

Millions of Them!

How Meccano Bolts are Made

I WONDER how many million Meccano bolts and nuts have been made since Meccano first came to light. For that matter I wonder how many are made in a year now. The number of course runs into millions, and they are to be found everywhere. What indeed would life today be without them? There would be no Meccano

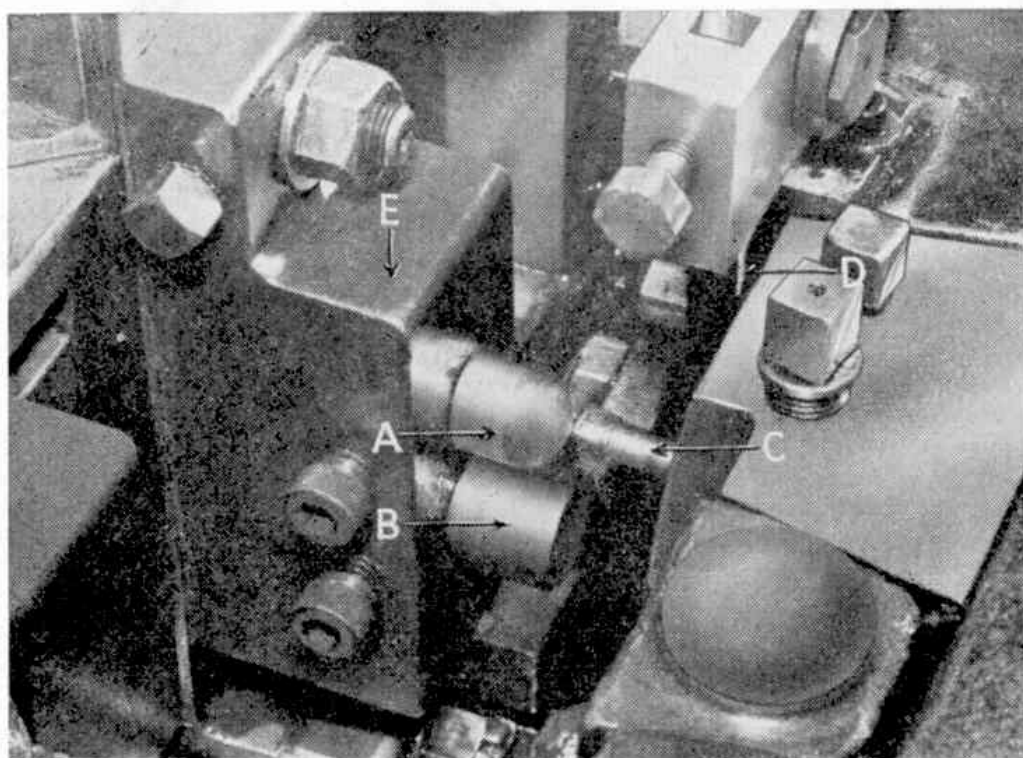
Looking into the heart of one of the machines on which Meccano bolts are made.

models for one thing, and that would be a real catastrophe. Then fathers and uncles would never make a beeline for their sons'

Meccano Outfits when they want a bolt and nut in a hurry to do some little repair in the home or in the garden shed; and even mothers would be disappointed, I am sure, if no Meccano bolts and nuts rattled into their vacuum cleaners, if only because that would deprive them of the opportunity of drilling into their offspring the importance of keeping everything in its proper place!

Bolts and nuts are interesting enough from this point of view, but they are even more interesting as engineering products. Making a bolt may not be quite the same as building up a giant machine such as the Craven boring and

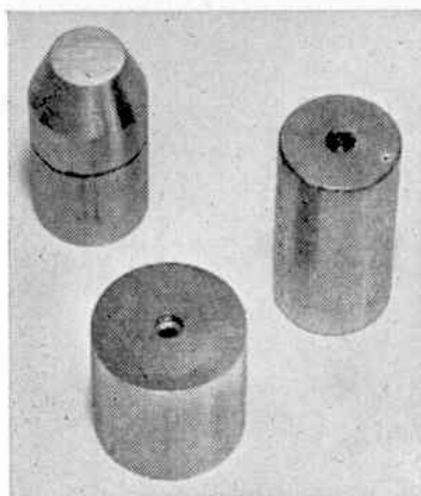
milling machine described and illustrated in last month's *M.M.* But the same care and precision have to be taken in producing it, for after all the failure of a bolt could easily mean the collapse of an entire



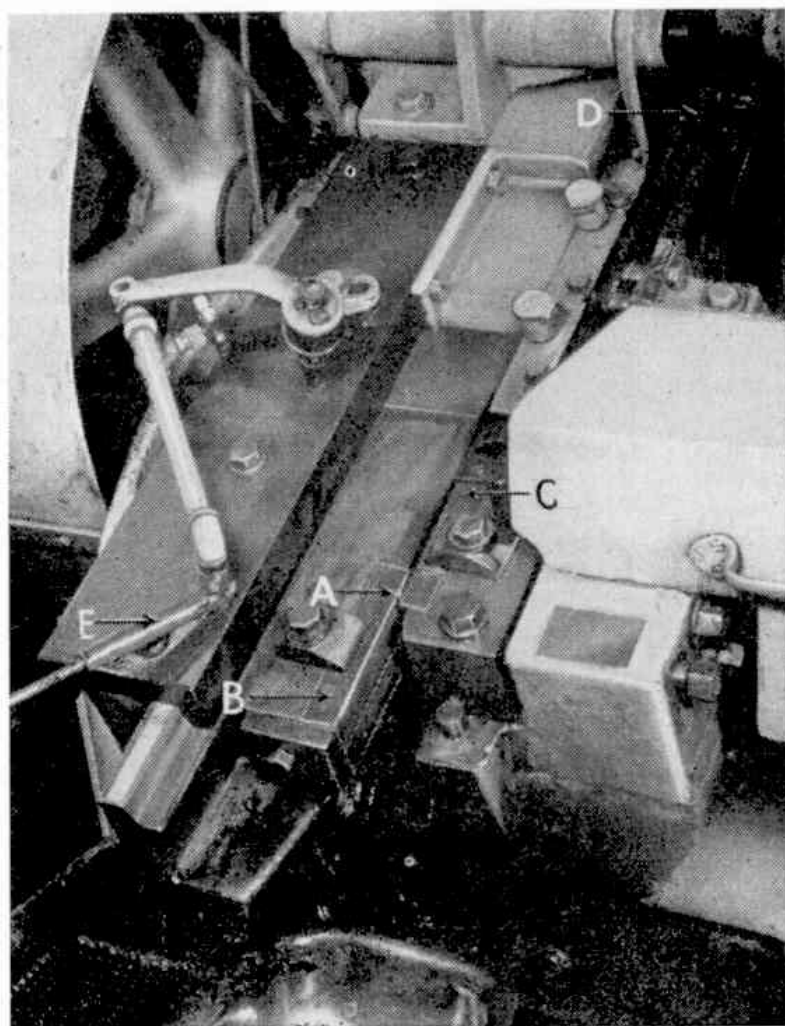
Meccano model, which must never happen!

Let us have a look at the making of a bolt. Obviously the best way to begin is to cut a mild steel rod of the required diameter into lengths. The novice might think that this rod should be of the diameter of the bolt head, and that part of the metal should be tooled away on a lathe to leave the proper shape. This would be wasteful and it is unnecessary. The rod used in practice has a diameter slightly smaller than that of the shank of the bolt, not the head.

How then is the head formed? To answer this question look at the larger picture on this page. In it you are looking down



Above are the two tools, successive blows from which form the head of a Meccano bolt. Below them is the die in which the head is formed.



Rolling the thread on a Meccano bolt.

provide the place in which the metal for the head is shaped. This is done by two violent blows, one by the tool shown on the right, which has a recess in its face and the other by the tool seen on the left, which has a plain face. The first blow squeezes the end of the rod into a pear-shaped head, and the second flattens this out to fill the die completely, and thus give the head the right shape. Forming the head in two stages instead of in one gives a better flow of metal under the pressure applied, and therefore a stronger bolt head.

The tools are mounted one above the other in the tool head marked E in the picture of the machine. This moves backward and forward, and at each forward stroke alternatively up and down, so that first the recessed tool A and next the flat tool B strike the rod to form the head, after which the bolt is ejected, to drop into a collecting tray.

The bolt made in this way still needs threading and of course has no slot for the

screwdriver. The slot is cut first, on a machine that is fed automatically with the blank bolts, which pass in turn under a circular cutter that is rotating very rapidly and forms the slot in very short time. From this second machine the bolts in the making then move on to a third for threading. The thread is actually rolled on, each bolt in turn being rolled between two hard steel dies, with grooves on them that correspond to the exact profile of the thread, to shape the metal of the shank of the bolt into the required form.

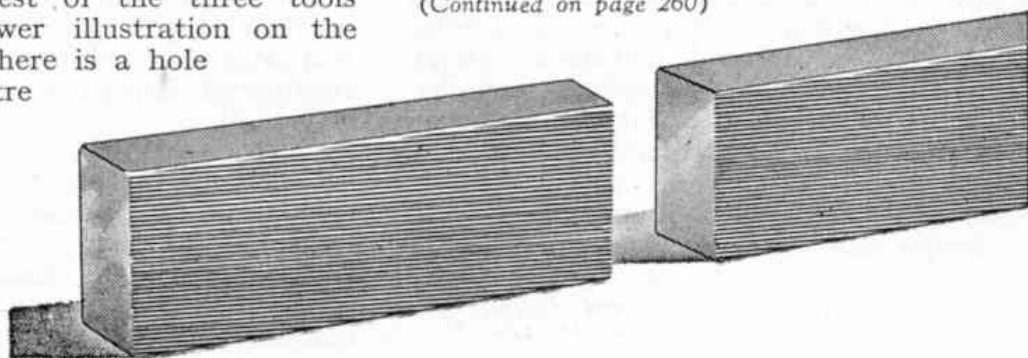
The thread rolling machine is

(Continued on page 260)

on the tools that perform the apparent miracle of making the bolt head. The coil of wire from which the bolt is made is passed through an opening on the right of the machine, to emerge below the blade marked D. As it is pushed forward its end comes up against the stop C—the place where this happens is just invisible in the photograph—and D then slides forward to cut off the length of rod required, which is seized by fingers and carried across the face of the machine, to be held in a position opposite to the die in which the head is to be formed.

You can see what the die is like if you look at the lowest of the three tools shown in the lower illustration on the previous page. There is a hole through the centre of the die, and this hole is counterbored at the end to

Dies used in
threading a
Meccano bolt.



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seen in the upper picture on page 221. The blanks are fed down the chute D, and arrive between a fixed block and a sliding block, each carrying one of the thread-forming dies. B is the die on the sliding block and C that on the fixed block, A representing the head of a bolt that is actually having a thread rolled on it. The faces of the dies roll the bolt along between them and squeeze the shank into the thread form required. The bolt and the dies become hot during this process, so oil is sprayed on them from the pipe E. Normally this pipe is over the line down which the bolt is rolled when the machine is working.

All that the bolts need now is cleaning and coating with brass. The brass finish is given by placing the bolts in a solution of copper and zinc salts, so that an electric current passes to them from a brass anode.

Mysterious Orchids—(Continued from page 229)

painful process it is for an orchid to reach maturity, it will be no surprise to you that many of our orchids are so exceedingly rare that it is doubtful whether they still exist or have in fact become extinct.

The extensive ploughing of pasture land has spelt disaster to many local colonies of orchids and it is possible that the monkey orchid, which until a couple of years ago survived in one place in Oxfordshire, has been destroyed in this way. The lady's slipper is found only in one area in Yorkshire, and every effort is being made to protect it from thoughtless people who cannot resist picking a rare flower when they see it.

At one time I used to gather the more common orchids myself when I found them, but when I came to understand them better, and realised how handicapped they are in the fight for survival, I made a promise never to pick one again. I leave them all to seed so that in future years people will still be able to enjoy these beautiful and interesting flowers.

Cycle Speedway—(Continued from page 239)

team addresses.

If your local team does not think that you are quite good enough for them, do not be dismayed. Instead form your own team! You will need eight riders—six team men and two reserves—and you must then decide upon a team name and team colours. Most important of all, you will have to contact your local Parks Committee to see if they can assist you to find a suitable patch of ground for a track.

The rules of the sport are outlined in the Cycle Speedway Annual and should be carefully studied. Equipment? Well, very briefly you will want an old bike, or one of the specially produced models that will set you back at least ten pounds; a good crash helmet; and leather gloves to protect the hands from cuts and dirt. You should have also a roll neck jersey or thick shirt, strong boots or shoes—an old pair—that will take quite a considerable amount of wear and tear, and riding breeches, or your oldest pair of trousers!

Study the photographs printed with this article. They will give you a guide as to how you should look when you are dressed and ready to race.

New Meccano Model—(Continued from page 249)

Rod so that it engages the Contrate 15.

To make the front axle beam fix a $4\frac{1}{2}$ " Strip to the strips 1 with Angle Brackets. Fit two $1" \times \frac{1}{4}"$ Angle Brackets 27 with Fishplates, and bolt one to each side of the bonnet. Now mount a $1\frac{1}{2}"$ Rod in each end of the axle beam and also in one of the Angle Brackets 27. Fit each Rod with a Crank 28, but space the Crank from the Angle Bracket 27 by a Compression Spring. Connect the ends of the

Cranks with a $4\frac{1}{2}"$ Strip 29 attached to them by lock-nutted bolts.

For the steering column a $6\frac{1}{2}"$ Rod is used. At one end support the Rod in a Semi-Circular Plate attached to the Plates 5 by an Angle Bracket. Mount its other end in a $1\frac{1}{2}"$ Strip bolted to the $1" \times 1"$ Angle Bracket 30. Fix a Collar on the end of the Rod, and screw a Threaded Pin into the Collar so that it engages between two Fishplates bolted to the Strip 29. Now mount each front wheel freely on a $\frac{3}{4}"$ Bolt, and screw the Bolt into the boss of one of the Cranks 28.

For the driving seat two Trunnions are bolted to a 3" Flat Girder. Connect two $2\frac{1}{2}"$ Stepped Curved Strips 31 to the ends of the Flat Girder by Angle Brackets, and bolt their upper ends to an Angle Bracket fixed to the Strips 6. Finally fix two $2\frac{1}{2}" \times \frac{1}{4}"$ Double Angle Strips, bolted together, at one side of the bonnet, using $\frac{3}{4}"$ Bolts, and on the other side fix four Collars, this time using $\frac{3}{8}"$ Bolts.

To build this novel racing car you will require these parts: 2 of No. 1; 10 of No. 1b; 8 of No. 2; 10 of No. 2a; 4 of No. 3; 2 of No. 4; 4 of No. 5; 2 of No. 6; 8 of No. 6a; 16 of No. 10; 1 of No. 11; 7 of No. 12; 1 of No. 12a; 2 of No. 12b; 2 of No. 12c; 2 of No. 14; 1 of No. 15b; 1 of No. 17; 3 of No. 18a; 2 of No. 20; 5 of No. 20a; 1 of No. 23; 1 of No. 25; 1 of No. 26; 2 of No. 29; 116 of No. 37; 36 of No. 37a; 32 of No. 38; 1 of No. 45; 4 of No. 48a; 2 of No. 48b; 1 of No. 55a; 11 of No. 59; 2 of No. 62; 1 of No. 63c; 5 of No. 90a; 1 of No. 103e; 1 of No. 103h; 1 of No. 109; 7 of No. 111; 3 of No. 111a; 14 of No. 111c; 1 of No. 111d; 1 of No. 115; 2 of No. 116a; 2 of No. 120b; 2 of No. 126; 4 of No. 133a; 4 of No. 142a; 1 of No. 147a; 1 of No. 147b; 1 of No. 147c; 1 of No. 148; 1 of No. 171; 2 of No. 186; 2 of No. 186e; 4 of No. 187a; 2 of No. 189; 1 of No. 192; 2 of No. 214; 4 of No. 215.

Stamp Collectors' Corner—(Continued from page 257)

months in that dangerous Weddell Sea. 2/-, *Pourquoi Pas*; a barque-rigged vessel lost off Iceland in 1936. 2/6, *Francais*; built for the French Antarctic Expedition of 1903-5, it was lost afterwards in the River Plate.

5/-, *Scotia*; Barque-rigged whaler used by the Scottish Antarctic Expedition of 1902-4. 10/-, *Antarctic*; a wooden sealer used in several polar expeditions, and finally crushed in the pack ice of Weddell Sea. £1, *Belgica*; a barque-rigged sealer used by the Belgian Antarctic Expedition of 1897-98.

Doesn't the romance conjured up by these famous names make you want to have a set?

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