NEW PATENTS by ALFONS PUISHES

In this Section of NUCLEAR APPLICATIONS we briefly describe some recently issued patents which we think are particularly interesting. The patents themselves, which contain all the detailed descriptions of the inventions, may be obtained from the Commissioner of Patents, Washington, D.C. for 50¢ each. They also may be read in patent libraries in major cities.

BOILING-WATER SUPERHEAT REACTOR employs built-in water separators and hollow fuel elements. Inverted cone-shaped centrifugal separator at the top of each element throws water outward from where it drains down and back into circulation while steam is led back down through the center of the hollow element and there is superheated. 3 178 358, L. E. Soderholm, Allmanna Svenska Elektriska Aktiebolaget (Sweden).

PETROLEUM HYDROCARBONS, gaseous or low-boiling, are converted to liquid or high-boiling hydrocarbons by nuclear irradiation. Propane, butane, and isobutane yield liquid products suitable for motor-fuel blending components by subjecting them to from 10^6 to 10^{10} rep gamma and beta rays. Process requires no catalytic agent. 3 177 132, A. T. Wilson and D. A. McCaulay, Standard Oil Co. (Indiana).

IMPROVED HYDROCARBON MODERATOR COOLANT for use with reactors such as the OMRE is produced by heat soaking process. Highly aromatic hydrocarbon extract is maintained at a temperature of 500° to 1100°F and a pressure up to 1000 lb/in.^{2}g for as long as 72 h and unwanted degradation products are removed. Resultant moderator-coolant is held to possess superior thermal stability and resistance to nuclear irradiation. 3 178 357, J. F. Black and J. Mackinnon, Esso Research and Engineering Co.

RADIOACTIVE TRACER GAS PROCESS detects relatively large and very small leaks in gas-filled articles. Article to be tested is placed in a vessel that is evacuated to a pressure below the initial pressure in the article. A radioactive tracer gas is forced into the vessel to a pressure above the reduced pressure and hence into the article if there are any leaks. The vessel is purged and decontaminated with an inert gas, the article removed and examined for radioactivity. 3 179 806, A. L. Dixon, Western Electric Co.

ULTRA HIGH VACUUM MEASUREMENT is effected by a nuclear manometer. Connection from vessel is made to an accelerated electron

beam. Rarified gas atoms are excited, emitting photons which may be measured by a Geiger-Müller tube. Measurement of vacuum as high as 10^{-14} T mm Hg is indicated. 3 174 036, Igor Alexeff.

INSPECTION OF RAILROAD TIES for unsoundness and decay is effected by a mobile apparatus equipped with gamma-ray sources and detectors. A number of gamma sources such as ^{137}Cs are suitably mounted in housings on a truck which runs along the tracks and is arranged to make successive contacts with each tie. Compton scattering of the gammas is greatly affeced by soundness of the tie and is read by standard counter such as one of the Geiger-Müller type. Defective ties are automatically marked for later removal. 3 176 134, J. J. Wright, Cleveland Technical Center, Inc.

INHIBITION OF CORROSION OF METALS used in nuclear reactors caused by high-temperature steam is provided by boric acid. Greatly reduced corrosion of beryllium, aluminum, and zirconium alloys are indicated by introducing into the coolant boric acid in which the boron is essentially 11_B. 3 171 789, J. N. Wanklyn and C. F. Britton, UKAEA.

REMOTE MONITORING OF CONTAMINATED AREAS to determine the amount of nuclear radiation present and the extent of hazard is effected by strategic permanent location of special instrument. Device combines ionization chamber, rate meter, transponder, and transceiver. It transmits data back to interrogator and receiver at a remote central station through an antenna system. Solar cells are used as source of electrical energy. Hazards to personnel are eliminated. 3 178 577, G. E. Wilcox.

ADVANCEMENT TOWARDS CONTROLLED THERMONUCLEAR REACTOR is indicated by achieving increased confinement time of heated plasma in a stellarator. A large positive potential is impressed on an electrical conductor which is inserted into the plasma. This establishes a strong, annular radial electric field region in the outer region of the plasma thus greatly decreasing the loss rate of the heated plasma to tke tube wall. An increase in confinement time of at least two-fold is indicated. 3 171 788, J. G. Gorman and L. H. Rietjens, USAEC.

HIGH POWER VOLTAGE SUPPLY FOR GEIGER-MULLER (G-M) COUNTER is rendered free from radio-frequency (RF) interference by a simple inexpensive circuit, eliminating need for special transformers and extensive condenser-resistor filtration. The half-wave diode rectifier supplying the G-M tube anode is equipped with an absorption shield. The latter is connected back to the center tap of the primary of the supply transformer. It is believed that thus feeding back the weaker RF into the stronger transformer primary current converts it to a lower frequency. 3 174 042, R. E. White.

ELECTRON ACCELERATOR BEAM ENERGY IS READ DIRECTLY in MeV on a meter. An insulated shielded thin rectangular metal pickup plate is positioned so that one corner lies within the electron beam. As the energy output of the accelerator beam increases, more electrons pass entirely through the plate, and, because fewer are thus collected, the pickup plate current decreases. A suitable amplifier circuit transmits the information to a properly calibrated meter. 3 179 804, G. G. Gibney and B. Indeck, Ethicon, Inc.

THERMAL BARRIER FOR GAS-COOLED REACTOR employing a prestressed concrete vessel utilizes coolant tubes between corrugated plates. An inner thin plate and an outer thicker plate comprise a jacket, which also provides a leak-tight membrane and takes care of expansion and contraction. 3 175 958, P. Bourgade, Ste Indatom (France).