HISTORY OF AIR NAVIGATION

by

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DALE COMPASS

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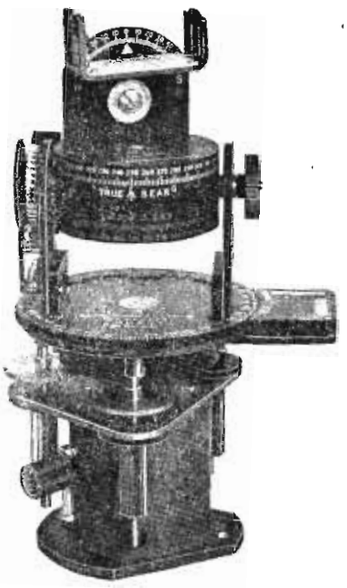

ASTRO COMPASS

In speaking of the sun compass, a debt must be paid to Mr. A. A. Bumstead of the National Geographical Society, who first designed this instrument for aircraft. It must be nearly twenty years ago, as Admiral Byrd used it most successfully in flying to and from the North Pole from Spitzbergen, and also to the South Pole and return to base.

The Bumstead sun compass consists of a timepiece with a single pointer which revolves once in twenty-four hours. The pointer is equipped with a shadow pin and a translucent screen on which the shadow of the pin can be made to fall.

It is clear that since the sun apparently rotates around the earth once in twenty-four hours, if the instrument is so directed as to have the shadow of the pin fall on the screen, the shadow will stay in the same position on the screen so long as the sun is visible, since the pointer revolves at the same rate of speed as the sun.

This means that if, when the shadow of the pin fell on the screen, the base plate of the instrument was in a certain position, and if we should move the instrument around, the old position of the base plate can always be found by causing the shadow of the pin to fall again on the screen.

the navigator, the radar and other stations and to co
the automatic pilot. The total weight of such outfits is a
15 lb.

The aperiodic compass, however, carefully adjusted, is
carried on the navigator's table for use as the standard com
by which to check the elaborate electrical R.I. Compass syste

It is a curious thing that the most aperiodic and quick ac
compass in the world is the centesimal scale compass, produ
in about 1925. It gives a remarkably quick return to rest wi

CENTESIMAL SCALE COMPASS

high degree of aperiodicity. The illustration shows four poi
or filaments attached to the magnetic element moving acr
fixed scale of 100°, and readings can be obtained quite e
The Russians have used this type of compass extensively a
might well be revived for standard readings in the naviga
cabin.

Adjustment of the magnetic compass at sea is done by
compass adjuster, and then continuously checked at sea by
navigator and recorded in the deviation book. This prin
was not employed in the air until the introduction of the
compass in 1942, when a simple form of sun compass was desi
by Mr. P. F. Everitt. Sights can be taken on sun or stars and
quite possible to bring an aircraft home to base by usin
astro compass.

In order to render the instrument capable of being set to obtain given directions, the timepiece is carried by two brackets mounted on a horizontal disc graduated from 0–360°. This disc is rotatable on a pivot and the graduation can be read against an index mounted permanently on the base plate of the instrument.

BUMSTEAD SUN COMPASS

The readings obtained are true only when the following conditions are satisfied:

1. The base plate of the instrument and the graduated disc thereon must be horizontal. A bubble level is provided which is mounted on the base plate and permits levelling of the instrument.
2. The axis of rotation of the pointer must be parallel to the axis of rotation of the earth. To do this, the timepiece can be tilted and the amount of tilting read from the graduated sector marked "latitude." The timepiece is tilted to correspond to the latitude of the observer.
3. The pointer of the timepiece must be set to local apparent time as indicated on the dial. Local apparent time is true solar time, taking into account the longitude of the observer and the equation of time.