

PHYSICS

Magnet With "Memory"

A new permanent magnet with a "memory" that permits a man to walk upside-down may help the future astronaut maneuver in weightless space.

► A MAGNET with a "memory" may help spacemen of the future walk in the weightlessness of outer space.

A permanent magnet with a "memory" that can be turned "on and off" has been developed by research engineers at Westinghouse Electric Corporation in Pittsburgh, Pa. The magnet remembers its "on-off" condition indefinitely. This development "marks a radical change from the behavior of conventional permanent magnets," Dr. George Wiener, manager of the magnetics department, said.

This "on-off" ability, due to a new magnetic circuit in which the permanent magnet is the key element, permits a man to walk upside-down on earth. Attached to the soles of a person's shoes, the magnets will clamp his feet securely to a steel beam on the ceiling and support him, and free his foot when a step is taken. Exposed to the full pull of gravity, this upside-down gymnastics is much more difficult than any walk in space.

This unusual property of the magnet is due to the transfer of the magnetic lines of force, or magnetic flux within the magnetic system, Ray J. Radus, engineer and developer of the magnet, said.

The circuit is described as a three-layer sandwich about one inch square and half an inch thick. The middle layer is a ceramic magnet and the two outer layers are thinner pieces of soft steel. These act as magnetic "funnels" that concentrate the magnetic lines of force into the end areas. The funneling effect creates a pull of about 30 to 50 pounds at either the north or south pole of the mag-

net. Two metal pieces or keepers, one at each end, complete the circuit.

Differing from the ordinary permanent magnet, this new magnet exerts a strong magnetic force at one end while exerting very little at the other end. Its strong and weak magnetic poles can be switched, thus turning the magnetism on and off. It remembers the direction of its greatest magnetic pull indefinitely.

Mechanical transfer of the pull is accomplished merely by moving the keepers at the ends of the magnet. The keeper first placed in position is always held with the strongest force.

The most practical way to shift the magnetic flux is electrically, by coiling a wire around one pole of the magnet. A short pulse of current is sent through the coil transferring the flux to the weak end. Possible uses for the magnet include remotely controlled locks for doors, trunk and hood of cars, under control from push buttons at the driver's seat, and also as a magnetic memory unit for digital computers.

• Science News Letter, 83:110 February 16, 1963

TECHNOLOGY

Insect Venom Removed By New Electric Device

► A NEW ELECTRIC device to remove insect venom is good news to the unfortunate persons who are allergic to the stings of bees, wasps and hornets which may kill them.

Injection of pure venom, now extracted

by hand, can protect these sensitive persons. Almost as many people die of insect stings as from rattlesnake bites in the United States.

With the new apparatus developed at Montana State College, two or three insects can be "milked" each minute with no apparent effect on the insect except pronounced hunger and thirst.

They live to make more venom to be extracted again.

Previous attempts at obtaining bee venom by electrical excitation have not been applicable to certain wasps and hornets because of differences in size, insufficient voltage or the danger of fighting among these insects.

Drs. Rod O'Connor, William Rosenbrook Jr. and Robert Erickson of the department of chemistry, Montana State College, Bozeman, reported the development of the new machine in the current journal, *Science*, 139:420, 1963.

Dried venom may be stored at zero degrees Centigrade for several months without loss of activity.

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TECHNOLOGY

Latest Bulletproofing Armor "Eats Lead"

► NEW ARMOR PLATE, made of a composite of materials and weighing 20% to 50% lighter than conventional armor plate, has been developed by the Aerojet-General Corporation's structural materials division. When a bullet hits this material, the armor "tips" the slug sideways, shatters it and "eats it up" by absorbing it.

Planned for use on light tanks, personnel carriers, planes, boats and other vehicles, this bulletproofing material can be applied to currently existing vehicles and structures.

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TECHNOLOGY

Optic Fiber "Brain Cell" Reacts to Human Voice

► A BUNDLE of fine fibers of quartz has been fashioned into a synthetic "brain cell" that can hear and react to the human voice.

Many uses are predicted for the new device, composed of several thousand tiny light-carrying quartz fibers that vibrate in a certain pattern to sound stimulus. The "cell" can not only listen to, understand and react to human commands, but it can discriminate between different voices and similar sounds, such as the subtly different sounds of the sonar return from a whale and that from a submarine.

Called the Sceptron and developed by the Sperry Gyroscope Co., the "cell" is expected to lead rapidly to the development of instruments with "photographic memories" through which men can talk to calculators, typewriters and other machines.

Because of its ability to discriminate sounds it will find use in heart damage detectors and submarine detectors.

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Sperry Gyroscope

MEMORY CELL—A fiber-optic array of tiny light-carrying, quartz rods is being assembled for a pre-production model of a Sceptron which can listen to, understand and react to spoken human commands.