

# Whisker for Transistor

➤ A VIBRATING whisker of gold is the heart of a new kind of transistor that can handle jobs ranging from the beeps in push-button telephones to spacecraft telemetry.

The whisker is much smaller than a human one—only one-tenth the diameter of a human hair and about twice as long as a hair is thick.

Like a diving board over a swimming pool, the whisker hangs over the edge of a channel in what is called "resonant-gate" transistor (RGT).

The golden sliver makes possible the "tuning" of integrated circuits, pin-head-sized slices of silicon, each of which is a complete electronic circuit in itself, often replacing dozens of individually wired parts.

Tuning such a circuit is not like changing stations on a radio, but rather like eliminating unwanted stations broadcasting on frequencies close to

the desired one. This has been a stubborn problem for integrated circuit designers in the past.

Experimental RGT's have covered frequencies ranging from about one to 100 kilocycles per second (now called kilohertz by engineers). Dr. William E. Newell, part of the team of Westinghouse scientists that developed the device, said that attempts would be made to get down to frequencies as low as 400 cycles and as high as one million.

RGT's have also been made with two whiskers, vibrating in unison side by side like a tuning fork. The advantage of two whiskers is that they interact with each other and are thus better able to discriminate against unwanted frequencies. The tiny forks are a million times smaller than the "ac-curtron" units used in some electric watches.

Two other members of the research team, Dr. Harvey C. Nathanson and Robert A. Wickstrom, began work on the whisker idea about two years ago.

phone and Electronics Laboratories, Inc., Bayside, N.Y., built the second known liquid laser to operate successfully. Making this laser takes only 10 minutes.

A bluish powder of neodymium oxide is dissolved in a solution of selenium oxychloride. The liquid is then transferred to a glass tube of any desired size or shape.

The laser's ability to amplify light is very high, Dr. Heller and Dr. Alexander Lempicki reported in Applied Physics Letters, 9:106, 1966. Laser action can be achieved without the usual end mirrors required in other lasers.

The principle behind the new laser is the use of such solvents as selenium oxychloride, which do not contain light atoms like hydrogen. The lack of such light atoms greatly increases the brightness of the solutions.

This new principle could lead to an entirely new family of liquid lasers using rare-earth atoms.

There is no practical limit on the liquid laser's length.

The new laser's emission is at a wavelength of 1.06 microns, a beam of infrared light invisible to the naked eye.

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## TECHNOLOGY

### New Liquid Laser Works Without Cooling

➤ A NEW KIND of liquid laser, the first to use an inorganic fluid as the light-amplifying material, is easy to make and operates at room temperature.

The energy output of the new laser is about 100 times greater than that previously achieved by the only other known liquid laser. The concentrated infrared light it emits has an energy comparable to that of solid state lasers now on the market operating under identical conditions.

The intense light comes in powerful bursts, or pulses. It could be used in radar sets, in medicine and in improved measuring devices, and might also have applications in drilling and welding.

Dr. Adam Heller at General Tele-

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