NEW STANDARD SEXTANT OF THE U. S. NAVY

The Director of the United States of America *Hydrographic Office* has sent to the International Hydrographic Bureau the following data relating to the new Standard Sextant now in use in the United States Navy. Photographs illustrating this Sextant are also shown.

Detailed Requirement of the New Standard Sextant.

1. *Frame.* — The frame shall consist essentially of four radial arms stiffened by two braces which shall be circular arcs concentric with the limb. The three legs for support shall be placed, two at the outer extremities of the outer radial arms, and the third below the pivot of the index arm. Radial arms and braces shall be T shaped in cross section and as light as practicable.

2. *Radius.* — The radius of the instrument measured from centre of pivot to outside edge of the limb shall be not less than 7 nor more than 7.5 inches.

3. *Pivot.* — The pivot shall be conical in form and ground to a true and accurate fit in its bearings. It shall terminate in a shouldered square on which shall be fitted a deep bearing washer, held in place by a brass screw with slotted head. The bearing surface of the washer shall also be ground to an accurate fit.

4. *Index arm.* — The index arm shall be not less than 1 inch wide at any part and about .09 inch thick, and shall be stiffened by means of a rib on top, which may be cut down slightly to clear telescope.

5. *Graduated Arc.* — The graduated arc shall be divided to read 1 degree, the graduations to extend from a negative angle of 5 degrees to a positive angle of 145 degrees.

6. *Graduation Marks.* — The graduation marks shall be straight, clean-cut, distinct, and coloured in black. The breadth of the silver arc shall be about 0.3 inch and the mark shall begin at the outer circumference of the silver. The length of the graduation marks shall be as follows: the fifth and tenth degree lines 0.125 inch, the single degree lines 0.062 inch. They shall be numbered every 10 degrees from zero to 140 degrees and shall be numbered with the numeral 5 every alternate 5 degrees beginning with the 5 degrees negative angle and continuing up to 145 degrees. The height of the 10 degree letter shall be 0.062 inch and the height of the 5 degree letter shall be 0.046 inch. The thickness of the lines shall be 0.007 inch.

7. *Tangent screw.* — The sextant shall be fitted with an endless tangent screw, held in place by a spring, and a micrometer drum, constructed so that the endless screw can be thrown and held by a lever in convenient

reach of the hand working micrometer. The micrometer drum shall be of nickel silver about 1.218 inches diameter graduated to read to 30 seconds. A nickel silver index for the drum shall be attached to the index arm. The drum shall be numbered beginning at zero, every ten degrees. The length of the 5 degree and the ten degree lines about 0.15 inch, the 30 second lines about 0.05 inch long, and the minute line about 0.10 inch long. A single index line shall be placed outside of the arc graduations on a level strip of silver about 1. 1/4 inches long, 1/4 inch wide. The index shall be in the centre of the silver strip, the thickness to match the thickness of the lines on the arc.

8. *Electric Lamp and Battery.* — The sextant shall be provided with an electric lamp and battery to illuminate the index. The battery shall be concealed within the handle. Battery shall be «Eveready» N° 700 or equal. The lamp shall be attached to an arm hinged to the spur of a collar revolving around a pivot bolt screwed into the index bar. A secondary spur shall prevent the lamp from coming down on the index arm.

9. *Mirrors.* — Mirrors shall be of high grade optical crown glass, stable, non-hygroscopic and free from strain, striae or stones; shall also be free from large bubbles or from small bubbles in quantity. Mirror surfaces shall be polished optically flat within one-half wave length and be free from any scratches, open bubbles, stain, or other defects. Mirrors when tested for parallelism of surfaces shall not show a deviation of the images from the two mirror surfaces of more than two (2) seconds of arc. The silvering of the mirrors and the silver protective coatings shall be capable of withstanding severe weather conditions. The index mirror shall be 0.14 inch thick, the remaining dimensions to be 1.32 by 1.77 inches; the horizon mirror 0.14 inch thick and 1.13 by 0.88 inch, and the silvered part shall be 0.56 inch wide.

10. *Index Mirror arrangement.* — The arrangement of the index mirror upon its plate and in its frame, together with the lugs which line on the mirror face and also the means for adjustment for perpendicularity, shall be identical in character with those of the standard sextant.

11. *Index Mirror Plate.* — The index mirror plate shall be the vertical flange of a right-angled bracket, the horizontal flange of which is secured to the index bar by three screws with slotted head.

12. *Horizon Mirror Mounting.* — The horizon mirror mounting and the means of adjustment shall be identical in character and arrangement to those of the standard sextant.

13. *Telescope Mounting.* — The mounting of the telescope and collar shall be identical in character and arrangement to those of the standard sextant, and shall provide means for adjustment of line of sight parallel to the plane of the graduated arc.

14. *Screw Heads.* — The heads of all adjusting screws shall be 0.12 inch square.

15. *Shade Glasses.* — Coloured shade glasses, four in number and of different intensities, shall be fitted for the index, and three similar ones for the horizon mirror. The angle between the two faces of any shade glass shall not exceed 5 seconds.

16. *Telescopes.* — One telescope objective and three interchangeable eye pieces shall be provided. The objective lens shall be a single achromatic lens of about 37 m/m diameter and 118.5 focal length. It shall be mounted in a conical brass tube about 1" in diameter at the smaller end. The tube shall be threaded to fit the telescope collar. The three eyepiece lenses shall be for 2, 4, and 6 power respectively and shall be mounted in brass tubes about 1" in diameter, any one of which may be readily inserted and focussed in the objective tube to provide specified magnification. The 2 and 4 power negative eyepieces shall consist of single biconcave lenses of 59.25 and 29.6 m/m focal length respectively. The 6 power positive eyepiece shall consist of two plane-convex lenses of about 19.75 m/m combined focal strength. The eye tube shall be fitted with two parallel coarse metallic cross wires about 32' of arc apart, and two spider lines, parallel to the centre wires and near the edge of the field for placing line of sight parallel to the plane of the sextant.

16a. *Lenses.* — All lenses shall be of first quality, made from first class stock, and accurately ground, polished and centred. The objective lens and the lenses of the positive eyepiece shall be cemented doublets of crown and flint glass. Lenses shall be mounted in brass cells and be readily removable. All lenses shall be fitted in their cells free from strain.

16b. *Telescope Tubes.* — Telescope tubes shall be made of the best hard drawn brass as light as practicable and be finished on the outside in a durable lusterless black; shall fit into the collar by continuous or interrupted screw threads of 24 turns to the inch. The castings used for fitting parts together and for mounting the lenses shall be of hard brass, free from imperfections.

17. *Weight.* — All parts of the sextants shall be made as light as practicable and the total weight without telescope shall not exceed 3-½ Pounds.

18. *Marking.* — Sextants and boxes shall be engraved with a serial number to be designated by the Bureau of Navigation, with the contract.

19. *Case.* — The sextant case shall be rectangular in shape, dark mahogany, well seasoned and finished. Top, sides and bottom to be of 5 ply laminated mahogany 3/8 inch thick to be secured by countersunk brass screws. Sides of the case and lid shall be lock cornered. The exterior surfaces of the top and sides shall be varnished and polished. The lid shall be secured to the case by inside brass hinges, and when closed, by a brass lock in the middle and a brass hook and screw eye near each end on the lock side. The sextant shall stand on its legs in the case held in position by checks on the bottom touching only the grip as it lies in the checks. The case shall be only large enough to take the instrument without touching it with the arm in any position and the telescope shipped ready for taking observations. A brass keeper, covered with felt where it bears on the inside of the grip, shall be provided to hold the sextant in place in the case. The keeper shall be hinged at one end to permit easy removal of the sextant. There shall be countersunk and secured by 2 brass screws on the middle on the outside of the lid, a brass nickel-plated plate.

20. *Grip.* — The grip shall be of well seasoned dark mahogany of the shape and dimensions of the standard sample, and small be hollowed out to

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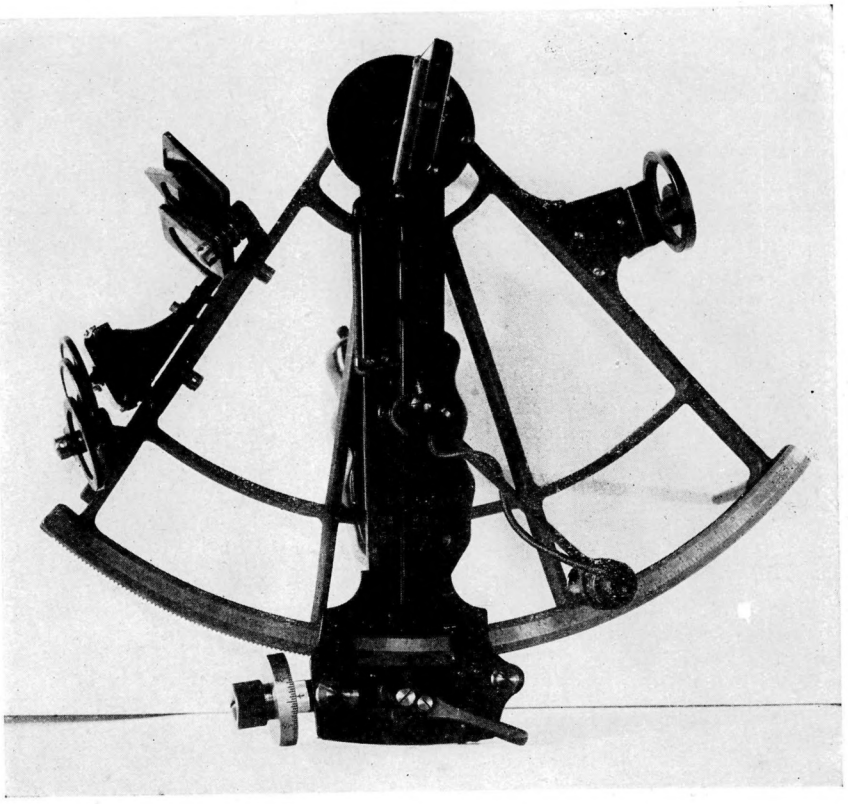
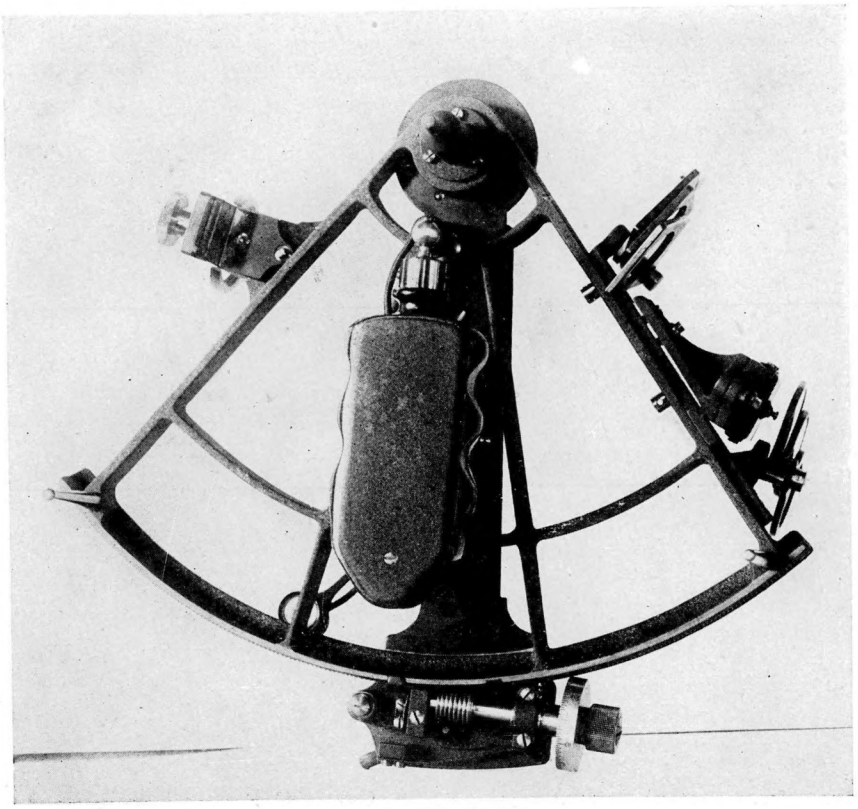
Nouveau Sextant réglementaire de la Marine des E. U.





receive the battery. A brass cover plate shall cover the battery. The supports for the grip shall be long enough to give 1 inch between it and the frame. The chocks, blocks, and brackets for securing the instrument and accessories must be secured by at least one countersunk brass screw, and by glue ; the bearing surfaces shall be covered with felt.