

INVENTION

Patents of the Week

Famous nuclear physicist Dr. Eugene P. Wigner received a patent for a neutronic reaction system, one of his early concepts in the field of breeder reactors—By Elizabeth Hall

► **WORLD-RENOWNED** nuclear physicist Dr. Eugene P. Wigner of Princeton University received a patent in Washington, D. C., for one of his early concepts in the field of nuclear reactors that is a promising method of producing both atomic fuel and power at the same time.

Dr. Wigner's "neutronic reaction system" provides for a nuclear reactor to breed more fuel than it uses in producing power. Although the method for which he received patent 3,102,851 has been replaced by improved systems, breeder reactors are now undergoing extensive tests because of their great potential as a power source.

The design has been kept secret for security reasons since 1947, when Dr. Wigner filed for it. A copending patent application by the late Dr. Enrico Fermi and by Dr. Leo Szilard, granted several years ago, covers the essential characteristics of nuclear reactors.

Dr. Wigner's invention calls for the use of fissionable material cooled by a slurry of thorium oxide. Neutrons released during the fission change the thorium into materials that can then be made to fission themselves.

Drs. Fermi, Szilard and Wigner helped to usher in the atomic age in 1939 when they drafted a letter to President Roosevelt, signed by Albert Einstein, suggesting that uranium could be turned into an important weapon or power source.

Their basic studies on the theory of chain reactions led to the first self-sustaining reactor in 1942. Dr. Wigner later devised ways to cool reactors with water and was the first to calculate the correct lattice proportions of uranium and graphite in designing the Hanford, Wash., production reactors.

Hungarian-born Dr. Wigner is Thomas D. Jones professor of mathematical physics at Princeton's Palmer Physical Laboratory and has been a consultant for many years to the Atomic Energy Commission, to which the patent rights were assigned.

Laser Pumping Technique

The Air Force has received rights to an internal pumping technique for use in lasers (light amplification by stimulated emission of radiation).

Lasers, which produce a very narrow beam of intense light, ordinarily use an external gas-filled flash tube to irradiate light on the transparent laser crystal and "pump" the atomic system from a low to a high level.

Under U.S. patent 3,102,920, invention of Janis A. Sirons of Springfield, Ohio, an internal electric arc or plasma provides the "pumping" source, allowing a coolant to

pass over the outer surface of the crystal. This coolant insures a greater emission of light radiation when the system is suddenly dropped to its low level.

Other Significant Patents

Other patents included:

A method of testing for mastitis in cows that earned U.S. patent 3,102,418 for Oscar W. Schalm and Daniel O. Noorlander, Davis, Calif., who assigned rights to the regents of the University of California, Berkeley.

A simulated dried fruit granule that can be incorporated into baked goods and prepared mixes, yet tastes like the original fruit. Stanley Barton of Springfield Township, Hamilton County, Ohio, assigned rights to patent 3,102,820 to Procter and Gamble Co., Cincinnati.

A spring-loaded frog gig for manually spearing and landing frogs, for which Jesse L. Horn Jr. of Central Point, Oreg., was awarded patent 3,102,355.

A machine-made yarn which when woven produces the effect of hand-made silk shantung from China at a much lower price. Kenneth Toy Ward and Joseph H. Eble of Greensboro, and William H. Musser of Randleman, N. C., assigned rights to patent 3,102,379 to J. P. Stevens and Co., Inc., of New York.

An identification system that photographs the ear instead of taking fingerprints, for which Manuel Zimberoff of Chicago received U.S. patent 3,102,459.

An intercom-alarm system for signaling between the boat pilot and water skier. Patent 3,103,005 was issued to Russell B. Hills of Grand Rapids, Mich.

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PHYSICS

Light Successfully Used As Short-Range Radar

► **AN EXTREMELY INTENSE** light beam has been successfully tested as a short-range radar in the field.

The laser device was demonstrated in Washington, D. C., by aiming it at the impressive tower of the Washington Cathedral, slightly more than a mile away in a direct line from the Shoreham Hotel, where the instrument was set up on a balcony.

The light pulse lasted only ten-millionths of a second. The Cathedral tower reflected back enough of the light beam to show its exact distance.

Lasers amplify light waves and emit them "in step" to form a highly directional and powerful beam of coherent light, in contrast to the incoherent, or random, nature

of light waves emitted by conventional sources. The name is derived from "light amplification by stimulated emission of radiation."

The development of high-power lasers that throw out a single beam of intense light many times a second has made using the devices practical for spotting artillery, tanks and surface missiles, Glen Taylor of Martin Company, Orlando, Fla., reported. A 20-pound unit that gives the distance to the object sighted directly in figures has been tested, he told the Seventh National Convention on Military Electronics in Washington.

The instrument giving the distance to the Washington Cathedral weighs about 40 pounds, but that could easily be cut in half without sacrificing efficiency, *SCIENCE SERVICE* was told.

The laser device could also be used to measure the height of cloud cover and of the distance to smoke caused by forest fires.

Another, improved version of a laser built by Martin Company scientists uses six of the light-amplifying devices simultaneously. It is hoped such an instrument could serve as a homing device for missiles.

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SPACE

Man-Chimp Team Urged In Space Satellite Launch

► **AN INSTRUMENTED** chimpanzee should ride along with the astronaut in the two-man Gemini earth orbiting satellite now scheduled for launch next year.

The man-animal team would gather much needed information on the effects of weightlessness in space.

The astronaut could collect specimens and perform medical tests on the chimp, two Air Force captains suggested in the *New England Journal of Medicine*, 269:508, 1963.

Unmanned satellites carrying an animal could also be used in space weightlessness tests. The Russian experiment with the dog Laika is cited as a model for studying the effects of prolonged space flight "relatively undistracted by the operational and engineering aspects of a manned vehicle." Only experimentation in space can give the needed information, the medical corps officers said.

The researchers, who point out that their opinions are not to be construed as U.S. Air Force policy, said that investigations of bed rest and water immersion do not necessarily duplicate space conditions.

"In many important aspects the analogy between weightlessness and immersion is faulty," they said. Inactivity, confinement and immersion do not compare to weightlessness in space where crew members will be physically active, performing their assigned duties.

Space flight itself "offers the first opportunity" to explore how man's biology is dependent on earth's gravity, Capt. Michael McCally of Grace New Haven Community Hospital and Capt. Duane E. Graveline, flight surgeon, Aerospace Research Laboratories, reported.

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