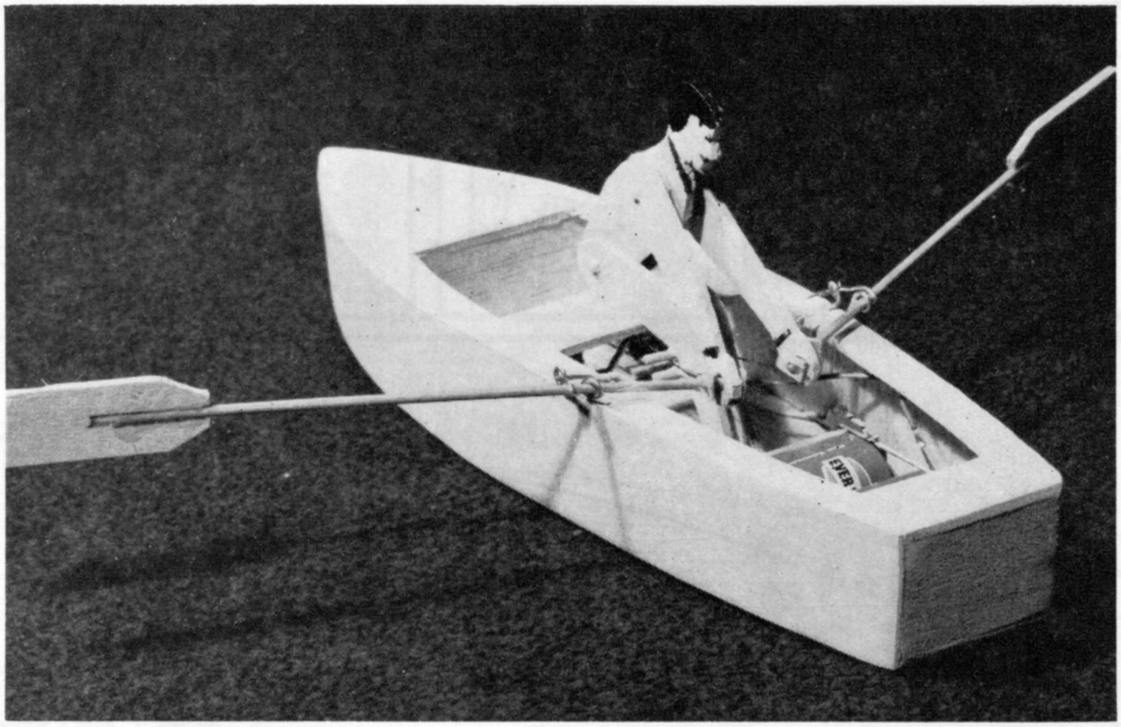


Robot Rowboat

by Peter Williams

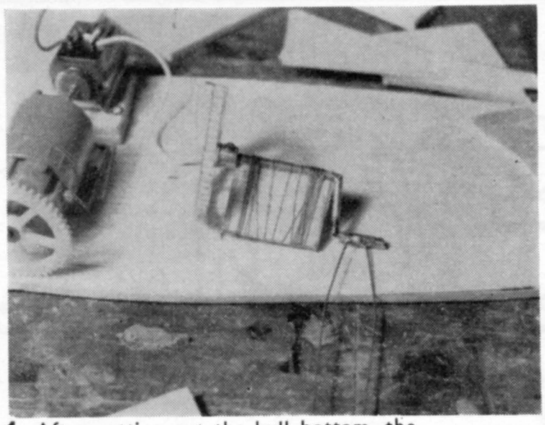
THIS mechanical rowboat is something novel to build. The little balsa oarsman rows tirelessly, until the battery runs down. He has been designed to row with an elliptical motion and is operated by a crank hidden beneath the seat. At a distance there is a certain air of mystery about him, that causes appreciative comment from the pond side. The model is not difficult to make; the hull is the most simple form of boat shaped box made from $\frac{1}{8}$in. sheet, with 1/16in. sheet sides added after the mechanism is completed and working. You do not have to be mechanically proficient to make the rowing mechanism, it is mostly simple wire bending and a little soldering.

You will need one sheet of $\frac{1}{8}$ x 4 x 36in. balsa, a sheet of 1/16 x 3 x 36in. balsa, a length of $\frac{1}{8}$in. dia hardwood dowel, a length of 18swg. piano wire, some 3/32in. dia brass shaft (Ripmax) or 3/32in. outside dia brass tube and a piece of 3/32in. bore brass tube to fit over the former, scrap tinplate cut from a tin can and a few paper clips to provide material for bending small parts used for the rowlocks, etc. You will also need an EM55 Mini Richard gearbox, 26s. 8d. (set it on 60:1 ratio) two Ripmax spur gears, one 50 tooth (1s. 9d.) and one 60 tooth (2s.), an EM005 Super Q Orbit 005 motor (4s.) and a scrap of thin plastic tube to couple it to the gearbox. A sheet of lightweight Modelspan tissue will be useful in the final stages of finishing the model, to cover the grain, also sanding sealer and dope to complete it.

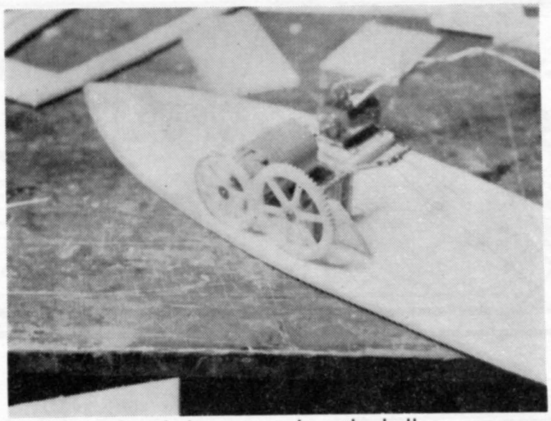
Start by tracing the outlines of the hull bottom, deck and inwales on to $\frac{1}{8}$in. sheet, using carbon paper under the plan. Next cut out these items and the bulkhead, stem and transom. Save the cut out area of the deck/inwale sheet, for cutting out further parts. Cement packing pieces for the motor and gearbox to the bottom sheet, the gearbox needs one piece of 1/16in. sheet and the motor two pieces of $\frac{1}{8}$in. sheet and one of 1/16in. sanded to 1/32in. thick.

Operating mechanism

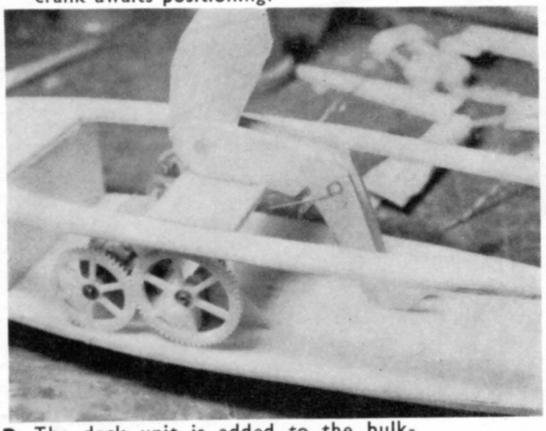
A small electric motor drives a crank via a reduction gearbox and an additional set of gears, the crank moves two connecting rods, which pass through guides which change their motion from a circular clockwise motion at the crank end, to elliptical anti-clockwise at the other end. This imparts a rowing action to the oars at their central point, where they are secured to the connecting rods with a small loop in each.



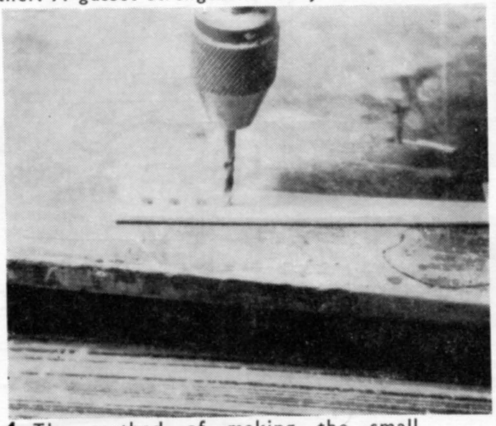
1 After cutting out the hull bottom, the packing pieces are cemented on and the motor and gearbox glued on. The crank awaits positioning.



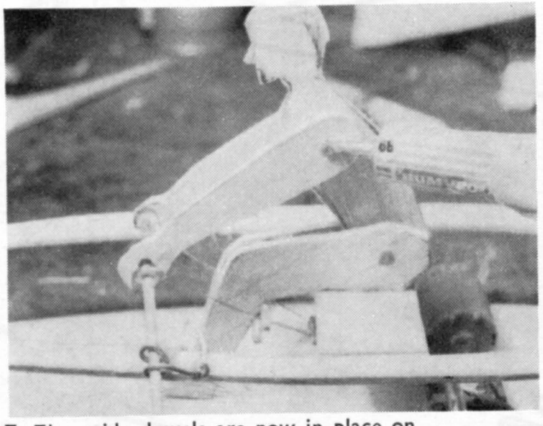
2 The crank unit is cemented to the hull bottom with the gears in mesh. The gears should not be too tightly together. A gusset strengthens the joint.



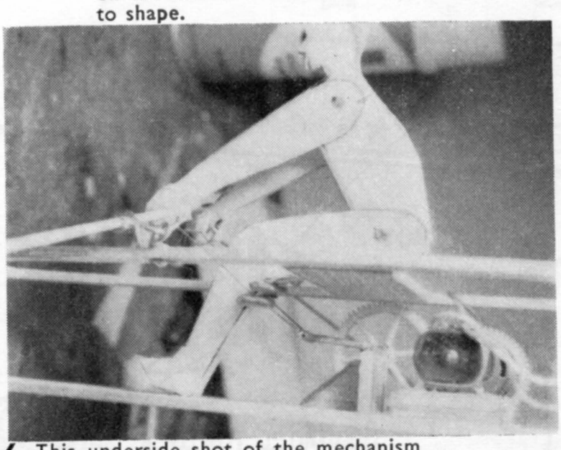
3 The deck unit is added to the bulkhead, stem and transom. The seat and lower parts of the oarsman are cemented in place over the mechanism.



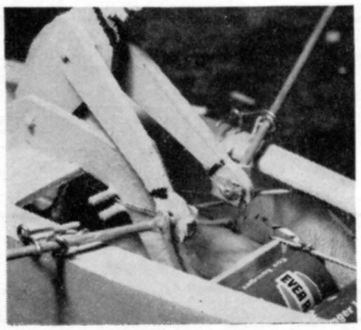
4 The method of making the small washers used to prevent the oarsman's arms and the connecting rods slipping off the end of the oars. Drill, then cut to shape.



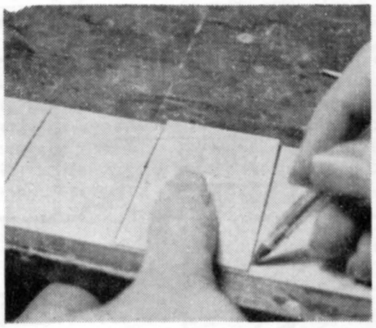
5 The guide dowels are now in place on the oarsman's legs and the connecting rods linked up to the oars. The dowels are cemented to the arms with a washer behind.



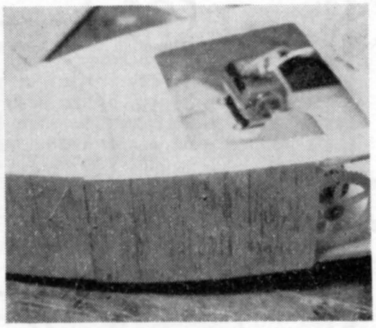
6 This underside shot of the mechanism shows how the cranks link the oars and indicates the position of the oars at the beginning of the rowing stroke.



7 This top shop shows the rowlocks clearly. The oars are just about to be lowered into the water. The battery box may also be seen.



8 This best method of cladding the sides is to mark one piece of 1/16in. sheet and use it to mark off the remainder. The pieces are doped before fitting.



9 Side sheeting being pinned in place while the cement sets. The inside of the hull should have first been doped while it was accessible.

Assembly

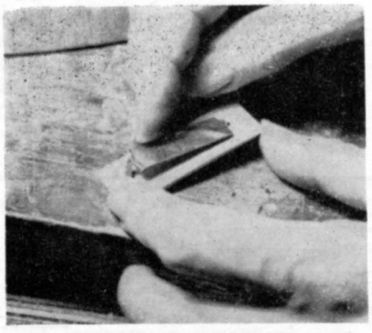
Connect the input shaft of a Mini Richard gearbox, to the armature shaft of a 005 Ripmax electric motor, with a short piece of small diameter plastic or rubber tube. Set the gearbox to operate at its lowest ratio, i.e. 60:1. Using contact adhesive such as Evo-stik, fix the gearbox and motor to the bottom of the hull where indicated. Be sure to allow the adhesive to become touch dry before placing them in position. The motor will need 9/32in. balsa packing below it to bring the shafts into correct alignment.

Fix a Ripmax spur gear (50 teeth) onto the output shaft of the gearbox. Bind and cement a 1in. long piece of 3/32in. brass tube on to a piece of $\frac{1}{8}$in. balsa $\frac{3}{4}$ x 1in. to form a bearing. Take a $2\frac{5}{8}$in. long piece of 3/32in. shafting and bend the end $\frac{3}{8}$in. at right angles, to form the crank pin. Bend it at 90° again in the opposite direction, $\frac{3}{4}$in. from the first bend; this makes a $1\frac{1}{2}$in. throw crank.

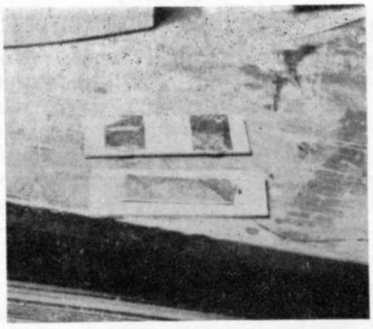
If you cannot obtain the 3/32in. shaft stock, use 3/32in. outside diameter brass tube and make "V" nicks two thirds of the way through it, with a triangular file. The sides of the "V" must be at 90deg to each other, i.e. at 45deg to the centre line of the tube. The tube can then be bent at right angles and the angle rejoined with solder, this makes a neat crank.

Slide the crankshaft through the brass bearing tube and fix a Ripmax 60 tooth spur gear to its other end. Position the balsa panel so that the gear meshes with the 50 tooth gear and cement it in place, using a $\frac{1}{8}$in. sheet gusset to hold it upright. Make the connecting rods by bending a single piece of 18swg. piano wire to form both, the centre point has a $\frac{1}{4}$in. long piece of 3/32in. bore brass tube to form a big end bearing. Solder this to the connecting rod where it loops in the centre. Bend 3/16in. dia loops in the opposite ends of the connecting rods. Slip the big end on to the crank and solder a washer on to hold it in place. Assemble the inwale/deck piece on the bow piece, bulkhead and transom.

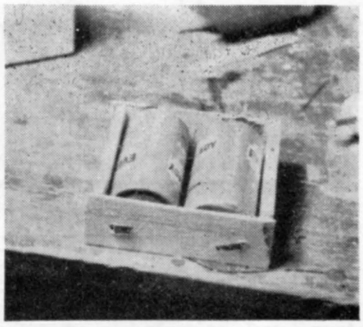
Cement the seat in position and cut out and mount the oarsman's legs on the seat and bottom of the hull, between the connecting rods. Pass two pieces of dowel through the legs, where indicated, and spring the connecting rods in between their ends. Bind and cement a pair of "L" shaped paper clip wire hooks onto the oar shafts, where they cross the gunwale. Make rowlocks from paper clip wire and clip them over the inwale and cement them in position. The oar passes through the large hole and the hook passes through the small loop. The purpose of this hook is to keep the blades of the oars upright. When the shafts of the



10 Tinplate contact strips are cut from an empty tin can with old scissors. This one is the bridging contact and is passed through two holes in the box back.



11 Both sets of contacts are now fitted to the battery box ends. Each contact strip has small lugs which are bent over after passing through or round the balsa.



12 Batteries in place in the battery box which sits on the hull bottom. A small ready made box could be used, but pencell batteries are really too small for the job.

oars are in position, cement the blades made from $\frac{1}{8}$in. sheet vertically onto the ends of the oar shafts.

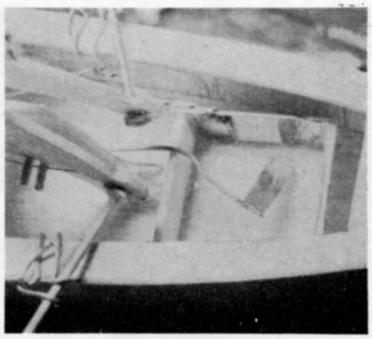
Assemble the oarsman like a puppet, using dowel or cocktail sticks as pivot pins, held at the ends with a touch of cement. 3/16in. holes in the hands are bevelled at the edges and given a skin of cement, they go over the ends of the oars, when the dowel joining the body to the legs has been put in place. By springing the connecting rods slightly, the ends of the connecting rods can be slipped over the oars.

Small 1/32in. plywood washers are used to retain the connecting rods and the oarsman's hands on the oars in the correct position. These are best made by the following methods: Cut a narrow strip of ply and drill four $\frac{1}{8}$in. holes in it. Being in one length, the wood does not tend to spin round and there is something to get hold of. The strip is now cut to a narrower width (5/16in.), then chopped up into squares. Mounting them on a dowel, the corners should be sanded off. The washers are cemented securely on to the oars, allowing $\frac{1}{8}$in. end float for the hands and connecting rods.

It is important that the rowlocks are in the right place and a test should be made by slackening the grub screw of the 50 tooth gear and turning it by hand to see if there are any tight spots. If one does occur at the forward or rearward end of the oars' travel, then the rowlocks can be slid along a little, before cementing them finally in place.

When all is working smoothly, re-tighten the grub screw and give the whole of the inside of the model two coats of clear dope, to prevent it soaking up any water shipped in choppy weather. It is easier to reach the top surface of the bottom, and the bottom surface of the inwale deck, etc., before the sides are added.

Now for the sides. Measure the depth of the hull along the length of a piece of 3 x 1/16in. hard balsa, cut one piece and use it to mark off nine more pieces. Give the backs of these, two coats of the clear dope, and let them dry. Cement them, grain vertical, around the hull, pinning them to the bottom and deck. Start at the bow and work aft, trimming away the surplus at the stern. The doped side should be inwards. When the cement is dry, carefully sand the edges flush with the top and bottom, taking care not to damage the oars in the process. Tissue cover the outside of the hull, give it a coat of clear dope when dry, then sanding sealer, finish with colour dope or paint.



13 When complete, the rowlocks are finally cemented in position, provided the action is smooth. This shot also shows the plug-in contact which serves instead of a switch.

Whilst one of the little twin pen cell battery boxes is convenient, the pen cells do not last very long, so a larger one was constructed for the prototype, which holds a pair of UII cells. It was made from $\frac{1}{8}$in. sheet with 1/16in. sheet ends. The latter were drilled to take bent over lugs of three tinplate contact plates, cut from a tin can, with an old pair of scissors. A switch was considered a luxury. Instead a further strip of tinplate was soldered onto one extended motor lead and this was pushed in between the end of the box and the battery.

COLONEL BEATTIE RETIRES

FIFTEEN years ago Colonel Beattie turned his Southgate Stamp Shop into a centre for model railway enthusiasts. He provided a new idea in service and advertised it to a world-wide clientele. He developed a unique method of exchange which enabled modellers all over the country to change their unwanted items for things they needed and the goods traded in stocked quite remarkable secondhand shops, where everything was sold reasonably and with a guarantee of the customer's satisfaction or money returned.

Thanks to advertising, the business grew rapidly, five shops were developed in Southgate to meet the needs of visitors from all over the world.

In January 1965 the Colonel bought the famous retail shops of Bassett Lowke in Holborn and Manchester and quickly restored the Holborn image of "The Mecca of Modellers" the shop which was once the rendezvous of Royalty and the leading members of the nobility, literature and the Arts.

Who is this almost legendary figure in the Model Trade? Stewart Beattie was born in Sunderland in 1897, he went to school at Red House, York, and the Preparatory School, Sedbergh, and finished his formal education at the Bede Collegiate School, Sunderland. He joined Lloyds Bank, Newcastle-on-Tyne in January 1914 at a salary of 16s. 8d. per week out of which he paid his fares to Newcastle and his lunches. He saved £10 in his first year at work!

In October 1915 he was commissioned into the South Staffordshire Regiment, he was then 17 and saw service in France, Italy and Egypt. Between the wars he had a variety of occupations, mostly with a "sales" slant. When war broke out in 1939, he was running his own Fire Equipment & A.R.P. business in Southgate, but was called off the Reserve to take a War Office appointment of Assistant Inspector of Fire Services.

He became Inspector of Fire Services in 1941 and built up the special organisation needed to protect Army installations at Home and the Army in the Field. During his service the Army Fire Services grew from two officers and seventeen other ranks to over 200 officers and 7,000 warrant officers, N.C.O.'s and men. He was awarded the M.B.E. in 1940 for his report on the fire Services of the B.E.F., and was demobilised in July 1946. While still in the Army, Colonel Beattie bought the Southgate Stamp Shop out of which his present organisation has grown.