It looks like a cross between a Dalek’s suction pad and a rubber ball on a stick. But this simple robot gripper can pick up unfamiliar and even delicate objects, and could rival robotic fingered hands for grasp and dexterity.

Grasping is a difficult task for robots, as it requires them to know precisely where to place their fingers, and how hard to grip the object to hold it securely without crushing it. This differs depending on whether the robot is picking up a light bulb or a hammer, so it must rely on sophisticated but costly sensors.

“Our gripper is simpler because it does not need tactile sensing,” says Eric Brown at the University of Chicago. His team has created a robot hand that is simply a rubber bag filled to about 80 per cent of its volume with glass spheres, each 100 micrometres in diameter.

When the bag is pressed onto the object to be picked up, the spheres flow around it and the bag moulds to its shape. A pump then creates a vacuum in the bag, jamming the spheres in place and hardening the gripper around the object. As the force is distributed evenly across a large surface area, the hand can pick up delicate objects like eggs without crushing them, says Brown. A larger version of the gripper could be used to pick up many objects at the same time.

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