INVENTION

Patents of the Week

The President's science adviser invented a method of preventing fading of microwaves. A proximity detection device and a machine to accelerate diamond dust also won patents.

➤ THE PRESIDENT'S science adviser, Dr. Jerome B. Wiesner, was awarded a patent for his method of preventing fading in microwave communications such as used for transmitting television programs.

Dr. Wiesner devised a receiving system in which the direct radio waves from a transmitting station are separated from the reflected ones at the receiver. By doing this, the signal finally used in the receiver arrives over only one propagation path, thus reducing fading.

For this communication system, Dr. Wiesner received patent No. 3,036,301. Rights were assigned to Raytheon Company.

In the receiving system, two antennas placed one above the other are used to pick up the microwave signals. The outputs of the two antennas are connected by transmission lines to two pairs of terminals of a so-called "hybrid network." A phase shifter connected in one of the transmission lines permits a change in the electrical length of that line with respect to the other line.

By adjusting the vertical spacing of the antennas and the electrical length of the transmission line, the direct radio waves can be made to be either in phase or directly out of phase. The reflected waves are of opposite phase from the direct ones.

Dr. Wiesner's official title now is Special Assistant to the President for Science and Technology. However, he is expected soon to be named director of the Office of Science and Technology, a new post that will be established as part of the Executive Office of the President.

The new office would have two main functions: to evaluate and coordinate all scientific programs by any agency of the Government, and to help determine, with the President's science adviser, Government policies on science and technology.

Proximity Detector

A device for detecting a missile or aircraft using visible, infrared or ultraviolet light won patent No. 3,036,219 for Arthur V. Thompson of Collegeville, Pa. He assigned rights to the Government through the Secretary of the Navy.

Proximity detection devices may be used not only to detonate the warhead of a missile but also to detect the presence and measure the relative speed of an object in space. The latter function could apply on an aircraft carrier, in order to wave off an approaching plane if its speed is not correct.

Many of today's proximity devices rely on radar, and are therefore complex. Those relying on passive radiation are less dependable and not portable. Mr. Thompson has combined the best features of both types of proximity detection devices. Although his invention uses passive radiation, the receiving detectors are arranged to produce a pulse from each segment of space due to a change in radiation from the segment.

Simulating Space Dust

A machine to accelerate diamond dust particles to speeds they would have in space won patent No. 3,036,213 for Alexander J. Dessler of Palo Alto, James F. Vedder of Los Altos, and Martin Hertzberg of Sunnyvale, all in California. They assigned patent rights to Lockheed Aircraft Corporation, Burbank, Calif.

The apparatus was developed to test materials that might be used for space vehicles to see how they withstand the corrosion caused by impact with tiny dust particles.

In the machine, diamond particles are injected into a suspension chamber maintained at a very high vacuum. A single particle is then charged by a high-energy beam of argon ions. The charged diamond particle is extracted from the chamber and accelerated to meteoric velocities by means of an electric field, then slammed into the surface of the material being tested.

Other Patents of Interest

Among other patents of interest are the following:

A secret telegraph system that itself has been kept secret since 1946. Charles N. Gillespie, then of Brooklyn, N. Y., was granted patent No. 3,036,156 for his method of using a circuit that reverses polarity in response to an on-off keyed signal. He assigned rights to the Government through the Secretary of the Army.

An improved "cuvette oximeter," for which Richard E. Jones and James Isaacson of Rochester, Minn., were awarded patent No. 3,035,481. The inventors assigned rights to Research Corporation of New York. The device is used to determine the density of blood and also the percentage of oxygen saturation in the hemoglobin of the blood.

• Science News Letter, 81:366 June 9, 1962

RADIOLOGY

Sulfur Gives Protection Against Radiation Harm

➤ SULFUR and sulfur-containing compounds give radiation protection, three scientists from the Royal Military College of Science, Shrivenham, Swindon, England, reported in Nature, 194:782, 1962.

Many biological systems, they pointed out, can be protected in part against the effect of ionizing radiation by very small amounts of chemicals.

Drs. A. Charlesby, P. G. Garratt and P. M. Kopp said the effect of radiation on simple organic polymers can also be reduced by various chemicals, and they believe this offers many comparisons with protection in the "more complex biological systems."

The investigations involved the use of both aqueous and non-aqueous polymer systems. Dilute aqueous solutions of polyvinyl-pyrrolidone (PVP) and polydimethyl siloxane fluids were used.

After examining the effect of a wide variety of chemicals on the behavior in these systems when exposed to gamma radiation, the investigators reported the high efficiency shown by colloidal sulfur suspensions in very low concentrations in inhibiting the "cross-linking of the investigated systems."

Protection was shown by many sulfur-containing compounds used in the dilute aqueous PVP solutions. It is not yet known whether the protection by these compounds comes from an initial release of sulfur or by an alternative route, the scientists said.

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CHEMISTRY

Tell Facts to Public In Chemical Disaster

➤ WHEN DISASTER strikes in the chemical industry, the basic facts should be given to the public as quickly, as accurately and as completely as possible, the Manufacturing Chemists' Association, Washington, D.C., is advising officials of the chemical companies of the nation.

After protection of personnel and plant property, informing the public is the major concern.

In dealing with newsmen and photographers during an emergency, chemical officials are advised that:

1. The public is entitled to prompt and factual information regarding a disaster.
2. Plant management is responsible for providing information to the news media and those in charge of information should have access to top management and should be authorized to speak in its name.
3. Providing information, though fragmentary, will prevent future embarrassment and prevent rumors regarding the extent of the disaster.
4. Reporters and photographers should be allowed to visit the scene of the disaster as soon as possible, consistent with their safety.
5. No attempt should ever be made to "cover up." Acknowledging an incident after denying it is highly embarrassing. It is best to acknowledge the incident promptly and release factual information as soon as it can be verified.

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Soft woods can be converted into the equivalent of hard woods by *irradiation*.

A newly discovered substance, *mycosuppressin*, that halts the metabolism and growth of tuberculosis bacteria may be an important active factor in acquiring immunity to tuberculosis.