

# current patents

SOLID STATE PHYSICS

## Tiny crystals emit microwaves

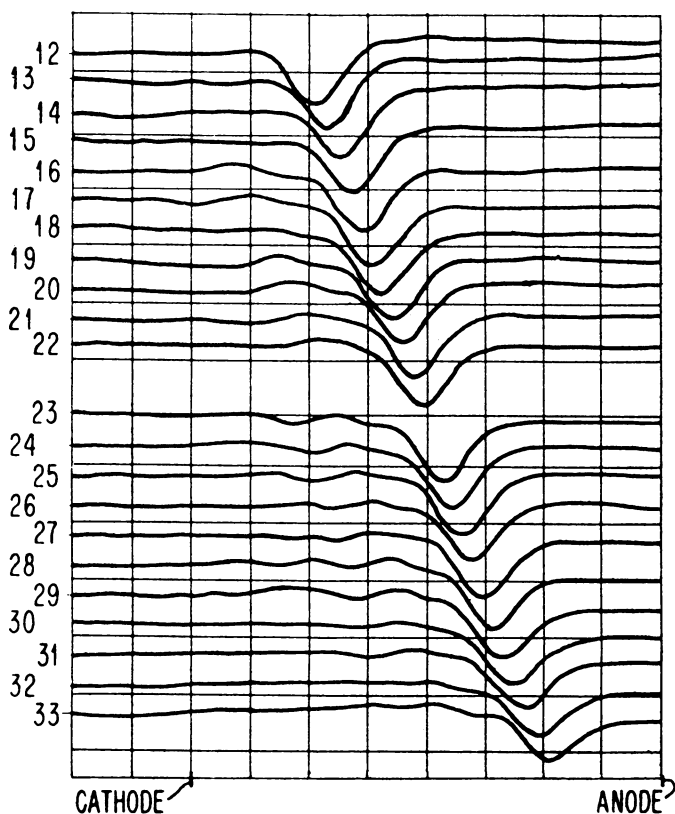
A single chip of gallium arsenide not much larger than the period at the end of this sentence can be made to emit microwave radio waves by applying a steady voltage across it.

The Patent Office last week granted a patent covering this electrical phenomenon to John B. Gunn of Yorktown Heights, N.Y., who assigned rights to IBM.

Devices using the Gunn effect are expected to cause a miniaturization revolution in radar and other microwave systems.

Synthetic gallium arsenide is a semiconducting material in which spontaneous variations of the internal electric field, and of the material's electrical conductance, occur when the applied voltage exceeds a specified value.

The electric field domain moves across the gallium



arsenide crystal from the cathode to the anode.

The variation of conductance can be used to generate microwaves having frequencies as high as 50,000 megacycles per second (SNL: 1/15/66, p. 38). By speeding up the reaction so that a new cycle starts before the first has completely traversed the crystal, frequencies as high as 100,000 megacycles can be attained.

Whether this latter mode of operation is covered in the current patent, which contains 61 claims, is likely to be decided in court.

Virtually every major electronics company in the world is working on the Gunn effect, both for its scientific interest in such fields as the energy levels of electrons and for its possible commercial application, as in low-cost radar sets for cars, boats and small aircraft, as well as the possibility of a hand-held device for the blind.

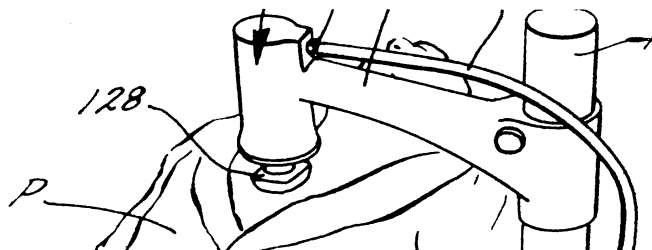
Patent 3,365,583

142/science news/vol. 93/10 february 1968

CARDIOLOGY

## Mechanical assist

Massaging the chest of a heart attack victim while he is receiving mouth-to-mouth respiration is an effective emergency technique. But in many cases of cardiac arrest, manual compression and respiration either are not practical or yield marginal support, because the effort is exhausting after any length of time.



A mechanical cardiac compressor to take over the chest massage has been patented by Clare E. Barkalow of Michigan Instruments, Inc., Grand Rapids. When combined with a ventilator that clears the lungs every five seconds, the system is known as Cardio<sub>2</sub> and is in use at some 500 hospitals around the country. Patent for the ventilator unit is pending.

Cardio<sub>2</sub> operates either from an oxygen tank, or from a standard hospital oxygen pipeline, avoiding problems such as the fluctuations occurring when mechanical devices are operated from an ambulance electrical system or battery failure when external power is used.

Although the unit was developed and is manufactured by Michigan Instruments, Inc., it is marketed by Corbin-Farnsworth Inc., Palo Alto, Calif., subsidiary of Smith Kline and French Laboratories.

Patents 3,364,924 and 3,364,925

POLLUTION

## Disposing of radioactive wastes

The waste oxides resulting from the fission reactions in atomic piles can be made into glass for disposal of the radioactive debris, according to a recipe patented by English inventors John Roger Grover of Reading and Alan David Jones of Betchworth.

The glass made from such waste oxides has very good leach properties and does not corrode its steel container. The inventors assigned rights to the United Kingdom Atomic Energy Authority.

Patent 3,365,578

RADIOLOGY

## Breast X-ray apparatus

A portable X-ray unit that makes possible mass screening for breast cancer in a mobile clinic has been patented by Dr. Philip Strax, a radiologist of Great Neck, N.Y.

All equipment is mounted on one mobile dolly. The X-ray tube, fluorescent screen and camera are on the same vertical mounting. The patient walks up to and steps onto a platform that is adjusted to place the breast between the tube and the camera and screen.

Dr. Strax assigned rights to Charles & Stella Guttman Breast Diagnostic Institute, Inc., New York.

Patent 3,365,575