Bubble

Use the dark field illumination of the bubble at night. This makes the bubble appear as a bright ring in a dark background. You can regulate the brightness of the bubble with the rheostat.

You can see directly through the center of the bubble to sight a heavenly body.

Optics

The focal length of the eye lens is equal to that of the objective lens.

The real field of the sextant is 9°.

See T.O. AN 05-35-7.

A-10 SEXTANT

Operation

Hold the sextant by its frame in the palm and fingers of your right hand. The control knob, which elevates the field prism, is down. Use your left hand to operate the control knob or to adjust the size of the bubble.

To register a line on the recording disc, move the plunger of the marker with your right forefinger.

The middle value of several readings in a series is the average of your observation. To obtain this reading, align the middle line of any group of readings with the index. Then read the counter to obtain this value in degrees and minutes.

If your observations are equally spaced, take a direct average. If they are not equally spaced, devise your own method of averaging them.

Bubble

Only the bubble itself is illuminated. This makes it easier for you to observe dim stars.

If the bubble disappears you can easily re-form it in this way:

1. Turn the sextant until the bubble-size knob faces downward.
2. Turn the bubble-size knob to its maximum INCREASE position, as indicated on the engraved diaphragm housing. Be careful not to force the knob past the limits of this position.
3. If the bubble is not visible, it may be formed in the diaphragm. Turn the knob to near its minimum position.
4. Hold the sextant firmly and snap your arm forward quickly, in order to release the bubble from the diaphragm housing.
5. An alternate method is to hold the sextant with the bubble chamber away from you and whip the sextant downward sharply.

Turn the bubble to maximum size when you put the sextant back in its case.

Optics

The auxiliary telescope and the eyeguard at the glass chamber housing are interchangeable. When you use the telescope you get a two-power magnification and your field is reduced approximately one-half.

The real field is approximately 14°.

The scales are illuminated. Replacement lights are provided, but in an emergency you can use the lamps out of the B-3 driftmeter, radio compass, or some other aircraft instrument.

See T.O. AN 05-35-12.

A-10A SEXTANT

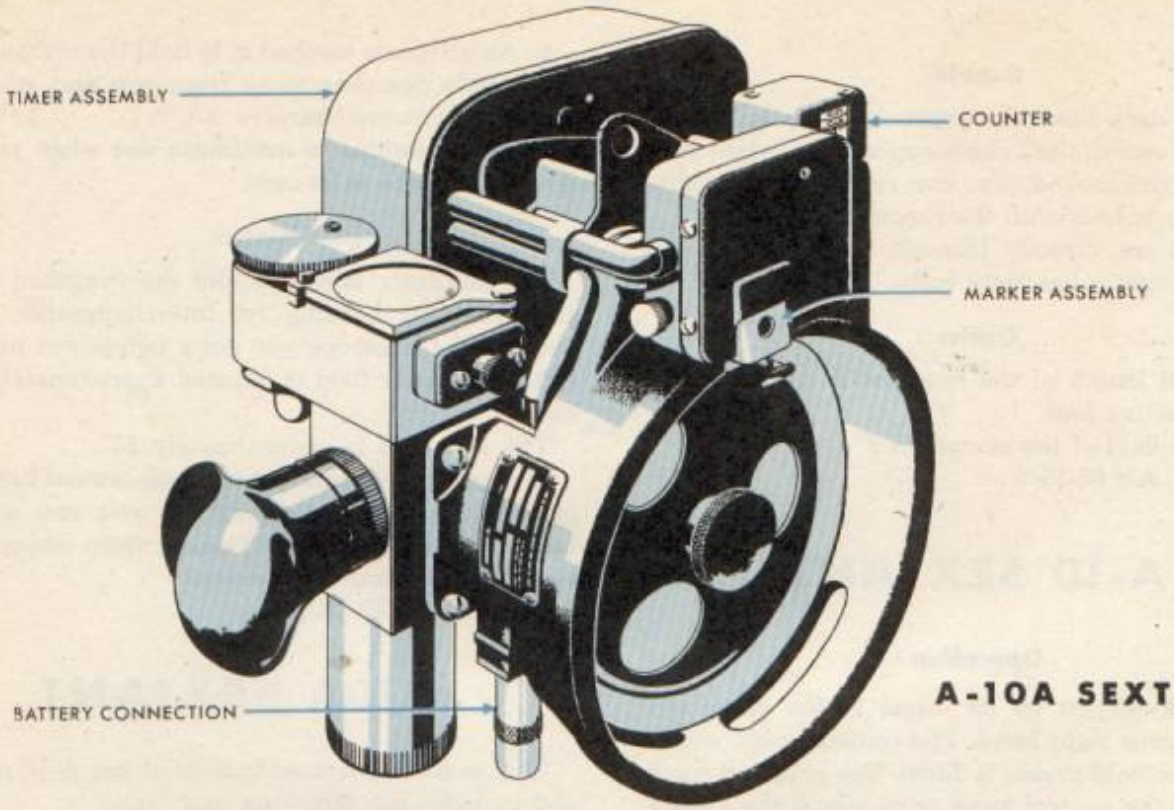
This sextant is a modification of the A-10 sextant and includes the following new features:

1. An automatic marking device operated by a solenoid timing mechanism, which makes a mark on a plastic disc. You can operate the marker manually if the timing mechanism fails.
2. An air-reservoir bubble chamber which permits the bubble to form more easily and produces a bubble which is less affected by temperature changes than the previous vapor-type bubbles.
3. An improved lighting system for the marking disc and counters.
4. A 3-cell battery case which operates the electric timing mechanism and the lighting system.
5. The rheostat which controls bubble illumination is on the sextant instead of on the battery case.

Operation

You must use the battery case to operate this sextant, both day and night. The batteries provide power for a small electric clock in the housing on the left side of the sextant. Approximately once every second, so long as you press the trigger above the marking disc, this clock energizes a circuit which actuates the solenoid marker on the right side of the sextant.

Shake the sextant lightly to make sure that the clock has started; it does not always start when the battery case is connected. As soon as you complete your observations, disconnect the batteries to preserve them.



A-10A SEXTANT

Determine the number of impulses of the marking mechanism per minute. Normally this number does not vary greatly even with extreme changes in temperature. Once you know it, you need only to count the clicks of the solenoid to time an observation.

In the air it may not be possible to hear the click of the marking device, but by resting your right index finger lightly over the marker you can feel its movement and count the number of impulses. At night the bubble light blinks at each impulse and you can use this means of counting them.

The marking device requires careful adjustment of the pencil lead so that there is sufficient clearance between the lead and the disc at the beginning of the stroke to allow the solenoid to gain momentum before the lead strikes the disc. If this adjustment is too close the lead doesn't slide over the disc and, consequently, won't make a mark. If the pencil lead is too far from the disc the mark made is too short. If you adjust it correctly, the lead should last for the entire flight.

You can operate the marking device manually by pressing the flat side of the marker with your right index finger.

General

1. After looking at your hack watch at the start you can time your observation accurately by counting the aural or visual impulses of the marker.

2. You can concentrate on maintaining collimation with the body without having consciously to space your observations at even intervals.

3. The automatic marker makes more uniform marks and eliminates movement of the sextant which occurs when you operate the marker button manually.

Bubble

The new bubble consists of a double chamber with a large air reservoir. Change bubble size by transferring air from one chamber to the other. The bubble never disappears except through deliberate operation of the diaphragm.

A large change in temperature produces practically no change in bubble size because the reservoir acts as a buffer. If you can't change the bubble size as you wish by rotating the diaphragm control to its extreme limit, level the sextant during the return stroke. You can rotate the diaphragm control back and forth any required number of times.

Optics

The real field of view varies between 12° and 14°, but is reduced one-half when you use the telescope attachment. You sometimes have difficulty in locating the desired star; it happens with all horizontal-viewing sextants. This procedure may help you: