

4-H'er builds robot that can help handicapped

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EVANS CITY — What stands 4 feet 9 inches tall, weighs 110 pounds, moves forward, backward, left and right, has two independent arms, wrists and pinchers and is made from discarded materials?

Rotom — a robot that can hold round and square objects, serve a glass of water, water the flowers and walk the dog. The brain child of Evans City 4-H'er Christopher Rishack, Rotom was designed with the handicapped in mind. Nineteen-year-old Chris says he hoped to design and create a robot that could aid a handicapped person.

Rotom is the final product of Chris' 4-H activities, which started seven years ago when he joined the Dunbar 4-H Club at the age of 12. Chris' other 4-H projects have included poultry, handicrafts,

entomology, home and garden and electrical. However, his most important and productive project has been his self-determined project.

Chris' 4-H leaders Judy Marburger and Ina Mikalauskas encouraged him to pursue his self-determined project at the county, state and national levels. Devoted to his small community club, Chris has served as reporter, secretary, vice president and recently retired as president after four years in that office.

When deciding what to pursue for his self-determined project, Chris planned to do something that would help him obtain a scholarship. Deciding that his family would think his idea of creating a robot was crazy, Chris kept his plans to himself.

He started spending all his spare time the family's garage, leading the family to believe he was cleaning it, when he was really

working on his first robot. His grandfather did have some insight into the project, but didn't think it would materialize.

A series of less successful robots preceded Rotom. His first ancestor was constructed of scrap material, as were the other five robots that followed Chris' first attempt. Robot number one was made of two by fours which were too heavy to move, a head, and one arm.

The second robot was again made with wood, but had no head. It did have an arm with fingers and a thumb that couldn't hold any objects and just wasn't practical. The other robots that followed all had imperfections, but led to the creation of Rotom.

Rotom, Chris' sixth robot, is unlike any of his predecessors. Chris used all "new" discarded parts when he created Rotom. He made Rotom from eight motors, six of which are government surplus and two of which are zerox motors from a copier. Chris derived the name Rotom for this sixth creation by spelling motor backwards.

Specially designed to have a vise-like grip in his pinchers, Rotom can hold objects as sensitive as an egg.

Chris' mother says: "He stayed in the garage in bad weather as it was winter, keeping warm with a camp heater while grinding down and polishing the arms and pinchers of Rotom."

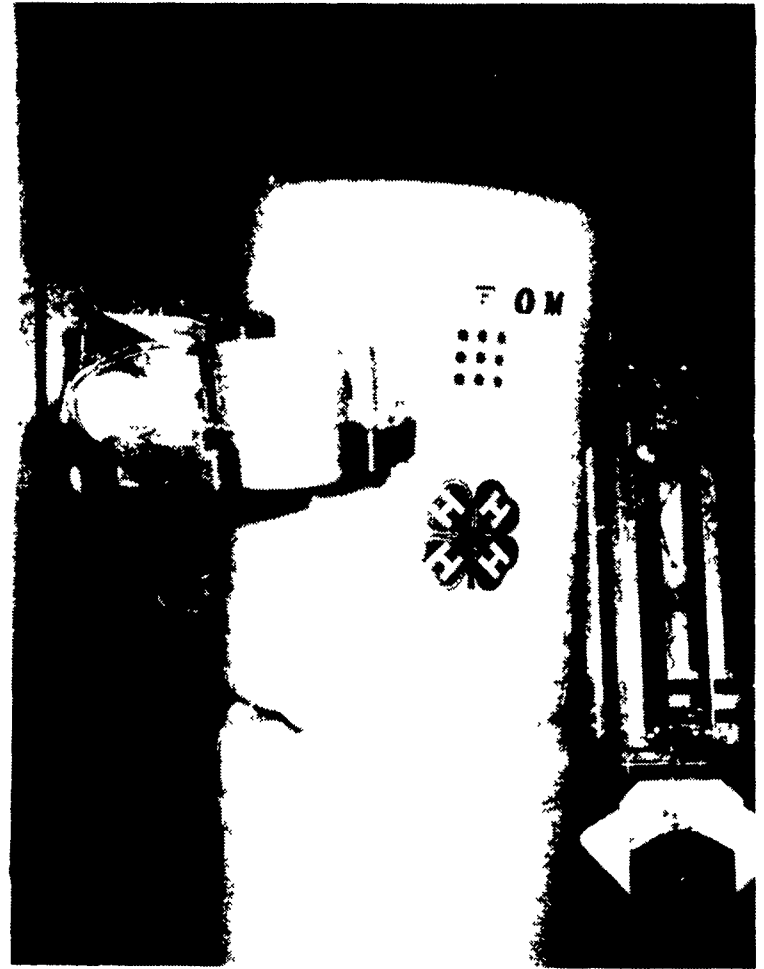
Chris adds, "The wrists are real stable as they have an automatic safety control which prevents the crushing of an egg."

Rotom's body is made from two 25-gallon iodine containers from a dairy farm, the aluminum base from an industrial transformer, wheels from old lawn mowers, and coffee cans. Chris designed a mold to create the large bubble on top, while "Tupperware" can be found on the control box.

Before beginning work on the actual robot, Chris worked out his design with Legos. His mother says he has played with Legos and Lincoln Logs since he was five years old. Gears and mechanical things also fascinated him, she said.

In late December 1981 Rotom was finally designed and built in just two months. Using the knowledge gained from experimenting with the other robots, Chris built his most efficient and practical creation.

While working on Rotom, Chris focused his efforts on creating a helpmate for the handicapped. He wanted Rotom to be able to pick up a glass of water and serve it, pick a piece of paper off a table, and do



Rotom demonstrates his ability to hold a coffee cup in his pinchers.

other chores that the bedridden cannot. Rotom is now equipped to do all these things, and by changing his base, a robot could do jobs such as mowing the lawn.

"Safety is a major concern in the construction of a robot," Chris says. "Rotom is the only robot who has made it to the house and into mother's dining room! No other ones left the garage," he continues.

"Another main feature of Rotom is that he's peanut butter and jelly proof, as he can't be hurt and wipes off easily," Chris adds.

Rotom also has the ability to speak any word in the language with any accent, through a voice synthesizer. It is programmed through his stereo system with a computer amplified with the stereo system. Chris says the next step is to complete the computer control.

At the time of this interview, Rotom's voice synthesizer was in Pittsburgh, where Chris is attending the Pennsylvania Technical Institute.

After completing his training at the Technical Institute, Chris plans to return home to start "Rishack Robotics," where he will make robot kits using his own designs. He's hoping that his father will join

him in a partnership. Presently, Chris is employed as a quality controller at the Marburger Dairy in Evans City.

Rotom is Chris' first robot to be shown to the public, "but he will not be the last," Chris says. Chris, now known as the kid the robot brings, can certainly be proud of his accomplishments. In just over two years, he and Rotom have won well over 30 awards in local, regional, state and national competition.

Industrial engineering firms who sponsored some of these awards include Armoc, Inc.; Joy Manufacturing Co.; Fisher Scientific Co.; the University of Pittsburgh Engineering; Westinghouse Electric Corporation; and the American Society of Mechanical Engineers, Pittsburgh.

Chris has received congratulatory memos from U.S. Senate and Westinghouse Corporation, his biggest sponsor in competitive events.

He was top among 300 entries on a research paper on the development and home applications of robots submitted to Washington D.C. in January 1984.

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Chris operates Rotom's pinchers with a control panel.



Rotom's pinchers are so sensitive that he can hold a fragile egg without breaking it. Here, Chris shows how he uses a control box to remove the egg from Rotom's pinchers.



Chris and Rotom display some of the awards they have in 4-H competitions.