NEW PATENTS

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.

Copper ore concentration by induced radioactivity. Ore falling from a chute or hopper passes by a conventional neutron irradiator. Sufficient falling time is permitted for decay of the unwanted short-lived isotopes in the activated ore. The falling ore then intercepts a photoelectric cell which starts a coincidence counter counting gamma rays from the ^{64}Cu. Overall activity as well as ^{64}Cu coincidences is measured; a calculator divides the amount of copper present by the weight of the particle. A pulse set for a predetermined value operates a diverting gate separating concentrate from tailings. 3 237 765, A. M. Gaudin, H. F. Ramdohr, Copper Range Company.

Flux trap testing reactor with pressurized core. Reactor core in pressure vessel together with moderator and reflector is centrally located in a larger pool. Borated water in thin annulus between the reactor core and the reflector is used for shim control. Heavy water may be employed in the reflector together with a droppable safety system. Test holes to the pool are open to facilitate insertion of experimental facilities and test loops. In addition to greater flexibility, superior neutron flux distribution for test purposes is indicated. 3 238 107, C.F. Leyse, O.J. Elgert, B. H. Leonard, Jr., Internuclear Co.

Pressurized reactor control by varying composition of coolant moderator. Spectral shift and resultant reactivity change are controlled by varying the ratio of D_2O to H_2O during circulation. Safety and reliability of this method is assured by utilizing 2 tanks in a side loop circulating from the main flow path. One tank serves as injection chamber while the other acts as an extraction chamber. Balance between feeding of one liquid (D_2O, H_2O, or a mixture) into loop and simultaneous removal of the other is effected by a common inert gas blanket acting on the surfaces of the liquids in both tanks. 3 239 423, A.A. Cooper, Societé Anglo-Belge Vulcain S.A. (Belgium).

Detection of nucleate boiling in a liquid-metal-cooled reactor. Early detection is provided and channel blockage is avoided by utilizing the acoustic properties of bubble formation. Characteristic sonic waves generated by nucleate boiling are conducted by a sound guide from each circulating tube to an electroacoustic transducer, thence to a registering and recording instrument. Selective monitoring of the spectrum of sonic waves shows a sharp peak at the very inception of nucleate boiling. 3 240 674, T.J. Ledwidge, UKAEA.

Improved **production of laminated plastics.** Paper, cloth, or fabric impregnated with an unsaturated polyester is subjected to about one megarad (beta) causing an initial gelling of the material. Subsequent heating to complete curing need only be to relatively low temperatures for short periods, depending on the material, thus improving efficiency of the process and eliminating blistering effects caused by high temperatures. 3 246 054, J.R. Guenther, R.B. Mesrobian, Continental Can Co., Inc.

Graphite moderator from raw petroleum coke. Various ways of preparing graphite bodies are disclosed employing mixing with different binders, molding and baking at elevated temperatures. All result in isotropic bodies with highly disordered crystallite arrangement. Extremely low coefficients of thermal expansion approximately equal in all directions over a wide temperature range are obtained. 3 245 880, S.W. Martin, F.

L. Shea, L.J. Juel, Great Lakes Carbon Corp.

Determination of water in oil flowing in a pipe line. Low energy radiation having a high degree of attenuation is employed for this purpose. A test chamber is inserted in the oil flow line. A radioactive source is positioned on one side of the chamber and a radiation detector on the opposite side. Circuitry comprising a photomultiplier tube, amplifier, pulse height analyzer, and count rate meter feeds to a recorder. Signals received are responsive to differences in density of oil and water, and chart may be directly graduated in percentage of water in oil. 3 246 145, R.A. Higgins, Socony Mobil Oil Co., Inc.

Passive defense for aircraft from nuclear explosions. Gamma-ray sensors are positioned in a predetermined space relation around the fuselage of an aircraft. Signals caused by gammas from a distant nuclear explosion enable instant detection of the direction of the explosion. Aircraft may then be maneuvered into position to expose its least vulnerable aspect to the sudden gust loading caused by the blast before it arrives. 3 243 147, J. Brown, D.N. Spangenberg, US Navy.

Rapid reading and reusable dosimeter. Lithium fluoride is combined with an electrical conductor comprising graphite cloth and silver paste. After exposure, an electric current is passed through the device, heating it. Light is emitted and measured by a photomultiplier tube and the data relayed to a digital recording system. The entire operation takes about 20 sec. After cooling, the device is ready for use again. Advantages over conventional film badge are indicated. 3 243 590, A.H. Forsman, J.R. Gaskill, W.A. Phillips, R.D. Taylor, USAEC.

Two compact steam generators. Compactness with emphasis on nuclear propulsion is obtained in two different ways.

Ammon puts his entire plant into a single heavy pressure vessel. Primary coolant circulates through the core while secondary coolant flows through steam-generating tubes surrounding the core. A concentric insulated wall within the vessel separates the core section from the secondary loop section. Natural circulation is relied on in the core and feed water is supplied to the tubes by an external pump.

Purdy employs a heavy reactor pressure vessel inside two lighter containment vessels. Forced circulation is provided by a pump in the primary loop; the secondary loop comprises helical steam-generating tubes in a concentric flow space provided by a cylindrical shell surrounding the core portion. The inner containment vessel holds heat insulation and the circulating pumps. The outer containment vessel holds a ring of neutron shielding and is filled with water for biological shielding.

Pressurizers are employed with both constructions. 3 245 879, D.C. Purdy, E.E. Shoesaw. 3 245 881, J.H. Ammon, T.S. Sprague. Both to The Babcock & Wilcox Company.