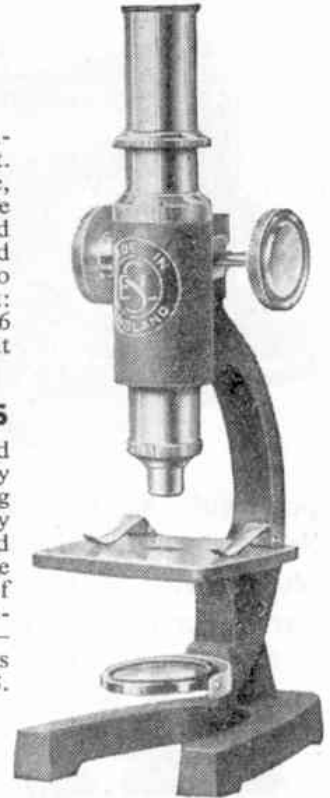


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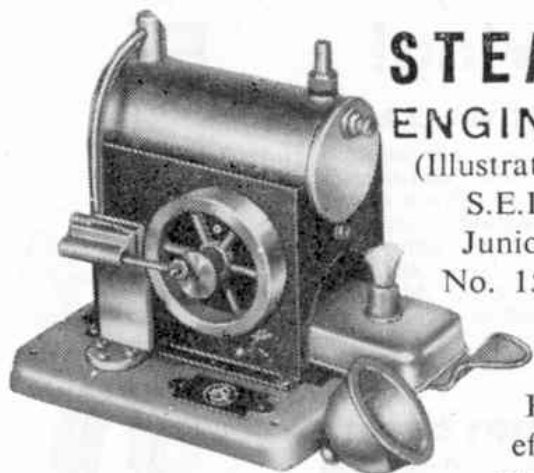
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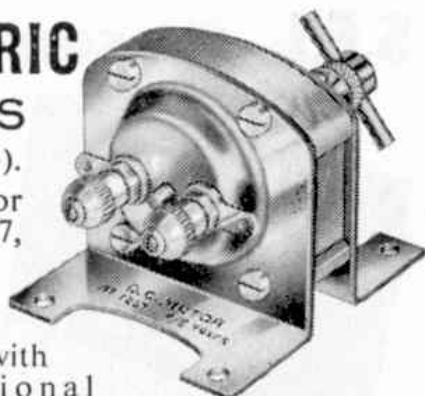
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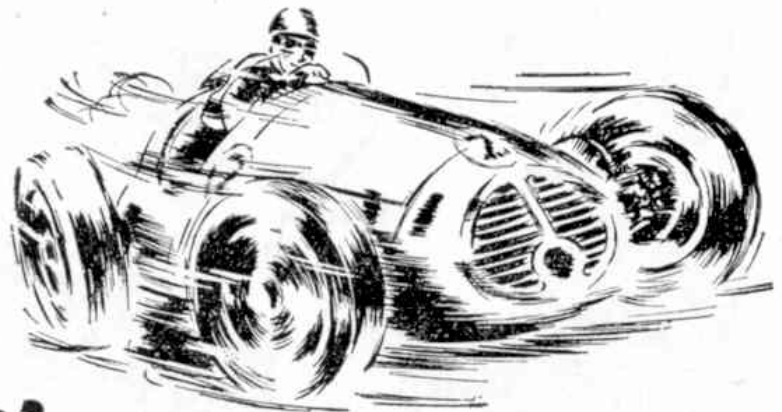
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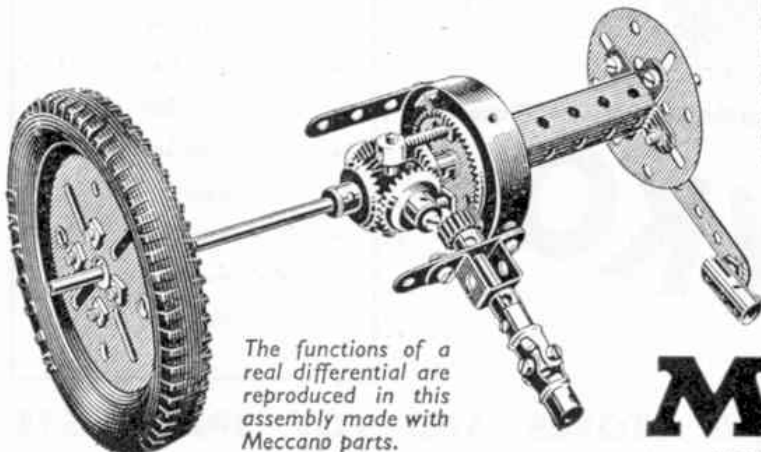
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THE Electric Clock shown in Fig. 1 is driven by a synchronous motor, and apart from the wire used for the motor field windings it is made entirely from Meccano parts. The clock operates from a Meccano 20-volt Transformer, and its accurate timekeeping and neat appearance make it an unusually interesting subject.

The framework for the clock mechanism is made by bolting two  $7\frac{1}{2}$ " Strips 1 across a  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate. Two further  $7\frac{1}{2}$ " Strips are connected to the Strips 1 by  $1\frac{1}{2}$ " $\times$  $\frac{1}{2}$ " Double Angle Strips, and a  $3\frac{1}{2}$ " $\times$  $1\frac{1}{2}$ " Flat Plate 2 is bolted in position. Two  $5\frac{1}{2}$ " Strips 3 are connected to the  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate by  $1\frac{1}{2}$ " $\times$  $\frac{1}{2}$ " Double Angle Strips, and the ends of the Strips are joined by  $3\frac{1}{2}$ " Strips. A  $3\frac{1}{2}$ " $\times$  $\frac{1}{2}$ " Double Angle Strip 4 is bolted between  $1\frac{1}{2}$ " Angle Girders fixed to the  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate, and three  $3\frac{1}{2}$ " Strips 5 face-to-face are bolted across the Strips 3. Two  $1\frac{1}{2}$ " Flat Girders 6 are attached to  $1\frac{1}{2}$ " $\times$  $\frac{1}{2}$ " Double Angle Strips fixed between the Strips 3 and the  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate. Two  $3\frac{1}{2}$ " Strips 7 face-to-face are bolted across the Strips 3.

The rotor consists of two Bush Wheels, each fitted with eight Rod and Strip Connectors arranged radially. It is very important to space the Rod and Strip Connectors accurately, so that the angles between them are exactly the same in each case. The Bush Wheels are fastened on a  $2\frac{1}{2}$ " Rod 8, which is supported in the  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate and the Flat Plate 2. The bearings for the Rod are strengthened by two  $1\frac{1}{2}$ " Strips bolted to each of the Flat Plates. The inner Bush Wheel is placed

with its boss facing the  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate, and it is spaced from it by three Washers. The second Bush Wheel is then fixed so that its Rod and Strip Connectors just touch and are exactly parallel to those of the first Bush Wheel.

The reduction gearing to the minute hand has a ratio of 45000:1 and is arranged as follows. A  $\frac{1}{4}$ " Pinion is fixed to the inner end of the Rod 8, and it meshes with a 57-tooth Gear on a 2" Rod

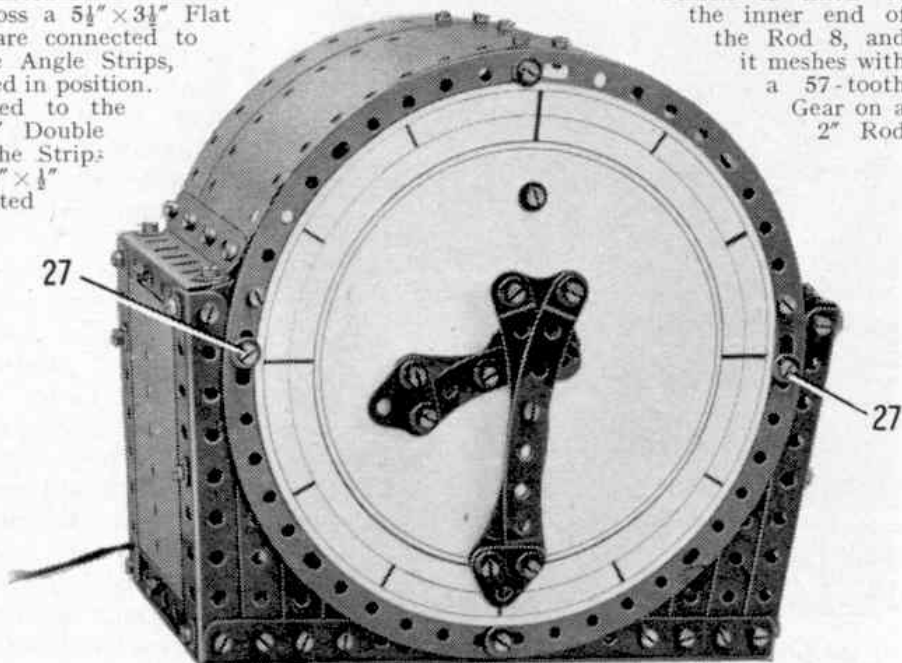


Fig. 1. This fine Electric Clock is operated by an easy-to-make synchronous motor, and is a good subject for the more experienced model-builder.

that carries a  $\frac{1}{4}$ " Pinion 9. This meshes with a 57-tooth Gear on a 4" Rod 10, which is fitted also with a Worm 11. Two  $3\frac{1}{2}$ " Strips bolted across the  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate strengthen the bearings for the 2" Rod and Rod 10. The Worm engages a 50-tooth Gear on a 4" Rod 12 supported in the Flat Girders 6. The slotted holes of the Flat Girders are used to adjust the mesh of the Worm and the 50-tooth Gear.

Rod 12 carries a Worm 13, and this drives a 50-tooth Gear 14 on a  $1\frac{1}{2}$ " Rod mounted in the  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate, and in the Strips 5. A  $\frac{1}{4}$ " Pinion is fixed on the  $1\frac{1}{2}$ " Rod, and this engages a 50-tooth Gear 15 that is loosely mounted on a 2" Rod supported in a  $1\frac{1}{2}$ " Flat Girder 16, the Double Angle Strip 4 and the  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate. A 1" Pulley fitted with a Rubber Ring is pressed against the Gear 15 to provide a light friction drive. This allows the hands to be turned without affecting the drive from the motor. A 1" Gear 17 is fixed on the same Rod as the Gear 15, between the Double Angle Strip 4 and the Flat Plate. The Gear 17 drives a similar Gear on a  $4\frac{1}{2}$ " Rod 18, which carries the minute hand.

The drive to the hour hand is taken from a  $\frac{3}{4}$ " Pinion 19, fixed on the same Rod as the Gear 15. Pinion 19 drives a 50-tooth Gear on a 2" Rod supported in the  $5\frac{1}{2}$ " $\times$  $3\frac{1}{4}$ " Flat Plate and in the Strips 7. The Rod carries also a  $\frac{3}{4}$ " Pinion 20, which is meshed with a 50-tooth Gear 21 on a 2" Rod. A  $\frac{1}{4}$ " Pinion on the same Rod engages a 57-tooth

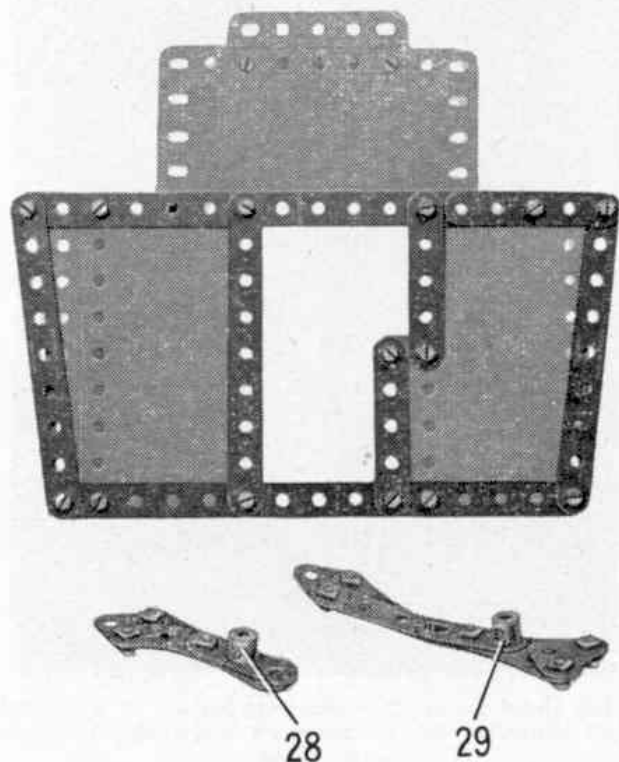


Fig. 2. The removable back of the clock case and the hands are shown clearly in this view.



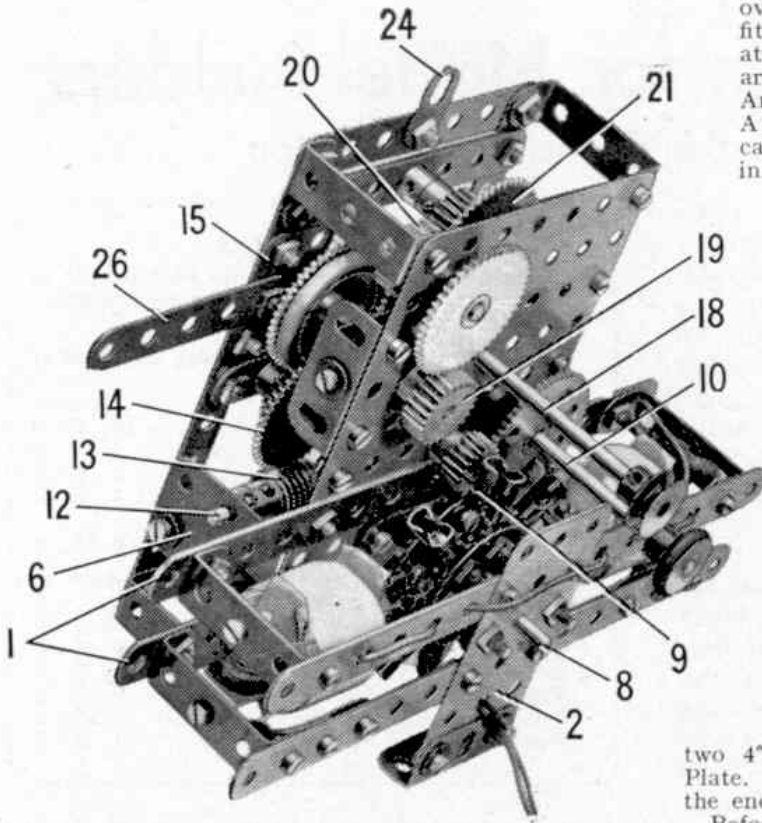


Fig. 3. The clock mechanism removed from its case, showing details of the field coil mountings and the rotor of the synchronous motor.

Gear 22. This Gear is gripped in a Socket Coupling 23 that is free to turn on Rod 18.

The Rods used in the mechanism are held in position by Collars where necessary, and Washers are used to space the Gears and Pinions so that they engage accurately. It is essential to make sure that all the moving parts of the mechanism are perfectly free running.

Each of the two field coils consists of twelve 2" Strips connected by 1/4" Bolts, which serve also to secure two Angle Brackets at one end and two Double Brackets at the other end. The 2" Strips and the Brackets are insulated by a layer of paper. Each coil is wound evenly with approximately 65 yards of 36 S.W.G. Double Cotton Covered Wire. The completed coils are attached by the free lugs of the Double Brackets to the 1 1/2" x 1/2" Double Angle Strips bolted between the 7 1/2" Strips, so that their inner ends are as close as possible to the rotor.

The coils are wired in series; that is, the inner end of one coil is connected to the outer end of the other coil. The two remaining ends of the coils are attached to a length of light flex, which is used to connect the clock to a 20-volt Transformer. The joints should be covered with insulating tape.

The base of the clock case consists of two 5 1/2" x 3 1/2" Flat Plates

overlapped seven holes. The Flat Plates are fitted at the front with a 7 1/2" Angle Girder, and at each side with a 3 1/2" Angle Girder. The sides are 4 1/2" x 2 1/2" Flexible Plates, edged by 4 1/2" Angle Girders, 4 1/2" Strips and 3 1/2" Angle Girders. A Circular Strip is attached to the front of the case as shown, and the lower corners are filled in by 2 1/2" and 1 1/2" Strips and 1" Corner Brackets.

The top of the case consists of four 5 1/2" x 2 1/2" Flexible Plates. These are attached to the sides and to the Circular Strip by Angle Brackets. The dial is made from cardboard, and is bolted to a Fishplate 24 and a 2" Strip 25 fixed to the front of the clock mechanism. When the mechanism is inserted in the case the end holes of 2 1/2" Strips 26 are passed over the shanks of 1/2" Bolts 27. These Bolts are passed through the Circular Strip, and each is fitted with four Washers and a nut. Further nuts are tightened on the Bolts when the Strips 26 are in place. The back is fastened in place by bolts screwed into Threaded Bosses attached to the sides of the clock case.

The hour and minute hands are shown separately in Fig. 2. The hour hand consists of two 2 1/2" Curved Strips bolted to a 1" Triangular Plate, and fitted with a Double Arm Crank 28. The boss of this Crank is gripped in the Socket Coupling 23. The minute hand is made by bolting two 4" Stepped Curved Strips to a 1" Triangular Plate. A Crank 29 attached to the hand is fixed on the end of Rod 18.

Before starting the motor a drop or two of good quality light machine oil should be applied to the bearings and to each moving part.

To start the clock the rotor must be spun at almost exactly its normal running speed, which is 750 r.p.m. With practice the speed can be gauged quite accurately, however, and once it is started the clock will run indefinitely and keep excellent time.

A list of the parts required to build this model will be supplied by the Editor on request.

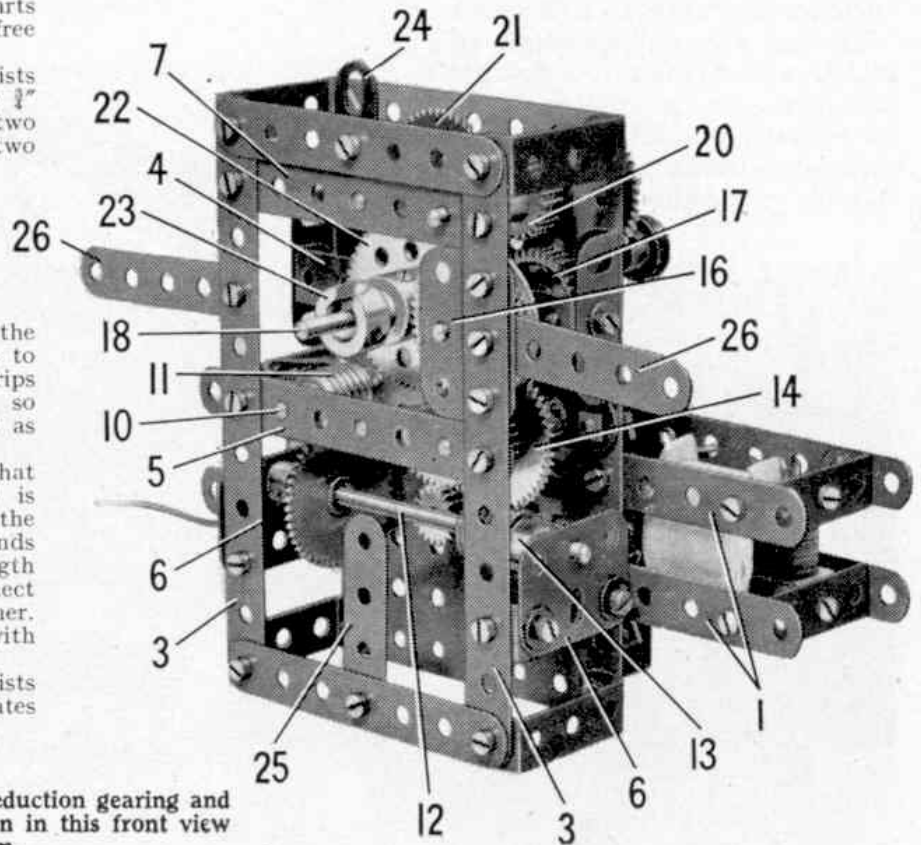


Fig. 4. The arrangement of the reduction gearing and the drive to the hands can be seen in this front view of the mechanism.



# Club and Branch News



## WITH THE SECRETARY

### CHRISTMAS GREETINGS

Again I have the pleasure of wishing a Merry Christmas to all members of the Guild and H.R.C. and to Meccano Clubs and H.R.C. Branches. It has become traditional for the first of the Winter Sessions to be "wound up" with a Christmas party, with plenty to eat, crackers to pull and lots of fun and games. Many Meccano Clubs and Branches extend their Christmas Party invitation to the parents of members, having discovered that pleasure is all the greater for being shared, and that members are always happier when they invite others to join in their fun.

I shall be thinking of members enjoying themselves in this way during the festive season.

### FORTHCOMING BRANCH EXHIBITION

The Mile End (Portsmouth) H.R.C. Branch will hold a Clockwork Railway Exhibition on Wednesday, 15th December, in the Buckland Congregational Church Hall, Kingston Road (corner of Queens Road), Buckland, Portsmouth. The Exhibition will be open from 4.30 p.m. until 9.30 p.m. Admission: Adults, 1/-; Children, 6d. An extensive and very attractive clockwork railway layout will be operated.

### CLUB NOTES

**EXETER M.C.**—Membership continues to increase and there is much enthusiasm at Model-building meetings. Models recently completed have included a goods yard crane, Meccano advertisement sign, tug boat, and a working weighing machine. The Club has acquired a Hornby Railway, and members have been bringing their own equipment to add to it on Train Nights. Club roll: 25. *Secretary:* C. Willis, 23 Hanover Road, Heavitree, Exeter.

**BELGRAVE UNION (LEICESTER) M.C.**—The two-day Exhibition in the Belgrave Union Church rooms was a great success, the fine display of working Meccano models and the extensive model railway layout being outstanding attractions. The Exhibition was highly praised by the many visitors, and by the local newspaper which published both a report and photograph of the event. Club roll: 19. *Secretary:* Mr. C. S. Smith, 18 Doncaster Road, Melton Turn, Leicester.

**STRENSALL (YORK) M.C.**—The highlight of the Club's annual outing this year was a visit to Messrs. Cochranes Steel Works, Middlesbrough, where members were greatly interested in the many processes carried out. During the same day the Middlesbrough Docks Superintendent took the party over the Docks installation. The seniors have been grouped into two Sections named Mechanics and Fitters respectively, and points scored at monthly points contests and fortnightly competitions go towards a House Shield. Club roll: 13. *Secretary:* J. Nurse, 73 Northfields, Strensall, nr. York.

**CONSETT Y.M.C.A. M.C.**—The Consett Y.M.C.A., with which this Club is associated, had a tent of their own at the Consett District Exhibition and Show. An outstanding feature of the display in this tent was a fine range of Meccano models that included one of a 600 b.h.p. mine hauler and a model of a mine conveyor. Both these models were in operation, and proved great attractions. Club roll: 28. *Secretary:* J. Norman Barron, 4 Garden Place, Leadgate, Consett, Co. Durham.

### BRANCH NEWS

**KENTISH TOWN**—New members will be welcomed. The Branch railway has been redesigned and the locomotives overhauled. Model aircraft construction is again becoming popular. Everyone is on the lookout for a new Club room, to enable the Branch to extend. *Secretary:* J. A. Kirby, 9 Busby Place, Kentish Town, London N.W.5.

**HALE END (LONDON)**—At one meeting members were tested on Hornby-Dublo operating, tests being made on accurate stopping, shunting, and smooth coupling of rolling stock. Members who passed the test were then asked to rail certain vehicles in a given time. There is a demand for locomotive "spotting" trips, and a member has been appointed to organise small outings of this kind. *Secretary:* A. L. Coe, 463 Hale End Road, Highams Park, London E.4.

**AVIARY MODEL RAILWAY CLUB (LEEDS)**—An outing to Knaresborough on the new Diesel car unit, in which the parents of some of the members also took part, was greatly enjoyed. The construction of cutout models for the Branch Hornby-Dublo layout is making good progress. Plans are in hand to raise funds for the purchase of additional railway equipment. *Secretary:* L. Blakey, 21 Arley Street, Armley, Leeds 12.

Officials and members of the Bury Grammar School M.C. This very successful Club was affiliated with the Meccano Guild in January 1950, and carries out an attractive programme of Meccano Model-building and Hornby Train operations.



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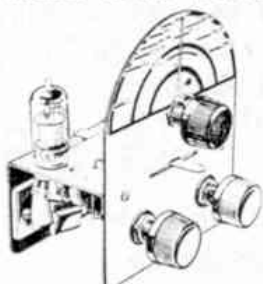
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