

heavy particles—protons, deuterons and alpha particles. The application will differ from that in the synchrotron. Instead of altering the magnetic field to keep the particles in step, the frequency of the accelerating electrical impulses will be changed, coming at slightly longer intervals in order to hit the lagging projectiles as they arrive at the acceleration point. This is called frequency modulation. Prof. Lawrence has estimated that the giant cyclotron, which was started prior to the war and designed to accelerate deuterons to 100 million electron volts, will be able to produce deuterons of double this energy as a result of Prof. McMillan's theory.

The Russian, Veksler, published his

theories in Russia before Prof. McMillan's first article on the subject was printed in the *Physical Review* last September. However, with communications what they were under wartime conditions, Veksler's articles were not known to Prof. McMillan until two months after he sent his letter to the *Physical Review*. Prof. McMillan was working at the University of California atomic bomb factory at Los Alamos, N. Mex., when he formulated this theory of phase stability. Prof. Lawrence stated that the Manhattan District has given every encouragement to the development of the synchrotron with the purpose of maintaining the pre-eminence of American fundamental science.

Science News Letter, May 11, 1946

ENGINEERING

Rocket Devices Patented

Nine patents have recently been granted to the late Prof. Robert H. Goddard. A hydro-pneumatically controlled automatic steering apparatus for aircraft is included.

➤ **ROCKET DEVICES** invented by the late Prof. Robert H. Goddard of Clark University and Roswell, N. Mex., are beginning to be made public through the issuance of U. S. patents. Nine such patents, for which applications were filed during or before the war, have been granted during the past few weeks.

One of them is a design for what might be called a rocket landing-strip to receive, if not space-ships from Mars and Jupiter, at least the ultra-high-speed stratosphere craft which rocket propulsion may make possible. Essentially, this device is really a big tube closed at one end, and with a trumpet-like flare at its open end. The rocket-craft is expected to enter this like a ferry going into its slip; wheels at various points on its circumference help to guide it smoothly. As it passes into the narrower part of the tube it will practically fill it, and will thus act as the piston in a grand-scale pneumatic shock absorber. As its nose reaches the closed end it will contact a final checking device built on the principle of the recoil cylinder under an artillery piece.

Several of the patents cover variations in the Goddard fuel system, which is based on the use of the combustion of gasoline or other hydrocarbon fuel with liquid oxygen. A tank of liquid nitrogen is also carried, to fill the empty space created in the gasoline tank as the latter is used up.

Prof. Goddard was especially concerned with keeping the temperature of the combustion chamber within manageable limits. In several of his designs, this is done by wrapping around it a helical coil from the liquid nitrogen tank. The liquid nitrogen thus heated passed as a gas under pressure to the gasoline tank. Some of the combustion chambers revolve as the fuel burns; ribs or baffle-plates within them mix the fuel and oxygen more thoroughly. Another design calls for a triple-walled combustion chamber.

Included among the nine patents are an exploratory research rocket, to be propelled by a series of explosive charges, automatically fed from a tubular magazine and set off in series; also a hydro-pneumatically controlled automatic steering apparatus for aircraft.

The patents are numbered, inclusively, 2,395,113—2,395,114, 2,395,403—2,395,406 and 2,396,566—2,396,568. Half-rights in all patents are assigned to the Guggenheim Foundation.

Science News Letter, May 11, 1946

MEDICINE

\$5,000 Awarded for Virus Research Technic

➤ **DR. ERNEST W. GOODPASTURE**, professor of pathology and dean of the School of Medicine of Vanderbilt University, Nashville, Tenn., will receive the \$5,000 Passano Foundation Award on

May 15 for his discovery of a method of growing disease viruses on chick embryos.

The vaccine which has protected American troops against typhus fever, and improved defenses against influenza, smallpox, yellow fever, fowlpox and rinderpest through vaccines are among the results of Dr. Goodpasture's discovery.

The Passano Foundation was established in 1944, by the Williams and Wilkins Company, medical publishers, "to aid in any possible way the advancement of medical research," especially research promising clinical application.

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