

INVENTION

Patents of the Week

Two types of reactors for controlling thermonuclear energy for peaceful uses have been patented. A device for assisting airplanes to make landings on water was invented.

► TWO DIFFERENT TYPES of reactors for controlling the fiery energy of the hydrogen bomb's reactions for peaceful purposes have been patented.

Key to achieving control of fusion reactions, one of the ways in which the sun and other stars are stoked, is long-time confinement of the reacting plasma.

A plasma is a gas in which the atoms have been partially ionized, or separated into positive ions and negative electrons. Electrically neutral as a whole, a plasma can nevertheless conduct an electrical current.

Although the inventors do not claim that either of the reactors patented will now confine the plasma for a long time, the methods used in the fusion reactors could achieve this aim in the future.

Four basic methods are being tested for confining a plasma. These are the so-called "pinch effect," which has been found to be unstable; the Stellarator; the mirror configuration, and the "picket fence," which is based on cusped geometry.

The "picket fence" is the most recent approach and is believed by many scientists to be the most promising. However, there are many combinations of the four methods being tested at various laboratories around the country.

Fusion reactions occur when such light elements as hydrogen, deuterium (double-weight hydrogen) or tritium (triple-weight hydrogen) combine with the release of energy. Since such fusion takes place only at temperatures of 100,000,000 degrees centigrade or higher, magnetic fields are the only known means of confining the plasma.

For the fusion reactor commonly known as the Stellarator, Dr. Lyman Spitzer Jr., director of the Princeton University Observatory, was awarded patent No. 3,016,341, rights to which he assigned to the Government through the Atomic Energy Commission. The Stellarator is so called because many of the reactions taking place within it are similar to reactions in some stars.

Dr. Spitzer describes a typical Stellarator as being a continuous tube about 40 inches in diameter bent into the shape of a "figure 8." Length of the tube is about 300 feet. The magnetic field is 20,000 gauss, and the temperature in the reacting zone is some 100,000,000 degrees centigrade.

The other type of reactor for controlling nuclear fusion reactions uses the "pinch effect." It won patent No. 3,016,342 for Drs. Martin Kruskal of Princeton, N. J., James L. Tuck of Los Alamos, N. Mex., Stirling A. Colgate, Livermore, Calif., and Marshall N. Rosenbluth of San Diego, Calif. Patent rights were also assigned to the Government as represented by the Atomic Energy Commission.

The method provides for creating and controlling a nuclear fusion reaction in an economical way so that the energy output exceeds the electrical energy input when operating at temperatures of approximately 100,000,000 degrees centigrade. The plasma is kept stable and free from contact with the surrounding walls by a magnetic field predominantly in the interior of the plasma.

Among other patents just issued is one for a device for determining the state of a water surface for airplane landings. Kurt M. Kramp of Lexington, Mass., was awarded patent No. 3,016,529 for it. He assigned rights to the Raytheon Company.

The system is particularly useful for helicopters making sea landings for rescue operations, he claims. It is independent of weather and altitude. The state of the sea is measured from the polarization of radio waves bounced back from its surface.

John W. Dyer, Pendleton, Ind., and Brooks H. Short and Walter R. Parker of Anderson, Ind., have devised an improved method for controlling the simultaneous operation of a wiper motor and washer pump to clean automobile windshields. For it they won patent No. 3,015,835 and assigned rights to General Motors Corporation.

The device operates electrically. The wiper motor will not operate if there is no fluid in the reservoir or if the tubes carrying the fluid to the windshield are blocked.

• Science News Letter, 81:63 January 27, 1962

Questions

EDUCATION—How many graduates in science and technology produces the USSR each year? p. 50.

ENTOMOLOGY—What purpose does beer serve in wasp-traps hung out for the siren wood wasp in Australia? p. 55.

NUTRITION—What is INCAPARINA? p. 53.

SPACE—How many men take part in the recovery, search and rescue effort during the orbital flight of astronaut John H. Glenn? p. 51.

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