

# innovations

from The University of Vermont

**TITLE:** ON-OFF MAGNETIC ATTACHMENT DEVICE

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**DESCRIPTION:** This invention is intended to be used in applications where it is desirable to attach and remove a device without having to overcome the force of a permanent magnet or use a switchable magnet. Unlike electromagnets, devices according to the present invention are able to hold objects indefinitely without requiring power. Examples of specific applications include the use of a robotic foot, an attachment for sensors or transducers, or a magnetic pickup device. The invention utilizes a rotating cylindrical dipole magnet contained in a specially designed casing. The rotating magnet is caused to rotate by an acuator that is connected to the magnet. The magnet/casing housing becomes an effective gripper when it is placed near to or in contact with a ferromagnetic object. Rotating the cylindrical dipole magnet about the cylindrical axis through 90 degrees switches the magnet/casing between two states – on and off. Placing the magnet/casing on or off the surface of a ferromagnetic object switches the device between two more states. This combination gives four possible states of varying energy levels. The management of switching from state to state provides the sliding and gripping action.

**ADVANTAGES:** Switching the device between the four states in an automated fashion is a breakthrough that allows the rotation of dipole magnets and to move the magnet/casing closer to or away from the ferromagnetic object. Using multiple devices enables deployment of sensor systems that rely on the relative position of the sensors. This could serve as a robot foot for crawling up a ferromagnetic surface. Other applications include pickup devices, sensor deployment, and sensor attachment devices.

**PATENT STATUS:** Provisional Patent

**LICENSING STATUS:** World wide rights available

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