

## INVENTION

# Patents of the Week

**A method for confining hot gases for power from thermonuclear reactions, a light source using a phosphorescent material and compounds reducing static on plastics patented.**

► USING ALTERNATING CURRENT to help confine the extremely hot gases necessary to obtain peaceful power from thermonuclear, or hydrogen bomb, reactions won patent No. 3,026,447. It was awarded to Dr. Donald W. Kerst of General Atomics, La Jolla, Calif., who assigned rights to General Dynamics Corporation of New York, the parent company.

Dr. Kerst told SCIENCE SERVICE that experiments were now being conducted using the alternating-current method, which requires very high power, but that the AC operated for only a brief flash of time.

He said the main problem was that of confining the plasma, or very hot gases. One way of doing this is by use of the so-called "pinch effect," by which the plasma contracts upon itself due to the interaction of a large current and the plasma's magnetic field. Both AC and direct current can cause the pinch effect.

Dr. Kerst said that if the "cantankerous aspects" of the pinch effect could be mastered, an extremely difficult problem, then the technique of using alternating currents to contain the plasma in a "magnetic bottle" would be "very useful."

Extraction of the current, or useful power, from a plasma undergoing thermonuclear reactions would be relatively simple using alternating current, Dr. Kerst reported. In such a case, a force pressing down upon the reacting plasma would make the thermonuclear reactions proceed at a higher rate and the plasma would therefore push back with more force than needed to press it down originally.

## Self-Contained Light Source

A light source consisting of a transparent bulb coated on the inside with a thin layer of phosphorescent material and filled with radioactive gas was awarded patent No. 3,026,436. Inventor John Duncan Horsfall Hughes of Wantage, England, assigned rights to the United Kingdom Atomic Energy Authority in London.

The bulb works because the phosphorescent layer is activated by radiation on its inner surface and emits light from its outer surface. The phosphorescent coating can be from one-twentieth to one-tenth of an inch thick.

The preferred radioactive gas is krypton-85, which emits very little gamma radiation with its beta radiation, is chemically non-toxic, and has a half-life of about ten years. Zinc sulfide, cadmium sulfide, zinc phosphate or zinc silicate are among the phosphorescent materials that can be used for coating the inside of the bulb.

By making only part of the container

transparent to light, the brightness of the light can be considerably increased.

## Anti-Static for Plastics

Compounds to reduce the static on plastic products and the methods of making them were awarded five patents, Nos. 3,026,287, 3,026,288, 3,026,291, 3,026,295 and 3,026,296. Rights were assigned to the Dow Chemical Company, Midland, Mich.

Stanley A. Murdock of Concord, Calif., and several associates were granted the patents for methods of obtaining plastic blends that can be made into fibers. The basic plastic is acrylonitrile, and other plastics are grafted on, or combined with, them to reduce the static electricity in the finished product.

## Automatic Headlight Control

An automatic system for dimming automobile headlights and then returning them to bright won patent No. 3,026,446 for Robert A. Martin of Noblesville, Ind., and

## BIOCHEMISTRY

# Anti-Radiation Drug

► A DRUG that may effectively protect man against radiation hazards in space as well as on earth is currently under development at Brooks Air Force Base, Tex.

The anti-radiation drug known as aminoethyl-thiouonium (AET) cysteine has proved 80% to 90% effective in protecting monkeys exposed to 700 roentgens and 50% effective against exposures of 900 roentgens, Maj. R. W. Zellmer, chief of bionucleonics of the School of Aerospace Medicine, told SCIENCE SERVICE. The lethal dose for monkeys is 500 roentgens.

The effects of radiation exposure and response to treatment on monkeys and men are similar, Maj. Zellmer said. The high degree of success with AET cysteine with monkeys indicates that it will be equally successful with men, he said.

AET cysteine was one of the 10,000 different compounds tested as a possible anti-radiation drug by the Air Force Laboratory at the University of Chicago. It was then used on small primates at the Balcones Laboratory at the University of Texas, Austin, where further studies were made to determine possible toxic effects.

In uncontrolled dosage, the drug is toxic and can cause serious, even fatal, damage to liver and kidneys. However, given in controlled doses, determined by the size and body weight of the animal, AET cysteine afforded protection against lethal radiation

Eugene G. Matkins of Anderson, Ind. They assigned rights to General Motors Corp.

The method works on the relatively low voltage of a car battery, thus avoiding the need for stepping up the voltage. This is accomplished by using a preamplifier as well as amplifiers. The headlamps are immediately returned to the bright beam circuit after an oncoming vehicle has passed by.

## Other Patents of Interest

Other interesting patents are:

A memorandum holder that can be operated with only one hand, devised by Paul J. Maggio and Lloyd W. Davidson of Fort Dodge, Iowa. They assigned one-tenth of the rights to patent 3,026,126 to Gadget-Of-The-Month Club, Inc., North Hollywood, Calif.

A slide rule calculator made by folding a single piece of paper and selectively coating the folded paper to produce in one operation both the slide and the guide walls. The device and method for making it won patent No. 3,025,767 for John B. Ruffalo of Huntington, N.Y.

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Almost 95,000 persons were rehabilitated in 1961 under joint state-Federal vocational rehabilitation programs now in operation in all 50 states as well as Guam, Puerto Rico, Virgin Islands and the District of Columbia.

exposures with no apparent toxic effects.

The drug is presently injected as a liquid before exposure to radiation. It is quick-acting but protects only for a few hours.

A "delayed action" pill taken orally is now being developed that could provide longer protection.

Such a pill, an Air Force goal since 1957, would meet both military and civil defense needs in the event of nuclear warfare. Dr. Zellmer said. Given to troops and civilian populations that might be exposed to nuclear explosions, it would not only reduce estimated casualties substantially but would make it possible to protect against dangerous exposures involved in treating radiation casualties.

Peacetime uses of atomic energy also pose hazards that an effective anti-radiation pill could virtually eliminate. The danger in handling radioactive wastes would disappear if those assigned to such tasks were able to take an anti-radiation pill beforehand. In the event of an accident in a nuclear plant, rescue personnel could work more effectively and save more lives if they could take such a drug before entering the exposed area.

In space, the astronaut could protect himself from solar flares and other radiation perils anticipated in exploring this vast frontier.

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