current patents

HIGH ENERGY PHYSICS

Aligning Accelerator Magnets

A physical effect that has been known since 1905 but for which there was no practical application has now been found useful for aligning the magnets in atom smashers.

The positioning of focusing magnets and the exact location of the magnetic field they create is critical for guiding nuclear particle beams into, through and out of accelerators. The magnets have to be lined up accurately enough to keep the beam axis from varying more than a thousandth of an inch.

An optical device using the Cotton-Mouton effect has been developed to detect the exact center of the invisible magnetic field. The center is indicated by the dark cross obtained when polarized light passes through a cell containing a solution whose light-transmitting properties are affected by a magnetic field. Colloidal ferrous oxide is such a solution. On each side of the cell is polarizing screen through which the pattern is viewed.

The Cotton-Mouton effect is one of double refraction in a magnetic field, corresponding to the Kerr electro-optical effect that some transparent solids and liquids exhibit in a strong electric field.

When a crystal of calcium carbonate, for example, is held between the eye and a pinhole in a card, two bright dots are seen. If the crystal is rotated around the line of sight, one dot travels in a circle around the other, which remains fixed. The light rays are doubly refracted.

Rudin M. Johnson of Berkeley, Calif., assigned rights to his method for optical determination of magnetic field patterns using double refraction to the Government through the U.S. Atomic Energy Commission.

Patent 3,353,097

MINING

Detecting Faults in Coal Seams

A method of detecting sudden changes in the level of a coal seam, or faults, ahead of where the seam is being mined has been patented by a German scientist.

Theodor Krey of Hannover has found that sound waves sent forward along the coal seam can be used to determine the location of a fault if two vibrators are used, one near the bottom and one near the top of the seam being mined. The waves travel along the boundary between the coal and the rock enclosing the seam until they strike a material of different composition, indicating a displacement.

The sound waves are reflected back from the displaced rock and picked up by geophones. The time lapse involved between sending and receiving the reflected wave indicates the distance to the fault. Krey assigned rights to Seismos G.m.b.H., Hannover. **Patent 3,352,375**

TECHNOLOGY

Stock for Paper-Making Machines

A method for delivering to a paper-making machine a paper stock that has the same composition and the same velocity at all points has been patented.

Kasimir Lopas of Stamford, Conn., assigned rights to Time, Inc., New York. Uneven characteristics in the consistency or velocity of paper stock when it reaches a paper-making machine result in imperfections in the paper, particularly when the paper is for printing books or magazines.

The method devised by Lopas provides for a recirculating loop and a tapered-flow header that can be used either separately or in combination.

Patent 3,351,522

OPTICS

Synthetic Ruby Laser

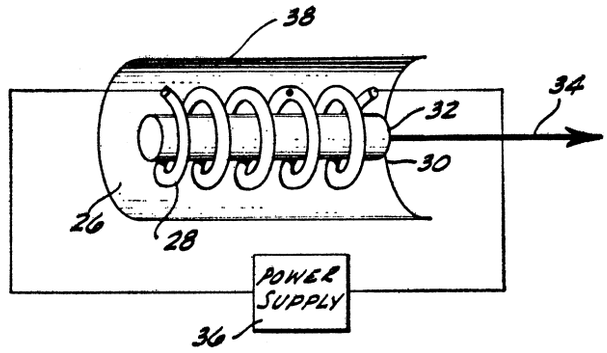
The man who first successfully amplified the laser light of ruby last week received a patent on the operating system.

Dr. Theodore H. Maiman, now president of Korad Corp. in Santa Monica, Calif., assigned rights to Hughes Aircraft Co., Culver City, Calif., where he was working at the time of the development in 1960 (SN: 7/23/60).

An atomic method for amplifying light beams was suggested early in 1959 by Drs. C. H. Townes, now a Nobelist and professor-at-large at the University of California, and Arthur L. Schawlow, chairman of the physics department at Stanford University. Many scientists immediately started working to see if they could build a laser, Dr. Maiman among them.

Dr. Maiman was convinced that synthetic ruby was the proper material for a laser, while his competitors experimented with different materials.

As originally developed by Dr. Maiman, a light source, such as a powerful flash tube lamp, irradiates a synthetic



ruby crystal. This optical energy excites the ruby atoms to a higher energy state, from which the energy is reradiated almost entirely in one frequency band. The excited atoms are coupled to the atomic resonator and stimulated to emit their radiation together.

In ordinary light sources, the atoms radiate individually at random and the light is therefore incoherent. The light from the ruby laser, as well as other optical masers, is coherent.

A ruby laser very similar to the one Dr. Maiman developed originally can be bought for from about $5,000 to $50,000, depending upon the power output. Purchasers are mainly university and industrial laboratories for scientific experiments.

Patent 3,353,115