

ELECTRONICS

Computer Switch "Flips" In Millionth of a Second

► A NEWLY developed switch to be used with digital computers can operate in a millionth of a second.

Kenneth H. Olsen of the Massachusetts Institute of Technology reported to the Institute of Radio Engineers meeting in New York that the switch is smaller, more durable and requires fewer vacuum tubes than previous switches of its type.

Basically, the switch consists of tiny ring-shaped magnetic cores. Each core has an input winding, an output winding and several control windings.

Information which must be switched to its proper "pigeon hole" arrives at the core in the form of an electric current. The current induces magnetic flux in the core. The output winding picks up the flux from the core, converts it back into intelligence-carrying electricity and sends it on its way for storage.

If, however, the core in question is not the proper one, current flows in the control windings. That saturates the core with magnetic flux which blocks the signal from going out on the wrong circuit.

The device was designed by engineers at the MIT Digital Computer Laboratory. An eight-position demonstration model already has shown the practicality of the switch. MIT engineers now are working on two 16-position switches of similar types.

Science News Letter, March 15, 1952

BIOLOGY

Thousands of New Life Forms Discovered Annually

► EVERY YEAR scientists discover about 5,000 new kinds of insects, 2,000 new kinds of plants, 500 new shelled creatures or mollusks, 20 or 30 new mammals and only two or three new birds.

This information came from a panel led by Dr. Remington Kellogg, director of the U. S. National Museum.

Dr. Edward A. Chapin, curator of the division of insects, said that the number of species of insects in the world is just about incalculable but that about 5,000 new ones are recognized each year. He also told how the National Museum cooperated with Australia in finding an insect which would get rid of a cactus which had driven 600,000,000 acres of land out of cultivation.

They finally found a small moth in Uruguay which would eat the cactus and at the same time not feed on plants cultivated in Australia. It clears cactus from 2,000,000 acres a year.

Dr. Jason R. Swallen, curator of plants, said that 2,000 new species of plants were developed or discovered each year. He showed a new species of grass collected in South America.

More than 500 new species of snails and other shelled animals are discovered every year, Dr. R. Tucker Abbott, curator of mollusks, said during the discussion. Man, he said, has been in the "shell racket" for a long time. Ancient man used shells for money on the early trade routes. Mollusks are still important, in that some of them carry diseases which are fatal to man.

Twenty or 30 new kinds of mammals are discovered each year, said Dr. Charles O. Handley, assistant curator of mammals, but hundreds of sub-species are identified. He, himself, is now working on half a dozen new forms. Mammalogists are useful to many other fields of science, he pointed out.

There may only be about 100 species of birds still undiscovered, said Dr. Herbert Friedmann, curator of the museum's bird division, and only two or three are discovered each year.

The scientists made their reports at the Science Talent Institute.

Science News Letter, March 15, 1952

MEDICINE

Confuse Pneumonia And TB with Lung Cancer

► VIRUS PNEUMONIA and tuberculosis are being confused with lung cancer in far too many cases, Dr. Richard H. Overholt of Boston declared at the Second National Cancer Conference in Cincinnati.

He cited figures showing that 45 out of 100 lung cancer patients had first been diagnosed and treated as virus pneumonia or tuberculosis patients. Some of the remaining 55 out of the 100 had their lung trouble diagnosed and treated as asthma or some other condition.

Lung cancer is the second most common cause of cancer deaths among men. But it is one of the most detectable, and Dr. Overholt thinks the most detectable, of any internal cancer.

The way to detection of this killer is through mass chest X-ray surveys. Chest X-ray pictures will show the disease in its "silent" but highly curable stage. If patient or doctor waits for symptoms to develop, the cure rate is much lower.

Lung cancer when treated in this early, "silent," stage can be cured in 75 out of every 100 cases. This high cure rate, higher than for any other internal cancer, is still a theoretical one, Dr. Overholt said, because so far most patients who have had lung cancer detected and treated in this early stage have had this early diagnosis and treatment so recently that doctors cannot say yet that they have been cured.

Dr. Overholt reported on a study of about 1,000 lung cancer suspects, of whom 807 were positively diagnosed as having the disease. While almost half, 45, of the first 100 had their cancers misdiagnosed as virus pneumonia or tuberculosis, of the last 100 in the study, only 25 had this misdiagnosis.

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ELECTRONICS

New TV Tubes Iron Out UHF Problems of Future

► A NEW receiving tube has been developed for television sets which not only is capable of tuning in standard very-high frequency television stations but also the ultra-high frequencies of future television stations.

Furthermore, a television transmitting tube which uses a forced-air cooling system instead of water has been designed to eliminate special water connections in ultra-high frequency television transmitters.

Known as a radio-frequency amplifier, the receiving tube was described by H. W. A. Chalberg, General Electric tube design engineer, as bridging a gap in the television industry because present receiver tubes will not operate over the entire UHF and VHF television frequency range.

He said existing tubes available for use in UHF tuners are unsuitable partly because of unconventional designs and prohibitive costs.

The new receiving tube is not as yet in commercial production, Mr. Chalberg said.

Meanwhile progress in television transmitting has been marked by a 1,000-watt transmitting tube which may rid future UHF television stations of cumbersome water cooling systems. Forced air rushes by the tube's radiator fins at one cubic foot a second.

Problems associated with high operating temperatures of transmitting tubes have been largely licked by replacing the conventional glass envelope with a ceramic and metal casing, GE engineers reported. The ceramic is made of talc and resists heat better than glass.

Science News Letter, March 15, 1952

INVENTION

Flame Cultivator Burns Weeds But Not Crops

► AN ATTACHMENT to a farm tractor which burns weeds but does not hurt the growing crops has been patented by James K. McNeill, Gary, Ind., and assigned to the International Harvester Company. He received patent number 2,587,873 for his invention.

The flame moves across the crop row, attacking the weeds and doing no substantial harm to the growing crops. It is more readily adaptable to the cultivation of plants which develop a large stem and a root system which firmly holds the plants in the soil, the inventor said.

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CE FIELDS

AERONAUTICS

Birds Dangerous to Planes But Not Disastrous in U. S.

➤ BIRDS are as dangerous to airplane pilots as icy roads are to automobile drivers.

On the average, one bird strike a week occurs in the United States, said J. W. Lankford, chief of the accident analysis division of the Civil Aeronautics Board. He said, however, that no major air disaster in the United States has been attributed to birds.

Meanwhile, American experts are waiting to hear whether birds actually played a role in the airline accident recently near Nice, France.

Night-flying migrating birds offer the biggest problem because they are larger and fly at about the same altitude as commercial airliners. However, windshields have been developed to withstand impacts from the flying fowl.

Sea-gulls offer a special problem, Mr. Lankford said, because they like to feed on airports after rains drive worms to the ground's surface.

"They come in droves," he said, "and the least little noise will make them all take off at once. Even though they are light birds they still present a threat to pilots."

Small aircraft occasionally are forced to make precautionary landings after bird strikes because of possible damage to the wing fabric.

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MEDICINE

Fluorine Concentrates Are Harmless During Pregnancy

➤ EXPECTANT MOTHERS in communities where the drinking water is fluoridated to check tooth decay will concentrate some of the fluorine in the placenta, or after-birth. The amount is too small, however, to have any harmful effect on the mothers.

The concentration of fluoride in the placenta was discovered in studies by Drs. Dwight E. Gardner, Frank A. Smith, Harold C. Hodge, D. E. Overton and Reuben Feltman of the University of Rochester School of Medicine and Dentistry, the New York State Department of Health and the division of dental research of the Passaic, N. J., General Hospital.

Previously Drs. Smith, Gardner and Hodge had found that the blood of persons living in Newburgh, N. Y., where the drinking water is fluoridated, contained almost three times as much fluoride as the blood of persons living in Rochester where the water is not fluoridated. In both cities,

the blood content of fluoride is extremely low, that is, 1 to 10 millionths of a gram in 100 cc. of blood.

The amount of fluoride in placentas from Newburgh women is also almost three times as high as that in Rochester, the scientists report in the journal, *SCIENCE* (Feb. 22). Even in this tissue the fluoride content is low enough not to interfere with normal metabolism.

In both cities the placentas had a higher concentration of fluoride than the blood. The scientists suggest two possible explanations: 1. If fluoride is an essential trace element, the placenta may concentrate it to ensure an adequate supply to the unborn baby. 2. Since excessive fluoride is poisonous, the placenta may be acting as a barrier to keep more than trace amounts from reaching the unborn child.

How much of the accumulating fluoride passes from the placenta to the child has yet to be determined.

Much of the fluoride taken with drinking water, previous studies show, is excreted in the urine.

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GENERAL SCIENCE

Frankenstein's Monster Was a Comparative Piker

➤ A LEAD-LOADED steel skeleton having a tubular spine, a rudimentary wooden head, a chest of welded layers of perforated steel plate, a canvas skin, spring limit-joints, interchangeable pre-fabricated bones, a checker-board suit and a center of gravity equal to man's has, by comparison, made Frankenstein's monster look sick.

The British developed this synthetic man to test parachutes to be used by pilots flying high-speed aircraft. The dummy was designed to do everything an unconscious man would do while drifting toward the earth in a parachute.

Because testing conditions might be dangerous to a live man, the British searched their dummy-drome for a suitable substitute. An ordinary sack of sand, or even an ordinary dummy man was given the thumbs down because the distribution of weights would be wrong. That would make the man's center of gravity in the wrong place and his movements would be false.

"At first," said the Britishers, "it was thought that a simple stuffed man would be adequate, but the experts discovered that a man was very solid inside and only soft 'stuffing' on the surface."

So the British compiled a set of calculations based on 1,200 crew men's bodies. Each joint was carefully weighed. Every pre-fabricated bone had to be exactly right, from the center of gravity on.

Spring limit-stops were installed between the dummy's joints so that if an arm or leg were twisted beyond the human breaking point during descent in the parachute, it readily would be spotted by experimenters.

Science News Letter, March 15, 1952

INVENTION

New Germanium Alloys, Rectifier, Receive Patent

➤ NEW GERMANIUM alloys which combine the germanium with gases such as nitrogen, as well as other elements such as copper, silver, magnesium, titanium or uranium, and rectifiers made from those alloys received a patent recently.

Inventors were Dr. Karl Lark-Horovitz, head of the department of physics at Purdue University, Lafayette, Ind., and Dr. Randall M. Whaley, professor of physics at the same institution.

Dr. Lark-Horovitz, Seymour Benzer, Pasadena, Calif., and Robert E. Davis, East McKeesport, Pa., also received a patent for a photoresponsive and thermoresponsive cell utilizing germanium bombarded with neutrons so as to have alternating strips of negative and positive type conductivity. The two patents were numbered, respectively, 2,588,253 and 2,588,254.

The germanium alloys patented by Dr. Lark-Horovitz and Dr. Whaley may be used as semiconductors for rectifiers of the contact type which among other things can stand high, continuous operating voltages, have low forward resistances and high back resistances, do not require power for heating a cathode and do not require more space than about that needed for a common one-half watt carbon resistor.

The alloys patented are all of the class of negative-type semiconductors.

The second patent provides for a method of producing the alternating negative and positive strips by shielding alternate strips with a material which will protect them from bombardment.

Both patents were assigned to the Purdue Research Foundation.

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INVENTION

Patent Improvements in Garand Rifle Mechanism

➤ JOHN C. GARAND, Springfield, Mass., inventor of the famous Garand rifle carried by millions of Americans in World War II and in Korea, received patent number 2,587,611 for improvements in a valve mechanism on the rifle to be operated when a grenade launcher assembly is attached to the rifle. He assigned his patent to the government.

In launching a grenade with a rifle, he explained, the gases in the barrel build up a great deal of pressure. The purpose of the valve is to relieve that pressure and thus save the recoil mechanism of the rifle from excess wear. The valve is opened by force when the grenade launcher is attached to the rifle, but it cannot be jarred open when the launcher is not in use. The valve also closes readily after the launcher is removed.

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