April 6, 1948. C. O. ROTHWEILER 2,439,102

INDICATOR ADJUSTMENT FOR SEXTANTS

Filed June 12, 1944 3 Sheets-Sheet 1

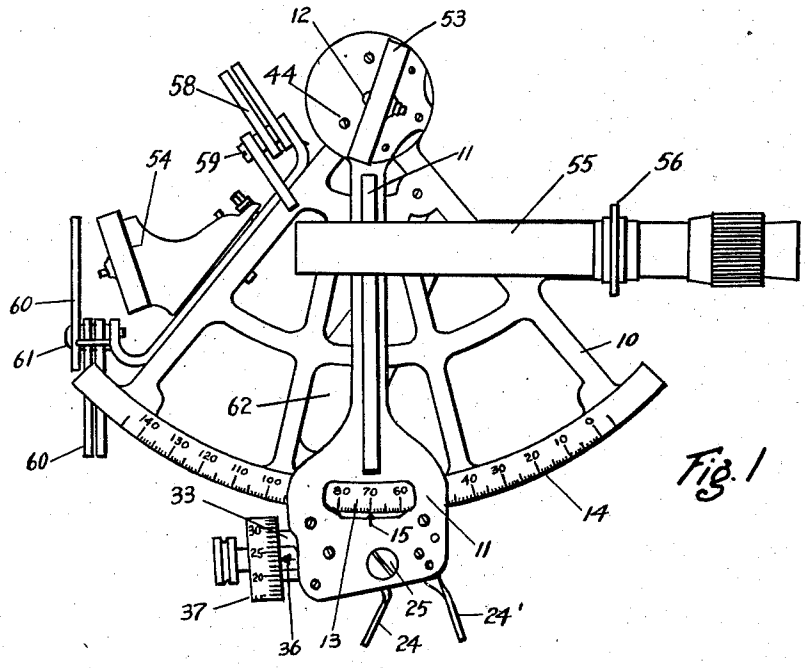


Fig. 1

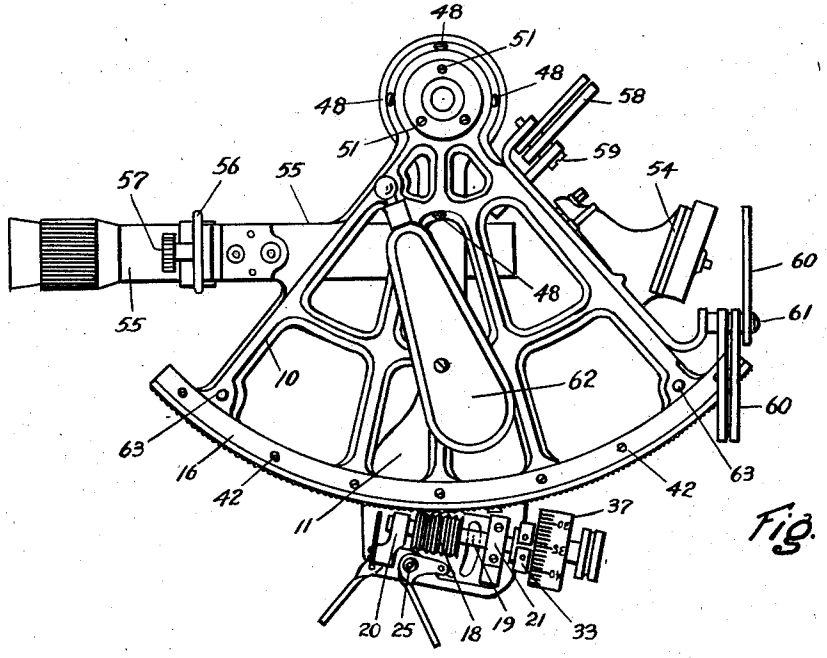


Fig. 2

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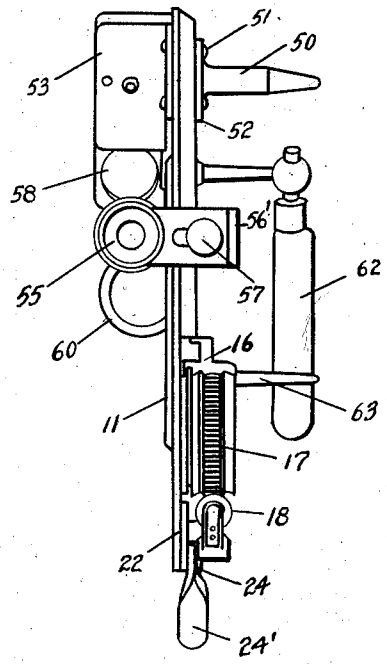


Fig. 3

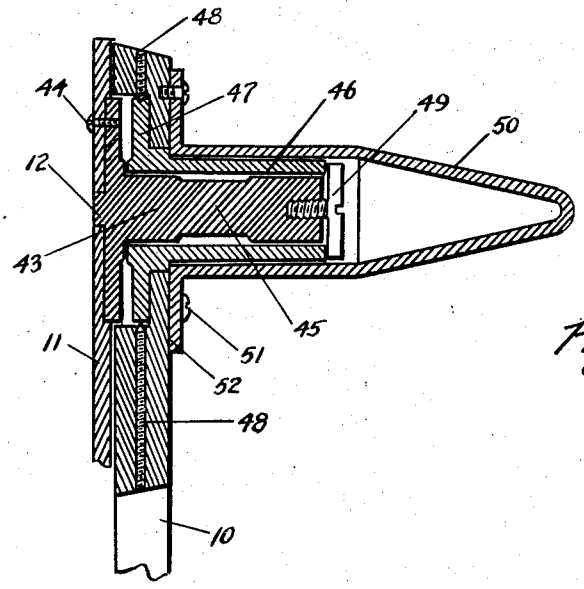


Fig. 4

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Filed June 12, 1944 3 Sheets-Sheet 3

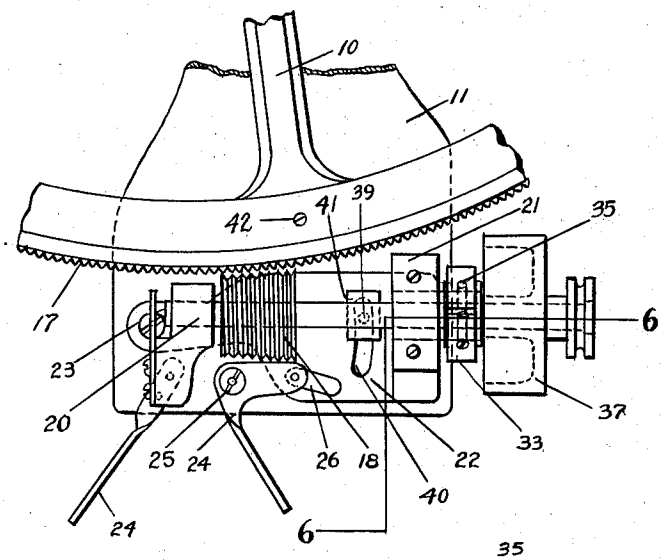


Fig. 5

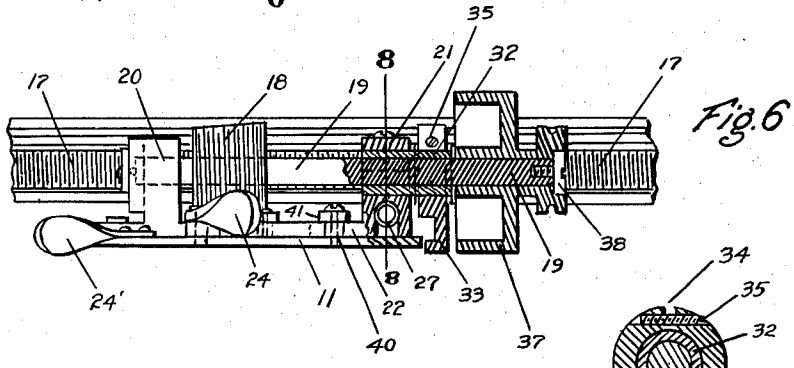


Fig. 6

Fig. 9

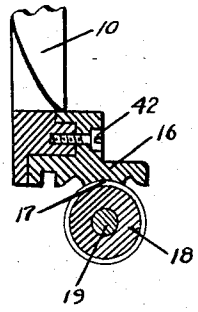


Fig. 7

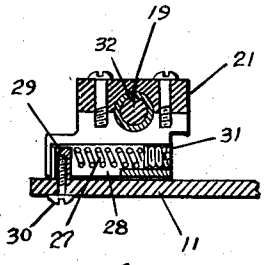


Fig. 8

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UNITED STATES PATENT OFFICE

2,439,102

INDICATOR ADJUSTMENT FOR SEXTANTS

Charles O. Rothweiler, Milwaukee, Wis.

Application June 12, 1944, Serial No. 539,843

3 Claims. (Cl. 116—124)

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My invention relates to improvements in sextants and more particularly to the type of sextant that is employed for measuring angular distances or observing altitude at sea to ascertain latitude and longitude.

The object of my invention is to provide a device of the character described that permits vertical and horizontal adjustment of the mounting of the index arm in the assembly of the device.

Another object of my invention is to provide a means of adjusting the index yoke in parallel relation to the micrometer index drum.

A further object of my invention is to provide an enclosed resilient means adjustably mounted into the frame supporting the worm, mounted on a shaft journaled in bearings, which shaft supports the micrometer index drum.

A still further object of my invention is to construct the arc of the sextant so as to enable an insert provided with the thread for engagement with the worm, to be separately mounted to the radius of the arc segment.

Other and further objects of my invention will become more apparent as the description proceeds when taken in conjunction with the drawings in which

Figure 1 is a plan view of the front of a sextant,

Figure 2 is a plan view of the rear of a sextant,

Figure 3 is an end view of a sextant when facing the telescope,

Figure 4 is a cross-sectional view of the bearing supporting the index arm to the arc segment,

Figure 5 is a fragmentary plan view of the end of the index arm showing the manner in which the worm is mounted on a shaft supported by bearings on an adjustable frame,

Figure 6 is a fragmentary cross-sectional view of the assembly shown in Figure 5 taken at the line 6—6 in Figure 5,

Figure 7 is a cross-section of the arc and arc insert together with the worm assembly,

Figure 8 is a cross-section of the bearing on the worm frame taken at the line 8—8 in Figure 6, and

Figure 9 is an end view of the index yoke slidably mounted onto a sleeve supported by the

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bearing in which the worm shaft is journaled.

Similar characters of reference indicate corresponding parts throughout the several views and referring now to the same, the character 10 shows the arc segment or frame of the device. There is an index arm 11 pivotally mounted at 12 to the arc segment 10. The index arm 11 is provided with a rectangular aperture 13 through which the characters 14 representing the degrees of angle inscribed on the arc segment are made visible. An indicating point 15 is shown inscribed on the face of the index arm 11 at the lower edge of the aperture 13.

The radial surface of the arc segment 10 is provided with an insert 16, having teeth 17 integral therewith. These teeth 17 engage the threads on a tapered worm 18, which is mounted on a shaft 19, journaled in a front bearing 20 and a rear bearing 21. The bearings are an integral part of a frame 22 which is pivotally mounted to the rearward side of the index arm 11 at 23, and a lever 24 pivotally mounted to the index arm 11 at 25 has a projecting member engaging a slot 26 in the frame 22, and when the lever 24 has pressure exerted thereon the frame 22 is caused to move downward thereby disengaging the worm 18 from the teeth 17 on the insert 16, which fastened to the radial surface of the arc segment 10. A lever 24' is permanently fastened to the index arc as shown and acts as a means for support when the lever 24 is acted upon.

Mounted within the bearing 21 is a spring member 27 as shown in Figure 8. The bearing 21 is provided at its lower side with a cavity 28 into which the spring 27 is placed. There is a stop member 29 fastened by means of a screw 30 through the index arm 11 as shown. This stop member 29 projects upward into the cavity 28 of the bearing 21. An adjustment screw 31 engages a threaded portion of the cavity 28 and thereby permits adjustment of the tension of the spring 27.

The shaft 19 being journaled in bearings 20 and 21 supports the worm 18. However the bearing 21 is provided with a sleeve 32 through which the shaft 19 passes. This sleeve 32 is longer than the width of the bearing 21, and extends outward therefrom to permit the mounting of an index yoke 33, which yoke is split at

34 and threaded to receive a clamping screw 35 as shown in Figure 9. The arrangement as described allows the index yoke 33 to be slidably adjusted onto the sleeve 32, either in horizontal alignment or in radial alignment therewith.

Inasmuch as the index yoke 33 carried an index arrow as shown at 36, the mounting of the index yoke permits this arrow to be adjusted to register with the readings on the micrometer index drum 37 fastened to the end of the shaft 19 and which when revolved will turn the shaft 19 and cause the worm 18 fastened thereto to revolve, forcing the index arm 11 in a radial path along the arc segment 10 due to the engagement of the worm 18 with the teeth 17 on the arc segment 10. The index drum 37 is fastened to the shaft 19 by means of the screw 38 as shown, or in any other convenient manner. By means of the clamping screw 35 the yoke 33 may be fastened onto the sleeve 32 in its correct position during the assembly of the completed device which eliminates any mechanical change in the machining of the parts.

The worm frame 22 is guided on the surface of the index arm 11 by means of a screw 39 being fastened to the index arc 11 and engaging a slot 40 in the frame 22. There is a washer 41 under the head of the screw 39 above the slot 40 in the frame. The assembly of the inserts 16 to the radial face of the arc segment 10 is shown in detail in Figure 7. The fastening of the insert 16 to the arc segment 10 is accomplished by means of the several screws 42 as shown.

In Figure 4 is shown in cross section the adjustable mounting of the index arm 11 to the arc segment 10. It will be noted that the center member 43, acts as a pivot point 12 and is fastened to the index arm 11 by means of screws 44. The member 43 has an inwardly projecting arm 45 engaging the shell center 46 which shell center is supported by means of its flanged face 47 contacting and resting upon the adjustment screws 48 in and through the arc segment 10. The center member 43 is held suspended within the shell center 46 by means of a slotted screw 49 and the entire shell and center member are protected from ready access which might cause tampering by means of a cover 50 fastened to the arc segment 10 with screws 51, through a flange 52 forming an integral part of the shell 50.

Attention is called to the fact that this manner of mounting the index arm 11 to the arc segment 10 will permit ready adjustment and support by means of the screws 48, this adjustment to be in any radial direction thereby enabling the person who assembles the complete unit to get accurate adjustment in any direction without having to make any mechanical changes on the parts themselves and to retain position of the parts 10 and 11 by means of the screws 48.

The device is provided as shown in Figures 1, 2 and 3 with the conventional type of index mirror as shown at 53, a horizon mirror 54 and a telescope 55, the telescope being adjustably mounted on the bracket 56 by means of the screw 57 engaging a bracket 56' which forms an integral part of the arc segment 10. There are colored lenses 58 adjustably mounted on a shaft at 59. These lenses are placed in direct alignment with the index mirror 53, and similar lenses 60 also adjustably mounted on the shaft at 61, are placed in direct alignment with the horizon mirror 54.

The conventional type of handle 62 is attached to the back of the segment 10. This handle permits a ready support for the device while it

is being used, and rest pins 63 being of the same length as the cover 50 permit resting the device on its side without any other part of the device contacting the table or the like on which the device might be rested.

It is manifest to anyone familiar with the art that a precision instrument such as a sextant must necessarily be assembled in a manner that is so exact in every detail that the instrument will function correctly for the purpose for which it is intended. The arrangement as outlined in this description provides means for properly assembling the index arm to the arc segment by means of the screws 48. It will also be noted that the index yoke is slidably mounted to the sleeve 32 and is held in correct position thereto by means of the clamping screw 35. Also the spring 37 in the cavity of the bearing 21 is mounted in a manner that entirely encloses this spring yet is adjustable for tension by means of the screws 31. Attention is also respectfully called to the insert 16 which engages the entire radius of the arc segment 10 and the manner in which it is attached thereto permits removal and replacement to take care of any wear on the threads 17 which engage the worm 18.

In the chosen embodiments of my invention there are many improvements and features not heretofore revealed in the art. I have shown these features and the manner in which they may be applied. However, I do not wish to confine myself to their specific construction for in the practice of the art there are many changes that may be made and different methods may be employed without departing from the spirit of the invention, or the scope of the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent in the United States is:

1. A device of the character described for use in combination with a worm gear, said device comprising a shaft, a worm mounted on said shaft, said shaft journalled in bearings slidably mounted, means for engaging and disengaging the worm with said gear rack, one of said bearings provided with an outwardly extending sleeve, a graduated micrometer drum mounted to one end of said shaft, an index yoke adjustably mounted to the outwardly extending sleeve at a point between said bearing and said micrometer drum.

2. A device of the character described for use in combination with a worm gear supported by a mounting, said device comprising a shaft, a worm mounted thereon, a bearing plate, a pair of bearings mounted to said plate, said plate pivotally mounted to said gear mounting, said shaft journalled in said bearings, one of said bearings provided with an outwardly extending sleeve, a graduated micrometer drum mounted to one end of said shaft, an index yoke, said yoke adjustably mounted to the outwardly extending sleeve at a point between said drum and bearing and means for engaging and disengaging said worm from the periphery of said gear.

3. A device of the character described mounted for engagement with the periphery of a worm gear, said device comprising a shaft provided with a worm for engagement with the periphery of said worm gear, bearings supporting said shaft, said bearings mounted on a plate, said plate mounted adjacent to said mounting and pivotally supported at one of its ends by said mounting, thereby permitting engagement or disengagement of said worm with said worm gear, one of said

bearings provided with outwardly extending sleeve, a micrometer drum attached to one end of said shaft, an adjustably mounted yoke attached to the outwardly extending end of said sleeve at a point between said drum and bearing, said micrometer drum provided with graduations on its outer periphery, said adjustable yoke provided with an indicating point for registering with the graduations on said yoke.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
785,894	Kretschmar	Mar. 28, 1905
786,274	Duff	Apr. 4, 1905
862,293	Swasey	Aug. 6, 1907
1,067,700	Wessoleck	July 15, 1913
1,383,950	Hughes et al.	July 5, 1921
1,425,682	Olmstead	Aug. 15, 1922
1,719,552	Karnes	July 2, 1929
1,743,979	Radford et al.	Jan. 14, 1930
1,968,002	Nowicki et al.	July 24, 1934
2,027,348	Seversky	Jan. 7, 1936
2,189,790	Gardner et al.	Feb. 13, 1940

FOREIGN PATENTS

Number	Country	Date
3,426	Great Britain	1911
11,851	Great Britain	1909
17,840	Great Britain	1909
358,451	Germany	Sept. 9, 1922