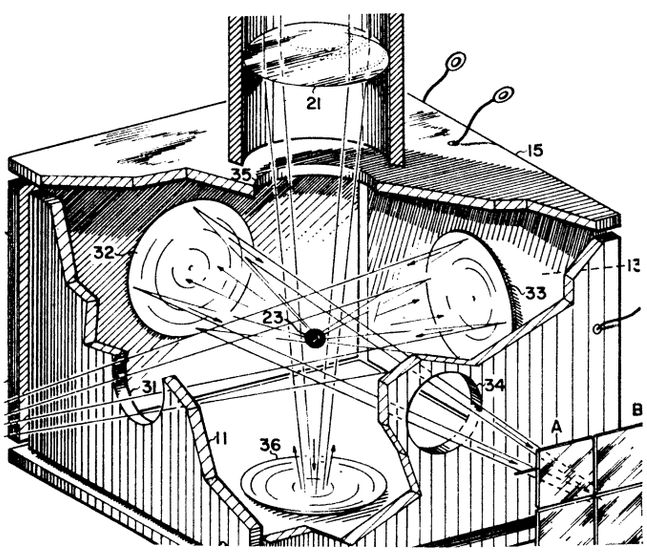
current patents

METROLOGY

Charged particle gauges accelerations

A device that suspends a tiny electrically charged particle in the middle of a box in order to measure acceleration has been patented by Robert A. Cunningham of the Martin Marietta Corp. The particle, which may be a hollow glass bead, coated with silver and as small as 2.5 ten-thousands of a centimeter, is suspended without mechanical supports by means of an electric field. When the field balances the weight of the particle, the particle will remain in the center of the box.

If the box is then subjected to an acceleration, a new unbalanced force begins to act on the particle, and the



particle will change its position. Photoelectric sensors note the shift and actuate a servomechanism that adjusts the electric field until it balances the new force and the particle returns to center. The amount of the acceleration can then be determined from the changes in the field.

The principle of electric suspension has been used before, for example, in electrostatic gyros, but successful use of particles as small as Cunningham's simplifies technical problems since their high ratio of electric charge to mass allows weaker fields to be used.

Patent 3,370,472

HOROLOGY

Radioactivity to tell time

Radioactive decay of atomic nuclei will be used to keep time in a patent assigned to the Benrus Watch Company. The basic system uses no moving parts—no balance wheels nor tuning forks—although either dials or hands or electronic readout devices can be used to show the time. When circuit technology is sufficiently refined, the unit will be small enough to be used in a wristwatch.

The timepiece is based on the statistical regularity of nuclear decays. Although individual decays happen at random, the number from a given sample in a very short period of time is quite reliably constant, and therefore counting radioactive events could in principle determine the passage of time. It is true that the rate of decay in a given sample slows down over a long time, but substances with half-lives as long as many thousands of years can be used. Technetium 99 (500,000 year half-life) and boron 10 (2.7 million years) are both usable.

Of course, a substance that released dangerous radiation could not be used. The elements mentioned, however, emit only beta decay products—electrons—that could not penetrate a watch case, or even the human skin.

In the device, electrons from such a substance are counted by an electronic sensing circuit. The circuit then operates electronic or mechanical means of displaying the time. At present because of technological difficulties in miniaturizing circuitry, use of the mechanism will be confined to special industrial or scientific uses.

The developers of the watch are Julian Lazarus, Lewis H. Strauss and William P. Canning.

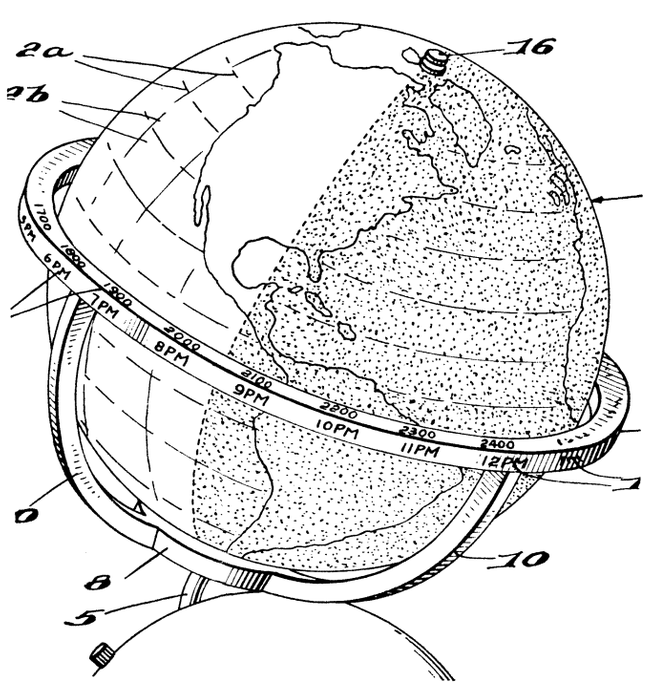
Patent 3,370,414

HOROLOGY

Global clock

Hubert A. McIlvaine of Geneva, Ill., has invented a global clock that indicates, on a map globe, the time of day anywhere in the world. The globe is mounted so that its rotation axis is at the same angle to the horizontal as earth's rotation axis bears to the plane of its orbit.

A drive mechanism rotates the globe in synchronism



with the earth's rotation. Around the globe's equator is a band which is engraved to show the 24 hours of the day. To find the time at any place a user reads the hour and minute mark under which its meridian of longitude is momentarily passing. If the globe is made translucent, a partial shadowing shell inside it can be used to indicate night and day.

Patent 3,370,415