant 10 are a plurality of yieldable fingers 40 so spaced as to hold a stop watch 41 therein, the stop watch 41 including a sweep second hand 42 controllable by the watch stem 43. The watch is slightly rotatable within the spring fingers 40 to the dotted position 43' for winding and setting the watch when necessary.

In operation, the watch is inserted in clips 40 and rotated to place the watch stem 43 under the toe 44 of the clock trip 37 after the sweep second hand 42 of the watch is started in agreement with a chronometer. The octant is raised to operating position and when the celestial body is steady in the field of view through the eyepiece 19 the control lever 35 is tripped to start the clock mechanism 31 and stop the sweep second hand 42. The timing mechanism 31 through the rotatable screw causes the pencil 17 to descend over the face of the marking drum 18, it being noted that the pencil 17 is in vertical alignment with the index or lubber line 13. The timing mechanism 31 is such that the pencil 17 passes each circumferential marking 16 at five second intervals. Thus, as the pencil 17 descends while a continuous observation is being made, a graph line 19 is formed on the marking drum 18 which is correlated both to the graduations 15 corresponding to graduations 12 and to the time graduations 16. When the observation is completed the navigator can spot an average reading of the graph and the time of that reading will be shown by its relation to the nearest adjacent circumferential graduation 16 added to

the time on the stop watch 41. Thus, in taking a reading, by inspection, the navigator will observe that his average reading was at point 45 on the graph, which happens to be on the horizontal graduation 16 crossed by the marking pencil 17 thirty-five seconds after the observation was started. As shown by the position of the stopped second hand 42, the observation was started at three o-clock, no minutes and eight seconds, thus showing the exact time that the correct average observation was made to be three o'clock, no minutes and forty-three seconds, and hence this is the true time factor or chronometer reading used by the navigator in computing his location, as determined by the octant in customary manner, making use of vertical graduation 15 on which point 45 is located to determine his altitude, this vertical graduation 15 being an extension of graduation 12 on the drum 11, thus correlating his time and altitude reading.

Other modifications and changes in the proportions and arrangements of the parts may be made by those skilled in the art without departing from the nature of this invention, within the scope of what is hereinafter claimed.

The invention described herein may be manufactured and/or used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

Having thus set forth and disclosed the nature of this invention, what is claimed is:

1. A device for accurately ascertaining the time of taking the altitude of a celestial body by means of an octant, the octant including a rotatable drum manually manipulable for keeping the observed celestial body in the field of view over a period of time while the observer is on a rapidly moving vehicle, the rotatable drum having a plurality of vertical graduations thereon, the time ascertaining device comprising means on the rotatable drum for supporting a scribable cylinder in fixed relation thereto, the scribable cylinder having a plurality of vertical graduations thereon adapted to be aligned with the graduations on the rotatable drum, and a plurality of horizontal graduations thereon, a scribing means, a timing mechanism for moving the scribing means across the horizontal time graduations of the scribable cylinder, means for mounting a settable and stoppable time-keeping mechanism on the octant, and a single control means for simultaneously stopping the operation of said time-keeping mechanism and starting the operation of said timing mechanism to move the scribing means over the horizontal graduations, whereby the time of the observed altitude at any selected position along the continuous graph produced by the scribing means over the scribable cylinder is fixed as revealed by the stopped time-keeping mechanism, previously set in accordance with a chronometer, plus the running time interval of the timing mechanism as revealed by the position selected on the graph according to its location relative to the horizontal graduations, the observed altitude being fixed by the location of the selected position relative to the vertical graduations previously aligned with the vertical graduations on the drum of the octant.

2. A device for accurately ascertaining the time of taking the altitude of a celestial body by means of an octant, the octant including a rotatable drum manually manipulable for keeping the observed celestial body in the field of view over a period of time while the observer is on a rapidly moving vehicle, the rotatable drum having a plurality of vertical graduations thereon, the time ascertaining device comprising means on the rotatable drum for supporting a scribable cylinder in fixed relation thereto, the scribable cylinder having a plurality of vertical graduations thereon adapted to be aligned with the graduations on the rotatable drum, and a plurality of horizontal graduations thereon, a scribing means, a timing mechanism for moving the scribing means across the horizontal time graduations of the scribable cylinder, means for mounting a stop watch on the octant, and a single control means for simultaneously stopping the operation of said stop watch and starting the operation of said timing mechanism to move the scribing means over the horizontal graduations, said control means including a timing mechanism trip, a stop watch actuating toe on said trip, and a hand lever therefor, said stop watch mounting mechanism supporting the stem of the stop watch under the toe, whereby the time of the observed altitude at any selected position along the continuous graph produced by the scribing means over the scribable cylinder is fixed as revealed by the stopped stop watch previously set in accordance with a chronometer plus the running time interval of the timing mechanism as revealed by the position selected on the graph according to its location relative to the horizontal graduations, the observed altitude being fixed by the location of the selected position relative to the vertical graduations previously aligned with the vertical graduations on the drum of the octant.

3. A device for accurately ascertaining the time of taking the altitude of a celestial body by means of an octant, the octant including a rotatable drum manually manipulable for keeping the observed celestial body in the field of view over a period of time while the observer is on a rapidly moving vehicle, the rotatable drum having a plurality of vertical graduations thereon, the time ascertaining device comprising means on the rotatable drum for supporting a scribable cylinder in fixed relation thereto, the scribable cylinder having a plurality of vertical graduations thereon adapted to be aligned with the graduations on the rotatable drum, and a plurality of horizontal graduations thereon, a scribing means, a timing mechanism for moving the scribing means across the horizontal time graduations of the scribable cylinder, and manually operable means for controlling said timing mechanism.

4. A device for accurately ascertaining the time of taking the altitude of a celestial body by means of an octant, the octant including a rotatable drum manually manipulable for keeping the observed celestial body in the field of view over a period of time while the observer is on a rapidly moving vehicle, the rotatable drum having a plurality of vertical graduations thereon, the time ascertaining device comprising means mounted on said drum for rotation therewith, said means being provided with a plurality of vertical graduations adapted to be aligned with the vertical graduations on the rotatable drum, and also provided with a plurality of horizontal time graduations, a scribing means, and a timing mechanism for moving the scribing means across the horizontal time graduations.

5. A device for accurately ascertaining the time of taking the altitude of a celestial body by means of an octant, the octant including a rotatable drum manually manipulable for keeping the observed celestial body in the field of view over a

period of time while the observer is on a rapidly moving vehicle, the rotatable drum having a plurality of vertical graduations thereon, the time ascertaining device comprising means mounted on said drum for rotation therewith, said means being provided with a plurality of vertical graduations adapted to be aligned with the vertical graduations on the rotatable drum, and also provided with a plurality of horizontal time graduations, a scribing means, a timing mechanism for moving the scribing means across the horizontal time graduations, and manually operable means for controlling said timing mechanism.

6. A device for accurately ascertaining the time of taking the altitude of a celestial body by means of an octant which includes a manually operable thumb wheel rotatable about a vertical axis for keeping the celestial body in the field of view during a predetermined period of time, said thumb wheel having a plurality of vertical graduations on its periphery, said time ascertaining device comprising a rotatable drum member mounted coaxially on and rotatable with said thumb wheel for supporting a cylindrical scribable member, one of said members having a plurality of vertical graduations thereon adapted to be aligned with the vertical graduations of said thumb wheel and also having a plurality of horizontal circumferential graduations thereon, a scribing means movable vertically along said scribable member, and a timing mechanism for moving said scribing means vertically along said scribable member and transversely of said horizontal graduations.

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