



### INTERNAL GEARING

In response to a widespread demand from model-builders, an internally-toothed gear has been added to the range of Meccano Parts. The new part, No. 180, Gear Ring, resembles a Circular Strip of  $2\frac{1}{2}$ " inside diameter and  $3\frac{1}{2}$ " outside diameter, with 95 teeth cut in the inner edge and 133 teeth round the outer rim. The part is provided with 16 perforations, as will be seen in the illustration in the panel on this page, and the arrangement of these holes is such that allowance is made for adjusting and centring the part by means of slots.

The applications of this part will at once be apparent to advanced model-builders, but a few notes on its various uses will be useful to those less experienced. The chief uses will be found in the construction of epicyclic gear boxes, and an entirely new field for experiment is opened up in this direction. A 57-teeth Gear forming the "sun wheel" can be arranged to mesh with  $\frac{1}{2}$ " Pinions serving as "planet wheels," and engaging the inside set of teeth of the Gear Ring. The Pinions may be mounted on  $\frac{1}{4}$ " bolts each fixed by two nuts to a  $3\frac{1}{2}$ " Strip or 4" Circular Plate, which is free on the Rod carrying the 57-teeth Gear. If a Strip is used for this purpose, a Double Arm Crank should be bolted over the centre hole. A Socket Coupling fitted to the Boss of the Double Arm Crank or Face Plate may be provided with a Gear or Pinion for driving purposes.

The Gear Ring may be mounted on a 4" Circular Plate fitted on an independent Rod, in which case there are three rotating units, namely, the Gear Ring, the "sun wheel," and the frame carrying the "planet pinions," any one of which can be stopped while the other two are connected to driving and driven shafts. A wide variation of speed can be obtained by driving through the 57-teeth Gear and the Face Plate carrying the Pinions, and also driving the Gear Ring by means of the external set of teeth. The speed of the driven shaft will then be varied according to the variation in the speed of the Gear Ring.

The new part may be utilised also where a small Circular Strip is required, and one of its applications of this kind is illustrated in the panel. In this case it is used as a slip ring for collecting the current supplying the lamps in the rotating structure of a model Flying Machine. The superstructure rotates on two 3" Pulley Wheels, the lower one of which is supported on Double Brackets to allow clearance for the Gear Ring. The Ring is insulated from the base by Insulating Bushes and Washers placed on the 6 B.A. Bolts holding it in place. The accumulator is connected to the Gear Ring and also to the frame of the model. To collect the current from the Gear Ring a Pendulum Connection is attached to the upper structure but insulated from it, and made to bear lightly on the Ring. The current returns through the frame of the model.

The Gear Ring may be mounted in a similar manner to that described above and used for rotating the superstructure of the model. With the part bolted to the fixed base, the power unit would be mounted in the upper structure; but a more usual arrangement would be to mount the Motor in the base and bolt the Gear Ring to the rotating structure. A  $\frac{1}{2}$ " Pinion engaging the outer teeth of the Ring should be driven from the Motor.

The possibilities of a Gear Ring for obtaining a reduction gear should not be overlooked. When suitably mounted and driven by the internal teeth, it will be found that driving and driven Rods rotate in the same direction, whereas two external gears would rotate in opposite directions to each other.

The parts may be bolted directly to the road wheels of a model tractor, etc., for supplying the drive, which may be taken to the outer or inner set of teeth. In such a case it would be a simple matter to arrange a two-speed gear by meshing  $\frac{1}{2}$ " Pinions both inside and outside the Gear Ring, and changing the drive from one to the other as required. The changing of the drive may be effected by means of Dog Clutches or by sliding Gears.

### MAKING LARGE BOBBINS

In large electrical models the standard-sized Meccano Bobbin is sometimes found too small to give satisfactory results as an electro-magnet. The difficulty can easily be overcome by building up a core of Meccano Strips and using stout cardboard for the cheeks. The required number of Strips should be clamped together by means of Screwed Rods at each end.

where both ends of the Springs are closed, and cannot be used in models such as a spring gun where the compressed Spring is suddenly released to catapult a washer off the Rod. If more than one Spring is used for this purpose the obvious result will be for the extra Springs also to shoot off the end of the Rod.

### SLIP RINGS FOR LARGE MODELS

A large model in which the upper portion is made to rotate frequently presents difficulty when it is desired to fit an Electric Motor or illuminate the rotating structure. Obviously wires cannot be connected to the rotating portion of the model, so that some form of slip ring must be devised.

A current collector for models incorporating the Roller Bearing Unit, Part No. 167, can be devised by forming two circles of  $4\frac{1}{2}$ " Curved Strips and bolting these above and below the Ring Frame.

For this purpose 6 B.A. Bolts (Elektron Part No. 1575) should be used, and although the two circles should be connected together electrically, they should be insulated from the Ring Frame by means of 6 B.A. Pushes and Washers (Elektron Part No. 1570). A Pendulum Connection attached to the base of the model, but insulated from it, forms a brush and bears against the lower circle of Strips; and a second Pendulum Connection attached to the rotating superstructure, but insulated from it, bears against the upper set of Strips.

To connect up for driving an Electric Motor, one wire should be attached to the upper Pendulum Connection and to one of the Motor terminals, the other terminal being connected to the frame of the model. The lower collector brush is connected to the Accumulator or Transformer, the second terminal of which is attached to the base of the model.

### CRANE JIB CONSTRUCTION

The jib of a model crane must be made as light as possible consistent with strength. A heavy jib requires considerable power for raising and lowering, and consequently several stages of reduction gearing must be fitted between the Motor and luffing barrel, so that the luffing operation is somewhat slow. Also, if the jib is too heavy the crane will have a tendency to overbalance, and even with a light jib it is often necessary to add counterbalance weights to overcome this. A strong and rigid jib can be constructed from Angle Girders, which are made to form a square section girder by means of Strips, additional Strips being added for diagonal bracing.

A jib of much lighter construction can be made from Braced Girders, and although perhaps not quite so rigid as the usual type, it will be found sufficiently robust for most models. The Braced Girders are made to form a large girder of square section by bolting them together by means of Angle Brackets. These should be placed at regular intervals along the sides of the Girders to prevent any tendency to buckle. The ends of the jib may be finished off by means of Strips or Angle Girders, and a jib of any length can be made by adding extra Braced Girders.

**BOILER MODIFICATION.**—The present design of the Boiler (Part No. 162) enables it to be opened out or contracted to make cylinders of various diameters, and your proposed tubular cylinder would not possess this very useful feature. The present Boiler can be bolted up to make a tube of fixed diameter, and the row of slotted holes allows for slight adjustment so that the Ends fit tightly. Your suggestion appears to be prompted by the tendency of the Boiler Ends to slip off after the Boiler has been in use for some time. This trouble may be overcome by opening the boiler slightly. The latest pattern Boiler Ends are perforated and may be bolted in position if desired. (Reply to B. Patrick, Huddersfield.)

## New Meccano Parts

No. 180, Gear Ring,  $3\frac{1}{2}$ " diameter, 95 internal teeth, 133 external teeth. Price 2/- each.

The illustration on the left shows the new Meccano Gear Ring. This part, which resembles a Circular Strip, has an inside diameter of  $2\frac{1}{2}$ " and an outside diameter of  $3\frac{1}{2}$ " and is provided with 95 internal teeth and 133 external teeth. It will be found extremely useful in numerous different types of gear boxes. It is specially suitable for reproducing epicyclic gearing, but it can be used in almost any instance where an internally toothed gear is necessary. In addition it can be used where a small Circular Strip is required, and in the illustration below it is shown in use as a



Part No. 180.

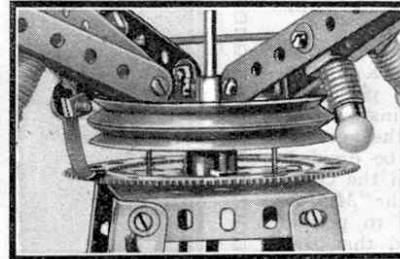
slip ring for collecting the current used for illuminating electric lamps fitted to the revolving superstructure of a model Flying Machine. The uses of the part are dealt with in detail on this page.



Part No. 147c.

No. 147c, Pawl without Boss. Price 1d. each.

This part resembles Part No. 147a, but is without a boss. The new Pawl can be mounted on a  $5/32$ " Bolt provided with two nuts for fixing it in position.



The length of the core is determined by the length of the Strips used, and the thickness depends upon the number of Strips employed. A handy size may be made from forty-five 2" Strips clamped between Screwed Rods and carrying at one end Angle Brackets for fixing the core in place on the model. At the other end the Strips may be fitted between a  $1\frac{1}{4}$ " x  $1\frac{1}{4}$ " Double Ang. Strip. The core so formed is provided with two coil cheeks of stout cardboard measuring approximately  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ ", with a rectangular hole  $1\frac{1}{4}$ " x  $1\frac{1}{4}$ " cut out of the centre. These form the limits of the windings, and to prevent damage to the wire the space between the two cheeks should be wrapped round with stout paper before the wire is wound on. When the coil is complete it is advisable to wrap a layer of paper round the outside to protect the wire. This precaution often prevents trouble arising as the result of the insulation of the wire being damaged and causing short circuits.

### EXTENDED COMPRESSION SPRINGS

It sometimes becomes necessary to employ a light compression spring of greater length than the standard part, and the obvious means of obtaining such a spring is to bring into use two or more short Springs. Constructors who have tried this method will have found that after a period of use the parts work one into the other, the effective length eventually becoming reduced to that of a single Spring. To overcome this trouble a washer should be placed on the Rod between each Spring. This prevents them from intertwining, and by adding extra Springs almost any length may be obtained. It should be remembered that this method of construction is only suitable