MECCANO® Magazine

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ABC

FRONT COVER

Motor Barge *Nutfield* and butty *Raymond* leave Cassiobury Park Bottom Lock, No. 76, on the Grand Union Canal. Picture taken in May 1970, by J. H. Talbot; since then cargo-carrying traffic has virtually ceased on this part of the canal which runs, incidentally, little more than a stone's throw from MM's offices.

NEXT MONTH

December issue includes do-it-yourself enamelling (fine for Christmas presents!), how a small brewery works, and Bailey bridges.

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MODEL & ALLIED PUBLICATIONS LTD.
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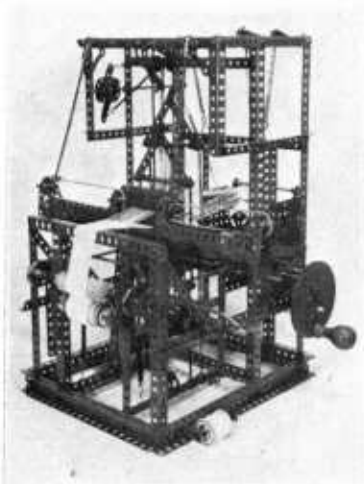
MECCANO EXHIBITION

Henley-on-Thames Town Hall

THIS WAS A SMASH HIT! It is probably true to say that in the entire 72 years of Meccano history there has never been such an ambitious and entertaining display of first-class Meccano models as that staged at Henley-on-Thames Town Hall on Saturday, September 2, last. The models, built by enthusiasts of all ages, covered most of the exhibition space in the upper main chamber of the Town Hall. Blessed by fine weather, enthusiasts merged from routes North, South, East and West of Henley to be greeted by a giant banner over the façade of the building leaving nobody in doubt that MECCANO was really on the map!

Although organised and sponsored by MW Models - Henley's Meccano-specialising model shop - and supported by Meccano (1971) Ltd., this was really a Meccanoman's show. No fewer than 3,000 members of the public, many of them making round trips of more than 200 miles, visited the exhibition. A modest entrance fee was charged to defray expenses of hiring the Town Hall for two days (one for extensive preparation), but any enthusiast turning up with a Meccano model was immediately given free admission and a welcome for his efforts.

Many well-known Meccano personalities were present representing both the "Mecca" of Binns Road, Liverpool and the now well-established Meccano Clubs of Southern and Midland counties. Members of the Midlands Meccano Guild were there in strength with their models and historical exhibits, together with the newly-centred Holy Trinity Meccano Club and its Secretary Tony Homden of Hildenborough, Kent. Dennis Higginson, Leader of the Stevenage Meccano Club, brought a minibus full of his young members complete with a marvellous range of eye-catching models built by the youngsters and some advanced constructions by Dennis himself. Long before mid-day, visitors were thronging the Town Hall, spell-bound by the fascinating range of models which served as a real eye-opener to many of them who were quite staggered by the sophistication and complexity of the models. By contrast, humorous and simplicity models caught the public's attention and the general atmosphere was one of great enthusiasm, delight and enquiry.



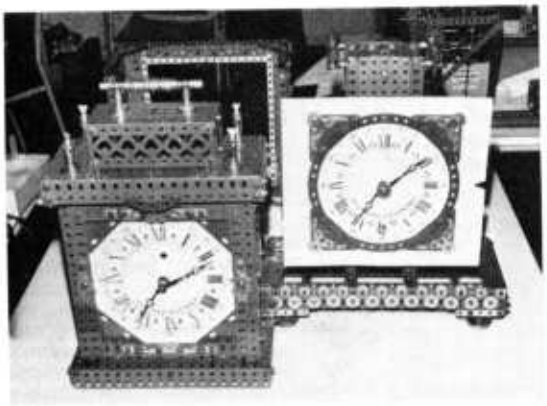
At 3 p.m. at the invitation of the organisers the official opening ceremony was performed by Mr. Bert Love, that well-known writer on Meccano topics and contributor to this magazine. He expressed his warm thanks to the public for their excellent support and the modellers in particular who had spent so much time and effort in preparing and transporting their models to make this the finest Meccano exhibition on record. It was quite obvious from the overwhelming enthusiasm of the visitors that their efforts were very much worthwhile. Bert then introduced Mr. Doug. McHard, Marketing Manager of Meccano (1971) Ltd., who welcomed the visitors and told them of the developments of Meccano products which were under constant review and drew attention to the No. 2 Clock Kit which was on display and constituted a weight-driven striking clock of very pleasing presentation. He also expressed his admiration for the outstanding quality of the enormous number of models on show – a sentiment which was echoed by all and not least by Mr. Geoff Wright, exhibition sponsor and owner of MW Models.

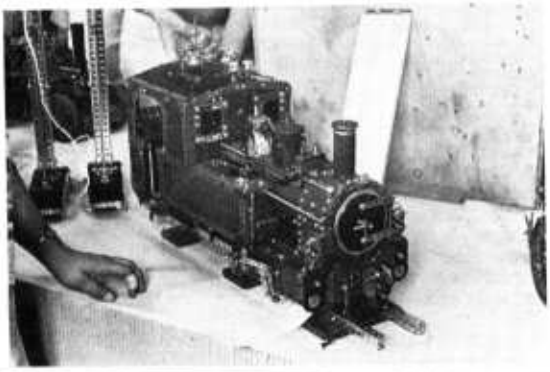
Any attempt to do full justice to the wonderful range of models on display would require a full volume of Meccano Magazines so it is only possible to make a brief mention of some of them in this report.

Large-scale locomotives, traction engines and cranes featured very strongly, including an advanced freelance design Block-setting Crane by Bert Love which functioned throughout the meeting as a centre-piece below the stage apron. This drew much attention and enquiry from the public and the local Press, but the same must be said for many of the other magnificent constructions in evidence. Nor was giant-size the yardstick for excellence, as many of the sophisticated models were of handy table-top proportions and included machine tools, made of standard parts, which were capable of producing precision components. One of these was a gear-cutting machine developed from a recent M.M. article and built by Michael Martin of Ilford. Tooth formation was excellent on the plastic blanks which the machine converted into gears in the twinkling of an eye. Tony Homden's mortising machine carved precision slots in polystyrene blocks to make ships' tackles.

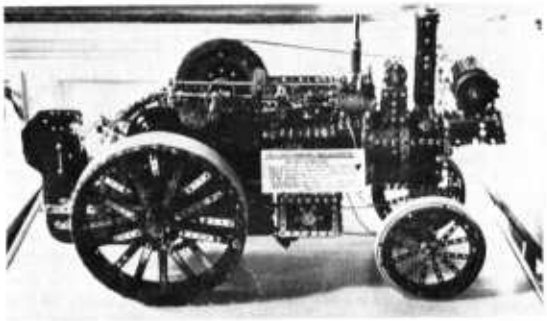
Tribute here should be paid to the rugged qualities of Meccano electric motors – standard items which powered both of the above models as well as the Giant Block-setter

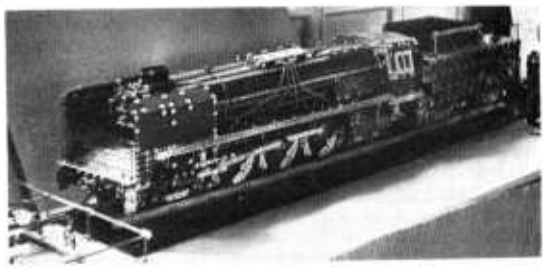
Henley-on-Thames Town Hall (above) – no doubt what was taking place with that giant banner! Left, Super Model Leaflet Meccano Loom on show. Left-hand column opposite, top to bottom, two of Pat Briggs excellent clocks, outstanding narrow-gauge Tank locomotive by Heather Burton, a traction engine by Bert Halliday and the travelling crab with fore and aft overrun lights on Bert Love's crane.

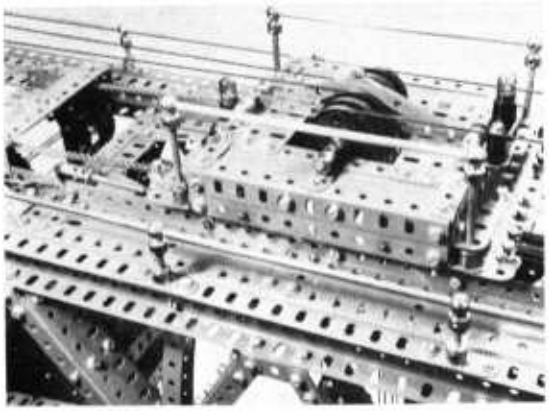


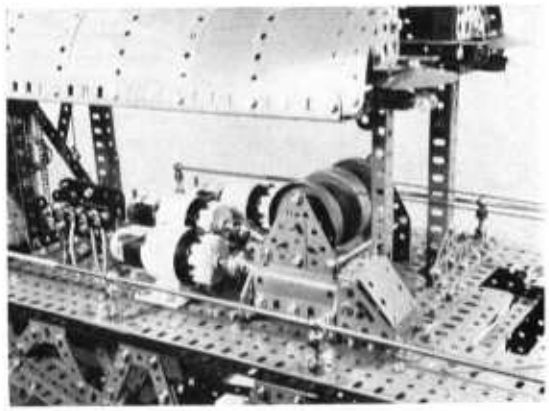


Some of the 3,000 visitors who attended during the day, seen from the stage. Some of Stevenage Meccano Club members; founder and leader is Dennis Higginson, with moustache. One of the giant locomotives on display (below), and bottom, the machinery house and wiring panel of Bert Love's free-lance Giant Block-setting Crane, showing hoisting drums and three motors for crab, slewing, and hoisting.



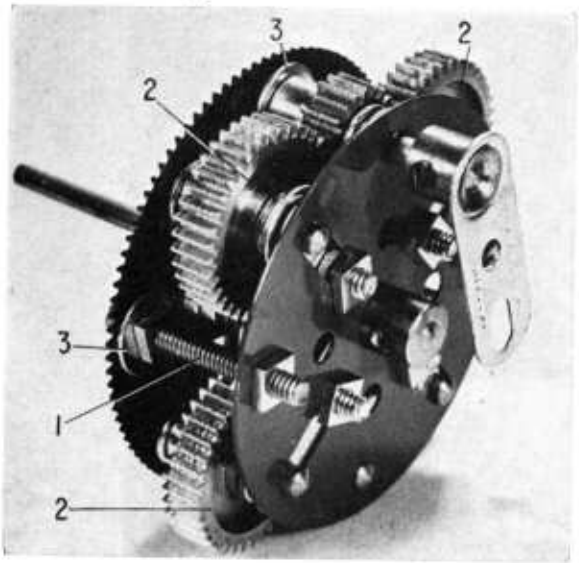


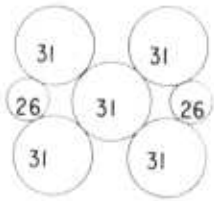




Among the Model-Builders

with 'Spanner'



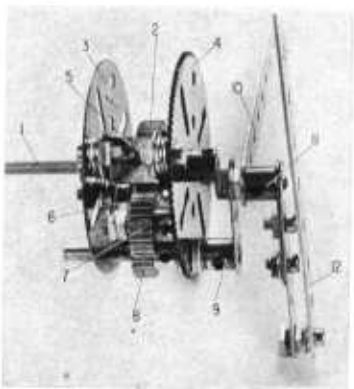


A "Motion Converter" modified by Mr. Stan Evans of Bebington, Cheshire, from a design first published in the August 1972 M.M., with, above, a diagram showing the relative position of the gears.

ONE of the things we try to do in this column is to feature mechanisms and ideas which, although they are presented here as separate items unconnected with specific parent models, can be incorporated in models to achieve improved results.

When we first receive details of a mechanism, however, it is often difficult for us to assess its true value, as frequently, that value is evident only to particular modellers who are, or have been, faced with a problem that could be overcome by the mechanism. If we haven't experienced the problem, then we might not know that the mechanism solves it—if you see what I mean!

Because of this, I am always pleased to hear from readers who have made use of ideas we have published. It makes our job worthwhile to know that the Magazine has been of help and I am sure the designers of the mechanisms are glad that their ideas have proved useful. Assuming the latter is true, then Mr. Colin Spence of Edinburgh will be interest to learn that his "Motion Converter", featured in the August M.M., has already been put to very good practical use—in modified form—by Mr. Stan Evans of Bebington, Cheshire.



The original "Motion Converter" by Mr. Colin Spence of Edinburgh, as it appeared in the August issue. Building instructions are obtainable from our Northern Office.

Stan writes, "The mechanism . . . gave me the idea of adapting it to a Meccanograph. However, Mr. Spence's basic unit proved to be a little too flimsy for my particular requirements, so I stiffened it up by dispensing with the Double Brackets and using 1½ in. Bolts (1) to separate the 2½ in. Gear and the Face Plate. In place of the original ½ in. Pinion, I used four 1 in. Gears (2) as idlers and added a second ½ in. Pinion as shown in the accompanying diagram.

"Between the Gears and the Face Plate I added two 2½ in. Strips (3) to provide added bearing surface on the slotted sections of the Plate, with the same arrangement on the other side. The whole unit was now very rigid and worked smoothly with a minimum of play and backlash.

"In operation, the central 1 in. Gear is fixed on the centre Rod and, in the Meccanograph, a second 2½ in. Gear is fixed on the same Rod, this Gear engaging with a Worm which can be located on the Rod driving the turntable, or on a separate Rod that can be turned manually. In the first case, the stroke of the pen will automatically increase from roughly ¼ in. to 4 in. and back to ¼ in. in one revolution of the turntable, provided, of course, that the Gear ratios are the same. In the second case, using the manual control, the stroke may be varied as and when described."

Stan's modified mechanism appears in the accompanying photograph and we have also reproduced the illustration of Mr. Spence's original unit featured in the August M.M. If, in addition, any reader requires a copy of the building instructions for the original unit, please drop me a line to Meccano Magazine, Northern Office, Binns Road, Liverpool L13 1DA.

PARTS REQUIRED

4—5	5—18b	5—31	22—38
*1—16b	2—26	14—37a	1—62
1—18a	1—27c	8—37b	1—109
			1—111d

*Dependent upon parent model

For New Zealand Modellers

Still on the subject of modifications to existing models, I have received an interesting piece of news from Mr. P. G. Askew of Christchurch, New Zealand relating to the Automatic Ticket Machine which we featured in the October 1971 M.M. Mr. Askew tells me that, when he built the model, he couldn't get the perforations in the ticket roll to coincide with "tear-off jaws" on the model—a situation which of course greatly reduced the value of the machine. He discovered, however, that the dimensions of standard ticket rolls in New Zealand differed from those used in our model and this was causing the problem as the machine was specifically geared to present our tickets at the correct point. Mr. Askew overcame the problem by replacing the original 2:1 Chain and Sprocket gearing with a 1:1 Sprocket drive, plus a gear drive consisting of two ½ in. Pinions, a ¾ in. Pinion and a 60-teeth Gear. This system gives an accuracy of 98% for ticket rolls available in New Zealand.

Small-scale Suspension Units

On a different subject, now, regular readers will need no introduction to Mr. James Grady of Dundee, Scotland—the man I have already dubbed "Champion of the small-scale vehicle builders". James' passion (if he doesn't mind me putting it that way) is that he doesn't

see why modellers with the equipment to build large-scale models should have all the fun. He believes, with some reason, that most of the effective motor chassis mechanisms generally featured are designed for larger models and, in fact, are too big to be included in small models using 1 in. Pulleys and Tyres as road wheels. This, he rightly claims, leaves the "small" man at a disadvantage and so he is always looking for ways to improve the situation.

We have featured several of James' compact mechanisms in the past and we now present another two offerings, both of which are workable front-wheel independent suspension units—fully operating. The first is the basic unit which consists of a 1½ in. Strip 1, representing the cross-member of the parent model. Secured through the second hole of this Strip by the same Bolt are a Double Bracket 2 and a Double Bent Strip 3, arranged as shown with the lugs of the Double Bent Strip parallel to the 1½ in. Strip. Journalled in the outer lug of the Double Bent Strip and in the end hole of the Strip is a Long Threaded Pin which carries a Compression Spring and a Collar 4, a Fishplate 5 and a Washer being tightly fixed to the lower end of the Pin. A free-running 1 in. Pulley without boss 6, fitted with a Motor Tyre, is lock-nutted on a ½ in. Bolt, a Washer spacing the Pulley from the bolthead, then the Bolt is tightly screwed into one threaded bore of Collar 4. In operation, of course, two identical units would be built and connected by a steering tie-bar lock-nutted between Fishplates 5.

PARTS REQUIRED

1—6a	1—22a	2—38	1—111a
1—10	3—37a	1—45	1—115a
1—11	1—37b	1—59	1—120b
			1—142c

Working Brakes

The more complex of Mr. Grady's units incorporates a working braking system which makes use of one of his previously-published ideas. In this case, two Centre Forks 1, free to turn, are located in the end transverse bores of a Coupling 2, where they are held by Collars 3. Note that, when the forked ends of the Centre Forks are vertical, the "empty" threaded bores of the Collars must also be vertical. Screwed tightly into these threaded bores are two ½ in. Bolts 4, the rearmost of which is fitted with a Compression Spring and two Washers, while the forward example carries a Nut and two Washers. The brake cable will later be attached to the Bolts.

Secured to the underside of Coupling 2 by standard Bolts is a 1½ in. Strip 5, spaced from the Coupling by two Washers on each securing Bolt to ensure that the Bolts do not foul the Centre Forks.

A rather unorthodox, but nonetheless effective wheel arrangement is now built up from a 1 in. Pulley without boss (carrying a Motor Tyre) which is secured to the boss of a ½ in. Flanged Wheel by a 2½ in. Driving Band threaded through the three holes in the face of the Pulley and located on Bolts each locked by a Nut in the transverse bores of the Flanged Wheel boss. The Bolts must not foul the centre bore of the Flanged Wheel. A 1½ in. Bolt, carrying a Washer, is passed through the Pulley and Flanged Wheel, after which it is fitted with two Nuts positioned one each side of a Washer and tightly screwed against the Washer to form a "stop", locked on the Bolt shank. If the Bolt is then screwed into the central threaded bore of Coupling 2, Flanged Wheel 5 should locate over the ends of Centre Forks 1, but the above "stop" should be so positioned that it prevents the inner face of the Flanged Wheel from making contact with the points of the Centre Forks. However, if the Forks are revolved slightly in their supporting Coupling, then their sides should make contact with the inner surface of the actual flange of Flange Wheel 6.

Once the correct positioning of the "stop" has been achieved, the 1½ in. Bolt should be removed from Coupling 2 and a Long Threaded Pin 7, carrying a Compression Spring and a Crank 8, should be inserted in the centre vertical smooth bore of the Coupling. The Bolt should then be replaced to hold the Threaded Pin inposition. Crank 8 represents the steering cross-member of the parent model, while the earlier-mentioned 1½ in. Strip 5 provides the anchoring point for the steering tie-bar.

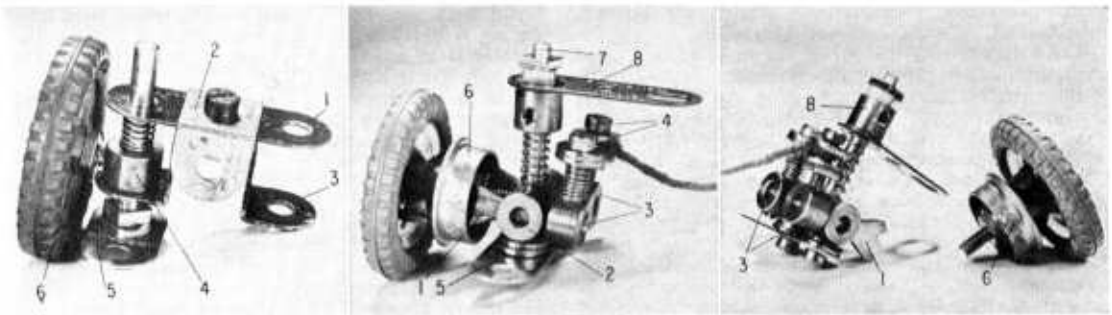
Finally, we have the brake actuating cable. In the original unit illustrated, James used a length of Cord secured to front ½ in. Bolt 4 by being tied and trapped between the Washers on the Bolt by the Nut. From there, it is brought back and secured between the Washers on the rearmost Bolt, after which it would be taken to the control lever or pedal on the parent model. When the Cord is pulled, movement of Bolts 4 causes Centre Forks 1 to turn, the ends of the Forks thus making contact with the flange of Flanged Wheel 6 to provide the braking action. When the Cord is released, the Compression Spring on rear Bolt 4 disengages the Centre Forks.

Having tested James' unit, I can confirm that his Cord actuating method works successfully, but I venture to suggest that, if a Narrow Strip were used to link Bolts 4, the result would be a little more positive.

PARTS REQUIRED

1—6a	4—37b	1—62	1—111d
1—20b	10—38	1—63	1—115a
1—22a	1—40	2—65	2—120b
5—37a	2—59	2—111a	1—142c
			1—186

(*please turn to page* 560)



Three mechanisms from Mr. James Grady. Left, a simple front wheel independent suspension unit, centre, a more-advanced front wheel suspension unit incorporating a working braking system, and right, the latter in partially dismantled form to show the brake shoes and brake drum.

C

Lamp

Although not an essential component the lamp illuminating the design table makes a novel luxury feature. This is built up from a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Insulating Flat Plate 62, to the centre of which an 8-hole Bush Wheel is fixed. Secured in the boss of the Bush Wheel is a $3\frac{1}{2}$ in. Rod carrying a universal Coupling 63 on its upper end, this Coupling in turn carrying a 1 in. Rod, to which a $1\frac{1}{2}$ in. Contrate Wheel 64 is secured.

A Lamp Holder 65 with clear Lamp is now fixed *by one lug only* to the inside of a Wheel Flange 66, but is spaced from the Wheel Flange by a Collar on the securing $\frac{1}{2}$ in. Bolt. Using its two opposite free holes, the Wheel Flange is then bolted to Contrate Wheel 64. A length of insulated wire is threaded through the Contrate and Wheel Flange and is connected to the free lug of the Lamp Holder, care being taken to ensure that the connection remains isolated from any other metal part of the construction. The other end of the wire is connected to one of two Contact Studs 67 secured to Insulating Flat Plate 62. The remaining Stud is connected to one of the Bolts fixing the Bush Wheel to the Insulating Plate, then the Plate itself is bolted to left-hand U-section Girder 7. A suitable power source is connected to Studs 67. A shade for the lamp is supplied by a $5\frac{1}{2} \times 1\frac{1}{2}$ in. and a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate bolted together in a thirteen hole circle and wedged inside the flange of Wheel Flange 66.

Operation

To set up for operation, a suitable drawing instrument, or pen, such as a free-running ball-point pen refill, is fixed in Crank 55 on the pen arm. A Cone Pulley 68 is slipped over the pen to serve as a weight to keep it in reasonably firm contact with the drawing paper disc, then the pen arm is located by one of its holes on Rod 38. Either Gear 31 or Gear 32 (never both) is tightened on its Rod and the machine is then ready to go. Pattern variations can be achieved in a number of ways, the most obvious being changing Rod 30 to a different hole in the pen arm. Also, however, the position on its supporting Rods of the Coupling carrying Rod 38 can be altered; the number and layout of the Bolts in slide-motion cam 40 can be changed; 57-teeth Gear 26 can be replaced by a 60-teeth Gear as also can be Gear Wheel 39, and, the pattern will differ between Gear Wheels 31 and 32, depending on which is fixed in place. The permutations of all these variables are almost countless.

"Photographic Plate"

Before finishing, I must mention a very interesting experiment successfully performed by Andreas with his original model. He de-greased the glass design plate with weak hydrochloric acid and then sprayed the plate with a thin coat of drawing ink dissolved in spirit. He mounted a gramophone stylus in the pen arm and then, in effect, engraved a pattern onto the glass plate which he subsequently used as a photographic plate from which he could produce perfect photographic prints, greatly enlarged if desired. An excellent idea!

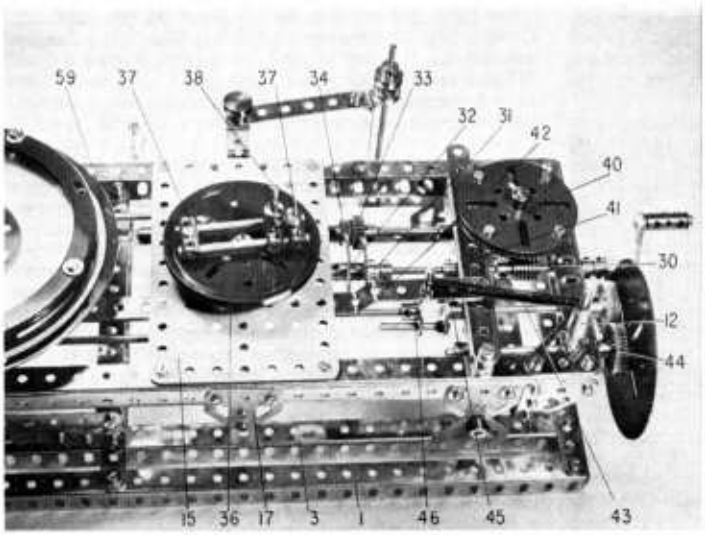
PARTS REQUIRED

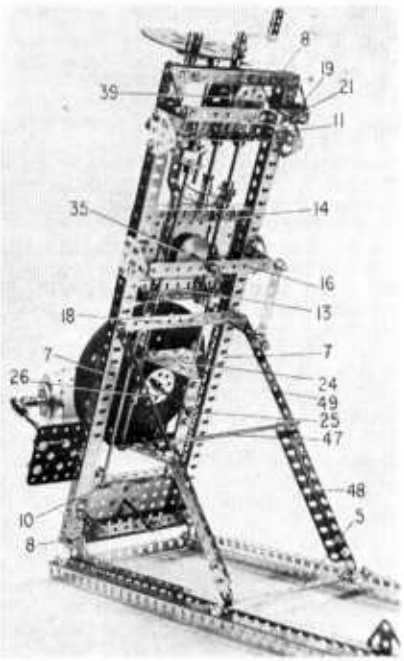
1—1	1—16b	1—45	1—123
1—1a	1—18a	3—48a	2—124
1—1b	1—19b	2—48d	4—126
5—2	3—23a	1—52a	6—126a
1—2a	3—23b	1—53	4—133
7—3	3—24	21—59	1—143
2—4	2—25	1—62	1—146
3—5	1—25b	1—62a	1—147b
4—6a	5—26	2—62b	1—173a
8—7a	2—27	4—63	1—211a
2—8b	2—27a	1—70	1—211b
10—9	1—27b	2—76	2—518
2—12	1—27c	2—77	1 flat
4—12b	2—27d	4—109	glass
1—13	2—31	6—111	disc,
2—13a	2—32	9—111a	121 mm
4—14	163—37a	1—111c	dia.
2—15a	127—37b	1—111d	1 length
1—15b	77—38	2—113	Piano
4—16	9—38d	1—115	Wire,
2—16a	1—43	2—115a	13½ in.

ADDITIONAL PARTS FOR LAMP

1—16	1—59	1—188	4—542
1—24	2—111	1—189	2—544
1—28	2—111c	1—511	Con-
13—37a	1—137	1—539	necting
9—37b	1—140	1—540c	Wire.

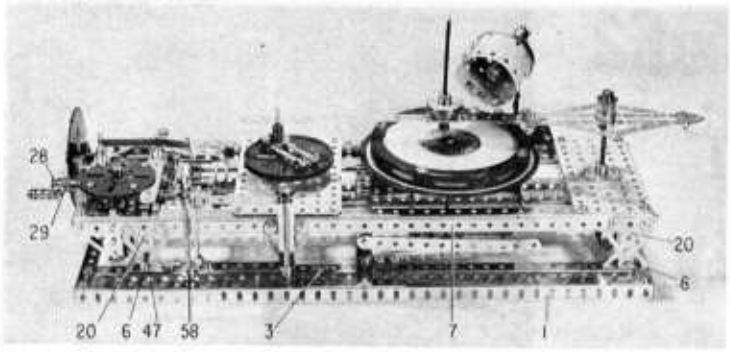
Right, the Guilloche Machine hinged open to show the general layout of the upper frame and drives. Note Rod 47 inserted in the hinge to lock it in place. Below, another close-up view of the model showing the pen arm movement actuator and the table-support movement cam.





Mecca

Hungarian reade



This outstanding Meccanograph is the brainchild of Hungarian reader Andreas Konkoly of Budapest—probably the world's leading exponent of Meccano-built designing machines. Mr. Konkoly has entitled the model "the Meccano Guilloche Machine"

PERHAPS the most captivating of all Meccano models ever built are those fascinating mechanical pattern-drawing machines we have long-since nicknamed "Meccanographs". Every Meccano modeller worth his salt has at some time built—or plans to build—a Meccanograph and I doubt if a single one of us has ever been, or will be, disappointed with the results. Our attempts aside, though, the world's leading exponent of this type of model is almost certainly Mr. Andreas Konkoly of Budapest, Hungary. Andreas is a true Meccanograph expert. He has designed and built various examples over the years and each one of them has been outstanding for its effective operation and amazing compactness. We have featured at least two of his machines in the M.M. in the past, the first being a straight-forward Meccanograph drawing traditional patterns and the second being a "Spiralograph" which drew a fine pattern that gradually spiralled in to the centre of the paper. Now we feature Andreas' latest and most intricate model—his Meccano Guilloche Machine, the end result of two years' continued experimenting.

I must admit that the title meant nothing to me when I first received the constructional details. I had never heard the word "Guilloche" before! However, thanks to the dictionary, I discovered that a Guilloche was a pattern made by interlacing curved lines and Andreas himself amplified this description by explaining that it was a complicated rosette, or similar type of pattern often used on banknotes and other bond-print to provide a safeguard against forgery because of the difficulty involved in copying. It was, in other words, an excellent description for the model, which does produce complicated interwoven designs, symmetrically ordered on both the outside and inside edges.

As with all Andreas' models, the Guilloche Machine is a fine example of careful design work. Compact mechanisms are housed in a strong framework which hinges open to allow easy access to the internal gearing. It will produce hundreds of different patterns and it even incorporates a small lamp for illuminating the revolving table. It is, beyond doubt, a magnificent piece of Meccano equipment.

The model illustrated is reproduced from Andreas' original instructions which we have tried to follow as closely as possible. We have, of necessity, slightly altered the method of securing the arms which hold the frame open, but any other slight differences which might be included are unintentional. I can say that our model worked successfully and this, after all, is the main requirement.

Framework

Construction begins with the framework which must be very rigidly assembled. Two 18½ in. Angle Girders 1 are joined at the ends by two 7½ in. Angle Girders 2, another two 18½ in. Girders 3 being secured between Girders 2, three holes from each end. The round holes of the Girders are used in all cases. Girders 1 and 3 are then connected together through their centre holes by a 7½ in. Strip 4, centrally overlaid by a 5½ × ½ in. Double Angle Strip 5, spaced from the Strip by a Washer on each securing bolt. Four Trunnions 6 are bolted, two to each Girder 3, in the positions shown, a spacing Washer on the inner securing Bolts in the end Trunnions and on both securing Bolts of the other Trunnions.

Two 18½ in. U-section Girders 7, each built up from two 18½ in. Angle Girders, are next connected together at the ends by two 5½ in. U-section Girders 8, the securing Bolts at one end helping to hold two 1½ in. Corner Brackets in position and, at the other end, a 5½ × 2½ in. Flat Plate 9. The inner Bolts securing this Plate also fix a 5½ in. Angle Girder 10 between girders 7, while a similar Girder 11 is bolted between girders 7 five holes in from their other ends. Note that the inner corner of one of the above Corner Brackets is fixed to its girder 8, not by a Nut and Bolt, but by a Bolt screwed into an Adaptor for Screwed Rod 12. U-section girders 7 are further connected through their eleventh and seventeenth holes by two more 5½ in. Angle Girders 13 and 14, the securing Bolts also fixing a 5½ × 3½ in. Flat Plate 15 in place, this being spaced from girders 7 by a Washer on each bolt. An 8-hole Bush Wheel is bolted to the centre top of this Plate, a similar Bush Wheel being bolted to the centre of Flat Plate 9.

Two 1 × ½ in. Reversed Angle Brackets, their lower lugs joined by a 4½ in. strip, are now bolted through the third holes in the lower flanges of girders 7 in such a position that the centre hole of the Strip lines up with the centre hole of Plate 9. Similarly the centre hole of Plate 15 lines up with the centre hole of a 5½ in. Strip 16 attached by 1 × ½ in. Angle Brackets to two Flat Trunnions 17 bolted to the sides of girders 7. Girders 7 are further connected by a 5½ × ½ in. Double Angle Strip 18 and a 5½ in. Strip 19, Strip 18 being bolted direct to the centre of the lower flanges of the girders and Strip 19 being attached by Angle Brackets to the lower corners of two 1½ in. Corner Brackets bolted to the sides of the girders in the position shown. Also bolted, two to the side of each girder, are four Flat Trunnions 20 which will later be connected to Trunnions 6 in the lower frame. A Double Bent Strip 21 is bolted to the underside of Strip 19, its centre hole coinciding with the fourth hole in the Double Angle Strip, while a 2½ in. Strip 22 is bolted between the fourth holes of Angle Girder 11 and nearby U-section girder 8.

no Guilloche Machine

's intricate designing machine described by 'Spanner'

Table-Support

We come next to the sliding table-support which consists of a 3½ × 2½ in. Flanged Plate 23, to each flange of which a 3½ in. Strip overlaid by a 2½ in. Triangular Plate 24 is bolted. The lower corners of Plates 24 are joined by a 3½ in. Strip, attached by Angle Brackets, a Double Arm Crank 25 being bolted to the underside of this Strip with its boss coinciding with the third hole of the Strip. An 8-hole Bush Wheel is also bolted to the top of the Flanged Plate, its boss coinciding with the corresponding hole in the Plate. The boss of this Bush Wheel and that of the Double Arm Crank serve as the bearings for a 3½ in. Rod on which the revolving table will be fixed. A 57-teeth Gear 26 is mounted on the Rod.

The table slides on two 8 in. Rods 27, passed through the end holes in the 3½ in. Strips bolted to Plate 23 and held by Collars in the third holes from each end of the Angle Girders 10 and 13.

Driving Systems

As drive not only for that table-support, but also for all movements originates from one point, it is advisable to complete the drive systems at this stage. A handle is supplied by a Washer and a Coupling mounted, free, on a 1½ in. Bolt locked by Nuts to the arm of a Crank 28 fixed on the end of a 6½ in. Rod held by Collars in the centre holes of Girders 8, 11 and 14. Also mounted on the Rod is a ½ in. Pinion 29, outside girder 8, a Worm 30, between Girders 8 and 11, and in order between Girders 11 and 14, a Collar, a 50-teeth Gear 31, another Collar and a 57-teeth Gear 32. Only one of these two Gears will be secured on the Rod at any one time and the Collars are therefore needed to hold them in place when unsecured.

In constant mesh with Gears 31 and 32 are, respectively, a ½ in. Pinion 33 and a ½ in. Pinion 34, both fixed on a 6½ in. Rod held by Collars in the fourth holes of Girders 11, 13 and 14. Also fixed on the Rod midway between Girders 13 and 14 is a ½in. Helical Gear which meshes with a 1½ in. Helical Gear 35 on a vertical 3 in. Rod journalled in the centre hole of Strip 16 and in the boss of the Bush Wheel bolted to the centre of Flat Plate 15. Fixed on the upper end of this Rod is the pen arm actuator which is built up from a 3 in. Pulley 36, to the face or which two Couplings 37 are secured by a ⅜ in. Bolt passed through the centre transverse smooth bore of the Coupling, fitted with a Washer, passed through an outer round hole in the Pulley and secured in place with a Nut. Fixed in the end transverse bores of the Couplings are two 2½ in. Rods on which a third Coupling is mounted, a vertical 1½ in Rod 38 being tightly held in the central transverse bore of this Coupling. A loose Collar is carried on this Rod, as also is the pen arm when fitted.

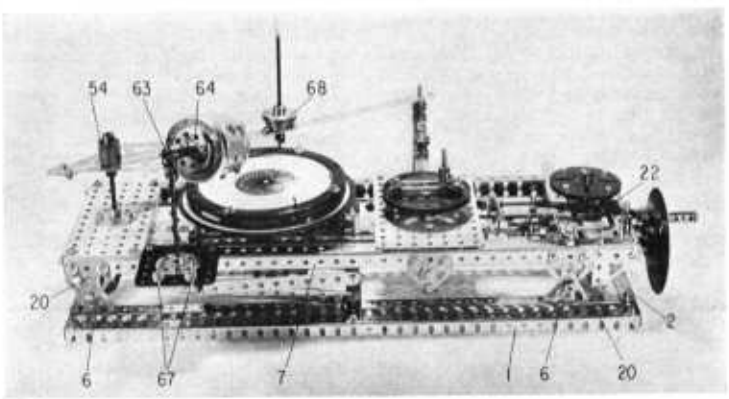
Worm 30 meshes with a 57-teeth Gear 39 on a vertical 3½ in. Rod journalled in Strips 22 and 19 and Double Bent Strip 21. Mounted on the upper end of the Rod is the table-support slide-motion cam 40, built up from a ½ in. Pulley without boss sandwiched between two Face Plates in the faces of which four ⅜ in. Bolts are carried. Varying the positions of these Bolts will of course alter the shape of the pattern.

The cam acts on a 5½ in. strip 41, pivotally attached to the fifth hole of appropriate U-section girder 7 by a Pivot Bolt, but spaced from the Girder by a free Collar. Lock-nutted through the fourth hole of the Strip is a 12½ in. Strip 42 which is cranked as shown, inserted through the space between Flat Plate 15 and Girders 13 and 14, and then bolted to the edge of Flanged Plate 23 in the table-support. Fixed through the third hole (cranked end) of this Strip is a Threaded Pin, a Tension Spring 43 being stretched between this Pin and Adaptor for Screwed Rod 12.

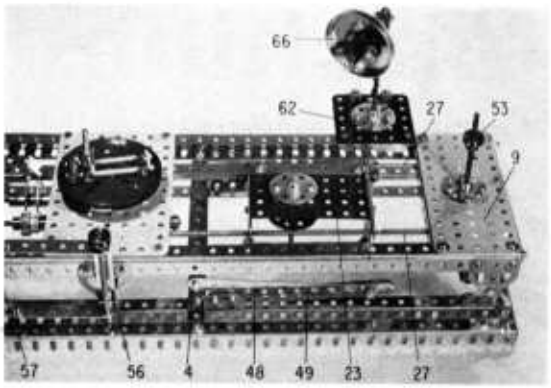
Pinion 29 is now meshed with a 3½ in. Gear Wheel fixed on a 4 in. Rod held by a Collar in the second holes of Girders 8 and 11. Also secured on this Rod outside girder 8 is a 1 in. Gear 44 which meshes with a second 1 in. Gear on a 3½ in. Rod journalled in the fourth holes of Girders 8 and 11 and held in place by the Gear and a 1 in. electrical Bush Wheel 45. Two Long Threaded Pins are locked in opposite holes in the face of this Bush Wheel, the shanks of the Pins engaging in corresponding holes in the face of a second 1 in. Bush Wheel 46 on an 11½ in. Rod journalled in the fourth holes of Girders 13 and 14. The Rod also passes through the end holes in the flanges of Plate 23 in the table support, where it is held by two Collars, one each side of the Plate. A Worm on the Rod meshes with Gear Wheel 26.

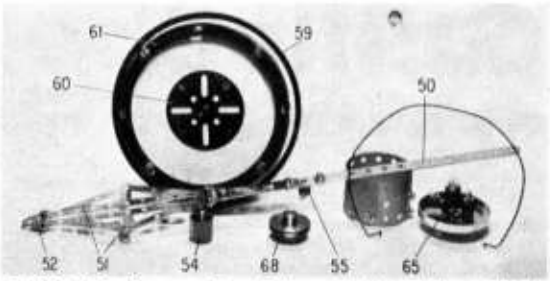
Frame Connection

At this stage, the two sections of the framework can be mated. As already mentioned, Mr. Konkoly designed the framework to open and this is achieved by lock-nutting the apexes of the end pair of Flat



A general view of the Guilloche Machine with the pen arm located on its "holding" support.





Left, in this close-up view of the model, the design table has been removed to show the sliding table-support. Above, a collective view, removed from the model, showing the revolving design table, the pen arm, the pressure weights (54 and 68), the lamp and lampshade and the wire circlip. The circlip has been bent into shallow waves to provide increased grip on the drawing paper.

Trunnions 20 to the apexes of corresponding Trunnions 6. The remaining Trunnions 6 and 20 are not bolted, but are connected by a 6½ in. Rod 47, passed through their apex holes and held in place by Collars. This Rod can of course be removed when desired.

Two collapsible supports are each provided by a 5½ in. Angle Girder 48, extended one hole at one end by a 1½ in. Strip. Lock-nutted to the Girder through its second hole from the outer end is a 5½ in. Strip 49, the other end of this Strip being in turn lock-nutted to the lug of Double Angle Strip 18. The 1½ in. Strip is lock-nutted to the lug of Double Angle Strip 5. When the frame is hinged open, the Girder and Strip 49 straighten, at which point Rod 47 (removed from Trunnions 6 and 20), or a Bolt or Threaded Pin is simply inserted through the appropriate hole in the Strip and the end hole in the Girder to lock them in place. (In his original model, Mr Konkoly actually had Strip 49 positioned inside the flange of the Girder which prevented the Strip from hingeing past the straight point, but none of our Strips would fit inside the Girder flange in our model.)

Pen Arm

Leaving the revolving table until later, we come next to the pen arm which is built up from a 9½ in. Strip 50, to the end of which a 1 in. Triangular Plate is bolted. Two Girder Frames 51 are in turn bolted to the remaining holes in this Triangular Plate, a second similar Triangular Plate 52 being secured to the opposite ends of the Girder Frames. A space of approximately ¾ in. remains between the Frames and located in this space is a 5 in. Rod held in the boss of the Bush Wheel bolted to Flat Plate 9 and in a Double Arm Crank bolted to the underside of the 4½ in. Strip beneath it. A ½ in. Pulley 53 is fixed on the Rod, its face forming a platform on which the Girder Frames can slide, while a loose ¾ × ¾ in. Pinion 54 is added above the Frames to serve as a weight to prevent the pen arm from rising. A Double Arm Crank 55 is secured to the underside of Strip 50, its boss coinciding with the sixth hole of the Strip and acting as the pen-holder. In operation, Rod 38 is located in one of the holes towards the other end of the Strip.

A novel "extra" built onto the model is a movable support for the pen arm when not located for drive. A 2½ × ½ in. Double Angle Strip 56 is bolted to right-hand Flat Trunnion 17, then pivotally attached to the lugs of this Double Angle Strip by a 3½ in. Rod are two 3 in. Strips, connected at their outer ends by a second 2½ × ½ in. Double Angle Strip 57. The Rod is held in place by a ½ in. Pulley and a Collar. A third 2½ × ½ in. Double Angle Strip is bolted back-to-back to Double-Angle-Strip 57 and in its lugs is journalled a 4½ in. Rod held in place by two Collars, each Collar being spaced from its lug by a ½ in. Pulley without boss 58. A ½ in. Pulley with boss is fixed towards the upper end of the Rod. The pen arm is slipped over the Rod when not engaged on Rod 38. Note that the lower end of the Rod projects very slightly beneath the securing Collar. Thus, when the support is not in use, it is hinged back to the frame, where the projecting end of the Rod is engaged in the space between Girders 1 to hold the support in place.

Revolving Table

We now come to the revolving table, with which care should be taken if good results are desired. The simplest table would of course be a wooden disc fixed to a Face Plate or Bush Wheel, but it is doubtful if this would give the results obtained from Andreas' carefully designed unit. This consists of a 6 in. Circular Plate 59 (covered with a paper disc), to each side of which a Face Plate 60 is bolted. A 2 mm. (approx. $\frac{1}{12}$ in.) thick glass disc of 121 mm. (approx. 4$\frac{23}{32}$ in.) diameter is obtained and positioned inside a 5½ in. Circular Girder 61, then the Girder, with the glass disc is secured to the Circular Plate, using four ¾ in. Bolts. Each Bolt is first fitted with a Washer, then is inserted into the Circular Girder and secured with a Nut. The glass disc is added, followed by a second Nut which is screwed up until the glass is tightly held between the two Nuts, care being taken not to break the glass by over-tightening the Nuts. (Although Andreas does not call for it, it might be an advantage to fit Washers between the glass and Nuts, here.) The four Bolts are then passed through the Circular Plate and finally secured by further Nuts.

It will be seen that a space equal to one Nut thickness remains between the glass disc and the lip of the Circular Girders. Into this goes the paper discs on which the patterns are drawn. These discs are ingeniously held in place by a "circlip" in the form of a length of steel wire curved round to an open and incomplete circle, with the ends of the wire bent up at right-angles. The length of the wire should be such that, when the open ends are closed to form a complete circle, the circle will fit inside the Circular Girder. Then, when the ends of the wire are released, the "spring" in the wire should cause the circle to open against the Girder and thus effectively clamp the paper disc. Andreas recommends wire with a diameter of about 2.2 mm. and we found 13½ in. to be a suitable length. Using Face Plates 60, the completed table is fixed on the upper end of the 3½ in. Rod carrying Gear 26 in the table support.

Lamp

Although not an essential component the lamp illuminating the design table makes a novel luxury feature. This is built up from a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Insulating Flat Plate 62, to the centre of which an 8-hole Bush Wheel is fixed. Secured in the boss of the Bush Wheel is a $3\frac{1}{2}$ in. Rod carrying a universal Coupling 63 on its upper end, this Coupling in turn carrying a 1 in. Rod, to which a $1\frac{1}{2}$ in. Contrate Wheel 64 is secured.

A Lamp Holder 65 with clear Lamp is now fixed *by one lug only* to the inside of a Wheel Flange 66, but is spaced from the Wheel Flange by a Collar on the securing $\frac{1}{2}$ in. Bolt. Using its two opposite free holes, the Wheel Flange is then bolted to Contrate Wheel 64. A length of insulated wire is threaded through the Contrate and Wheel Flange and is connected to the free lug of the Lamp Holder, care being taken to ensure that the connection remains isolated from any other metal part of the construction. The other end of the wire is connected to one of two Contact Studs 67 secured to Insulating Flat Plate 62. The remaining Stud is connected to one of the Bolts fixing the Bush Wheel to the Insulating Plate, then the Plate itself is bolted to left-hand U-section Girder 7. A suitable power source is connected to Studs 67. A shade for the lamp is supplied by a $5\frac{1}{2} \times 1\frac{1}{2}$ in. and a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate bolted together in a thirteen hole circle and wedged inside the flange of Wheel Flange 66.

Operation

To set up for operation, a suitable drawing instrument, or pen, such as a free-running ball-point pen refill, is fixed in Crank 55 on the pen arm. A Cone Pulley 68 is slipped over the pen to serve as a weight to keep it in reasonably firm contact with the drawing paper disc, then the pen arm is located by one of its holes on Rod 38. Either Gear 31 or Gear 32 (never both) is tightened on its Rod and the machine is then ready to go. Pattern variations can be achieved in a number of ways, the most obvious being changing Rod 30 to a different hole in the pen arm. Also, however, the position on its supporting Rods of the Coupling carrying Rod 38 can be altered; the number and layout of the Bolts in slide-motion cam 40 can be changed; 57-teeth Gear 26 can be replaced by a 60-teeth Gear as also can be Gear Wheel 39, and, the pattern will differ between Gear Wheels 31 and 32, depending on which is fixed in place. The permutations of all these variables are almost countless.

"Photographic Plate"

Before finishing, I must mention a very interesting experiment successfully performed by Andreas with his original model. He de-greased the glass design plate with weak hydrochloric acid and then sprayed the plate with a thin coat of drawing ink dissolved in spirit. He mounted a gramophone stylus in the pen arm and then, in effect, engraved a pattern onto the glass plate which he subsequently used as a photographic plate from which he could produce perfect photographic prints, greatly enlarged if desired. An excellent idea!

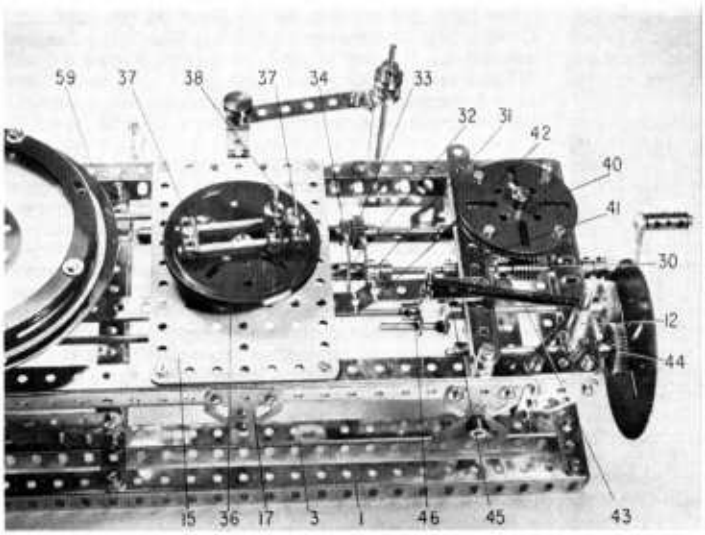
PARTS REQUIRED

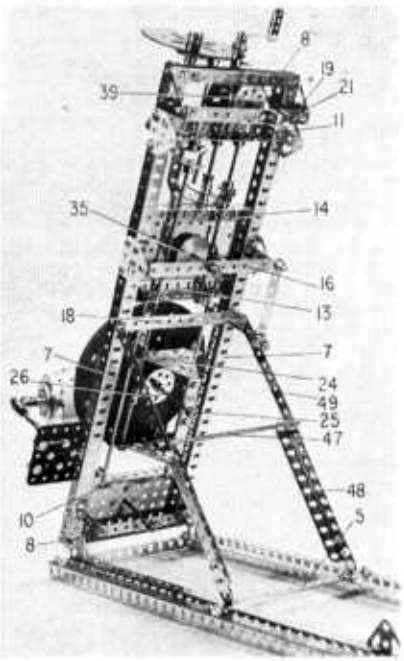
1—1	1—16b	1—45	1—123
1—1a	1—18a	3—48a	2—124
1—1b	1—19b	2—48d	4—126
5—2	3—23a	1—52a	6—126a
1—2a	3—23b	1—53	4—133
7—3	3—24	21—59	1—143
2—4	2—25	1—62	1—146
3—5	1—25b	1—62a	1—147b
4—6a	5—26	2—62b	1—173a
8—7a	2—27	4—63	1—211a
2—8b	2—27a	1—70	1—211b
10—9	1—27b	2—76	2—518
2—12	1—27c	2—77	1 flat
4—12b	2—27d	4—109	glass
1—13	2—31	6—111	disc,
2—13a	2—32	9—111a	121 mm
4—14	163—37a	1—111c	dia.
2—15a	127—37b	1—111d	1 length
1—15b	77—38	2—113	Piano
4—16	9—38d	1—115	Wire,
2—16a	1—43	2—115a	13½ in.

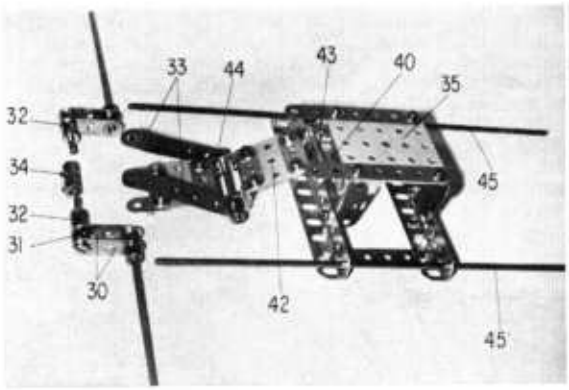
ADDITIONAL PARTS FOR LAMP

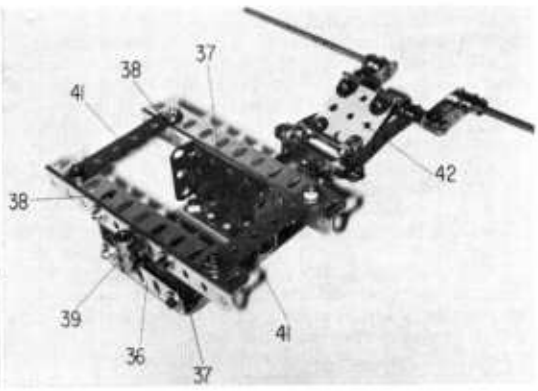
1—16	1—59	1—188	4—542
1—24	2—111	1—189	2—544
1—28	2—111c	1—511	Con-
13—37a	1—137	1—539	necting
9—37b	1—140	1—540c	Wire.

Right, the Guilloche Machine hinged open to show the general layout of the upper frame and drives. Note Rod 47 inserted in the hinge to lock it in place. Below, another close-up view of the model showing the pen arm movement actuator and the table-support movement cam.









Above, top and underside views respectively of the ram, toggle links and crankshaft in "exploded" form.

Automatic Rivet-making Machine

Part three of an advanced model requiring relatively few parts By P. Blythe

Punch and Extract Mechanism

In the case of the punch and extract mechanism, this section is operated by a cam, built up from a Fishplate (forming the lobe) bolted by its round hole to a Bush Wheel 95. The lift should be approximately ¼ in. The Fishplate is trailing when the crankshaft is rotated in the correct direction, i.e. clockwise when the shaft is viewed from the left-hand end. A Grub Screw locks the Bush Wheel to the shaft, the boss being spaced by a Washer from the left-hand bearing housing.

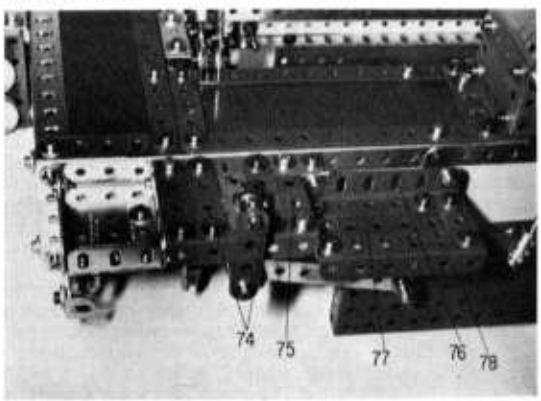
The cam follower and "rocker" are made up from a pair of 3 in. Strips 96 secured together by five ½ in. Bolts, the Strips being spaced by lock-nuts. A ½ in. Pulley rotates freely on the upper Bolt, while the lower Bolt carries a pivoting Rod and Strip Connector. The centre pair of Bolts retain two forward-facing 1 in. Corner Brackets 97 and the remaining Bolt forms an anchor for a rearward-facing Tension Spring 98, the opposite end of which is secured to the rear of the body by a 1½ in. Bolt.

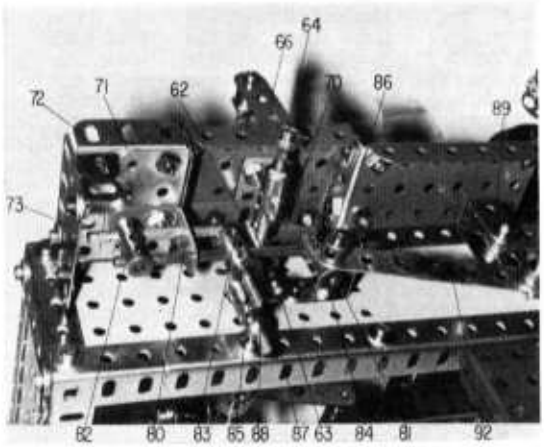
The rocker pivots upon a 3½ in. Rod, journalled in the left-hand bearing housing and retained by a pair of Collars. Lock-nutted together are a pair of Rod and Strip Connectors 99, one of them being fitted with a 2 in. Rod and the other, with a 8½ in. Rod. This latter Rod is pushed into the Rod and Strip Connector on the cam follower, while the shorter Rod is slid into Double Bent Strip 18 with its end pushing against the front horizontal rocker inside the feed roller assembly at the front of the body. This front rocker is held against the end of the Rod by a rubber band slipped over one arm and hooked on to a Bolt 100 within the frame.

Rivet Ejection Mechanism

Having been formed (in real life) the rivets are ejected and in the model the simulated ejection mechanism is supplied by a pair of Trunnions 101 bolted to the top of the left-hand side of the body. Journalled in these Trunnions is a 3 in. Rod, on each end of which a Crank is fixed, the left-hand Crank facing rearwards and the right-hand Crank forwards. The former Crank is extended by a 3 in. Strip 102, to the rear end of which two 1 in. Triangular Plates, separated by lock-

Below, the cutter slide housing and tool tray, viewed from above. Right, an underside view of the tool tray and cutter slide housing, with the cutter slide equipment.





nuts, are fixed by a pair of ½ in. Bolts. A third Bolt retains a freely-rotating ½ in. Pulley, acting as a roller. Actuating this roller is a cam comprised of a Bush Wheel 103 to which is bolted a Paxolin or metal disc 1¾ in. in diameter which has a "dwell" approximately ⅝ in. long, the radius of this portion being 11/16 in., i.e. the same as the Bush Wheel. The cam is secured by a pair of Bolts.

The right hand Crank is extended forwards by a 3½ in. Strip, to the free end of which an End Bearing 104 is pivotally secured by a lock-nutted Bolt. A 2 in. Rod is carried in the boss of the End Bearing.

Now journalled in Double Bent Strip 14 fixed below the die block is a 2½ in. Rod, retained by two Collars. The forward end of this Rod carries a further Collar secured by a 1¼ in. Bolt projecting horizontally towards the right-hand side of the machine. Under the head of this Bolt a ½ in. Pulley 105 is secured to serve as a counterweight to keep the cam roller in contact with the cam. Adjacent to the rear Collar of the 2½ in. Rod is mounted a Coupling arranged vertically and secured by its end transverse hole. In the longitudinal bore is fixed a 1 in. Rod, on the upper end of which is carried a Rod and Strip Connector, to which is bolted by its "middle" hole a Pawl without Boss 106, the pointed end facing to the right. This serves as the "knock off arm" which gives a quick flick across the die at each cycle of the machine.

It now remains to fit a further Coupling 107 on the rear end of the 2½ in. Rod, the upper transverse plain hole of this carrying a 1 in. Rod upon which pivots a Small Fork Piece, in the boss of which is held the lower end of the 2 in. Rod projecting down from End Bearing 104. The timing of the cam must be adjusted so that the arm quickly whips across the die and returns while the Ram is at the back of its stroke—thus avoiding a collision!

Wire Feed Mechanism

The mechanism which actually feeds the wire to the forming and cutting units is built up from an Eccentric 108, mounted boss outwards on the left-hand side of the Crankshaft. Bolted to the arm of this Eccentric is a 9½ in. Strip extended a further three holes by a 3 in. Strip 109. A Pawl carrier is supplied by a 3 in. Strip 110, to one end of which is fixed a Threaded Pin. One hole down from the opposite end is a Pawl with boss 111 (boss outward) pivotally attached by a Pivot Bolt, the Threaded Pin and Pawl being situated on opposite sides of the Strip.

The upper feed roller shaft is a 5½ in. Rod, to the left-hand end of which is fixed a 1 in. Gear 112. The right-hand end carries a 1 in. Pulley 113 representing a feed roller. The shaft is, of course, journalled in the Flat Girder and Flanged Plate at each end of the feed roller housing.

The lower Rod is 6½ in. long and similarly journalled and also carries a 1 in. Gear and Pulley. Fixed on the left-hand end of this lower Rod, next to the Gear, are three Washers, the Pawl carrier assembly (Pawl outwards) and a Ratchet Wheel, also mounted boss outwards. Finally, Strip 110 is secured to the Threaded Pin on the bottom of the pawl carrier by a Collar. *(to be concluded)*

Meccano Parts and How to Use Them

PART II — SOME MISCELLANEOUS PARTS

By B. N. Love

ALTHOUGH competitors of the Meccano system have been numerous over the years, the majority of them have failed for one simple reason: they could never compete with the wide range of additional parts which the Meccano system offers.

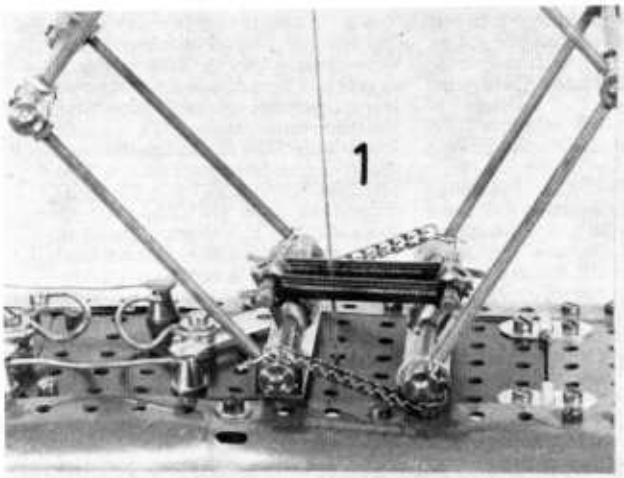
Once the basic construction of a model has been completed, detailed modelling and mechanical reliability depend to a large extent on the "brassware" available to provide both working and decorative features Meccano is rich in brassware, but, because of the very wide range available, it is only possible to feature here a few of the more popular and perhaps most useful of the miscellaneous parts.

Every serious constructor is familiar with the Collar, Part No. 59, as being a basic holding device for keeping Axle Rods in place. It is very much more versatile than this, however, and some additional applications are shown in Figs 1 and 2. In Fig. 1, a working pantograph is shown which will pick up current from a bare conductor wire overhead to drive a model train or tramcar. Although this particular design is well known to older readers, the introduction of the Meccano electrical parts of the 1960's enables an insulated fibre baseplate to be used for the pantograph anchorage, effectively insulating it from the metal framework of the electric locomotive. The use of a pair of Hinges, Part No. 114, can be seen in Fig. 1 and this allows the pantograph to be tilted back for wiring connections below. Collars are used extensively in this design and in their simplest form at the base of the pantograph, where they locate the two 2½ in. Axle Rods forming the lower pivots for the Screwed Rod framework. Again, we see an unorthodox use for another part – Sprocket Chain, short lengths of which are attached to the Screwed Rods entered into the Collar bosses as shown. Note that the two lengths of chain are rigged in opposite slope on the two sides of the loco roof and this ensures that, as the whole framework of the pantograph moves in concertina fashion to keep its tension against the overhead conductor, it does not topple fore and aft.

The middle joints of the pantograph can just be seen in the illustration of Fig. 1 and these require six Collars on each Axle Rod. The outside Collars are locked in place by their Screwed Rods and a lock-nut, but the Collars immediately inboard are free to turn on the Axle Rod, the second set of Screwed Rods being entered into the tapped hole of the Collars sufficient to make a firm hold, but not enough to bind against the Axle Rod. Finally, the inside Collars are locked to the Axle Rod to keep the middle free-turning Collars in place.

A development of the Collar is Part No. 63, the Coupling, and this also appears in Fig. 1. A pair of Couplings are locked to the lower Axle Rods of the pantograph as shown and linked by Tension Springs, Part No. 43, the Springs being held in place by 1 in. Axle Rods and Spring Clips. This ensures that the pantograph maintains an upper thrust towards the overhead conductor. The top of the pantograph is a 2½ in. Double Angle Strip, joined by an Axle Rod and more Collars to the upper set of Screwed Rods. A length of Meccano Cord, attached to the centre of the Double Angle Strip and passing down into the driver's compartment, allows the pantograph to be drawn downwards for stowage.

Similar applications are shown in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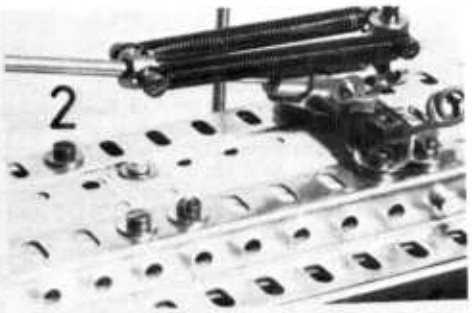
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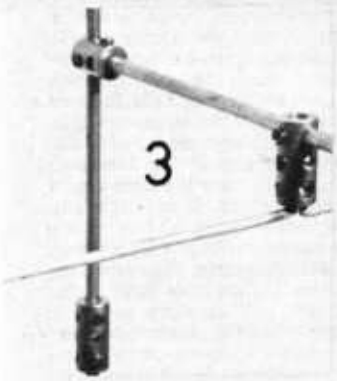
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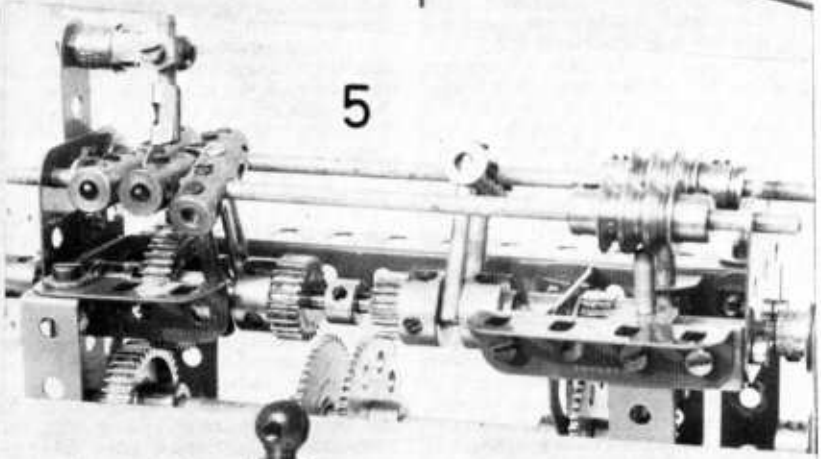
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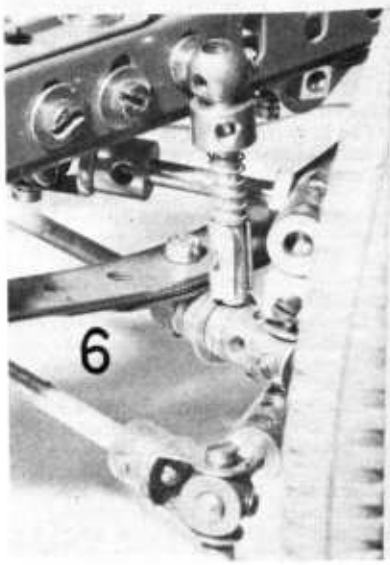
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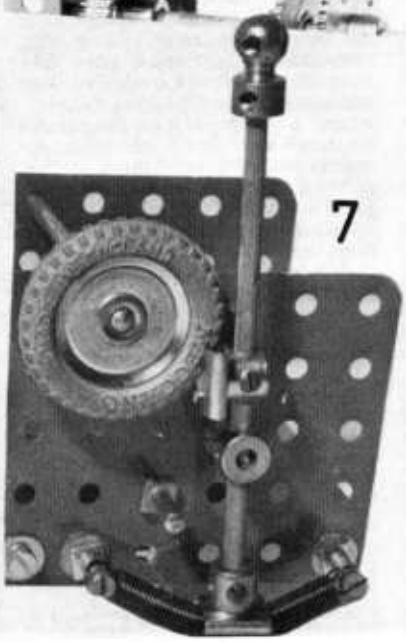
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8

Fig. 2 with much the same miscellaneous items. This time, tension is required on a trolley pole for an electric tramcar and this is achieved by pivoting the Axle Rod forming the trolley pole by means of a Small Fork Piece, Part No. 116a, which pivots on a short Axle Rod mounted in the rear cross-bore of a Coupling. A Threaded Pin, Part No. 115, is mounted vertically in the front tapped bore of the Coupling and this carries a Collar fitted with two Set Screws which trap a pair of Tension Springs. A second Collar is set on the trolley pole at a critical point to give the required angle and tension to the trolley pole and this also carries a pair of Set Screws to hold the rear end of the two Tension Springs. By pivoting the Coupling on a second Threaded Pin which is secured to a 1½ in. Insulating Strip stood off from the metal roof of the tram, the trolley pole becomes isolated from the metal framework of the tram and can be used for direct overhead pick-up.

Fig. 4 shows the upper end of the trolley pole where further miscellaneous parts are employed. A Rod Connector, Part No. 213, can just be seen under the numeral 4 and this allows various lengths of Axle Rods to be used to extend the trolley pole to critical length, as required. A Rod and Strip Connector, Part No. 212, is attached to the end of the trolley pole and this carries a pair of Pawls without boss, Part No. 147c, bolted in place, but separated by two or three Washers to permit entry of the bare wire acting as the overhead conductor. This is quite adequate for "straight line" track running. If a fairly stout copper wire is chosen, then it may be mounted as shown in Fig. 3, where the Coupling comes into its own again as the joints of the tramway standard. If the standards are used on wooden boards, no further insulation is required.

Somewhat larger than the standard Coupling is the Socket Coupling, Part No. 171, and two of these are shown in a sliding gearbox in Fig. 5. Something like dumb-bell in shape, the Socket Coupling has cylindrical recesses at each end which will accommodate the standard ¾ in. diameter boss of the majority of Meccano gears and wheels. The centre portion of the Socket Coupling is waisted to recieve a fork arrangement intended to slide along. As this particular gearbox has been described elsewhere in Meccano literature, only the use of miscellaneous parts will be dealt with here. The versatile Coupling in this case provides a four-position "gate" for the gearbox and the use of the Rod and Strip Connector is again also seen, this time acting as a selector for either the near or farside Axle Rods forming the gear-change rods. Two of the Couplings are mounted at an angle on the sliding Rods so that a pair of 1½ in. Axle Rods which they both carry engage the waisted portions of the Socket Couplings, thus allowing them to be moved by the gear lever. Although not clear from the illustrations, these Socket Couplings are fitted with Key Bolts, Part No. 231, which allow them to be driven by the Keyway Rod on which they are mounted, but which permit the Socket Couplings to be slid along the Rod to engage the different gears, as required.

Notice the gear lever in Fig. 5 is mounted in a Swivel Bearing, Part No. 165, and this is really a Small Fork Piece attached to a special "Collar" having four tapped holes. Two of the holes are available for locking the "Collar" or "Spider", as it is sometimes called, to a shaft, but the two larger screws are special "Shoulder Bolts" which allow the Fork Piece to swivel freely, but prevent an Axle Rod from binding where a free pivot is required. Readers will note an unusual application of ½ in. Pulleys at the right-hand end of the gear-change Rods. These bear against the tips of short Axle Rods, spring-loaded from below, and give a positive register of the gear-change Rods in neutral or active gear.

Fig. 6 shows yet another application of the Rod and Strip Connector where it is used as a swivel end for a shock absorber on a leaf suspension system. This time the Connector carries a 1½ in. Axle Rod which slides in the smooth bore of a Handrail Support, Part No. 136, pivotally connected to the side chassis member by lock-nuts. A loose Collar below the Handrail Support takes up the distance and acts as a thrust ring for the Compression Spring. Further uses of the Coupling and Swivel Bearing are also illustrated in Fig. 6 where they form pivot joints in the steering linkage. Similar uses are shown in Fig. 8 where the drop arm from the steering column gearing, in the form of a Crank, is connected to the drag link.

Neighbour of the Handrail Support is the Handrail Coupling shown at the top of the brake lever in Fig. 7. Although the Handrail parts are commonly used, as their names suggest, in supporting Axle Rods as handrails, they are also versatile parts in their own right. In the application of Fig. 7 the Handrail Coupling simply acts as a lever knob.

The Slide Piece, Part No. 50, is normally used as a sliding component running along a Perforated Strip, but the brake illustrated in Fig. 7 uses it somewhat differently. In one case, a Slide Piece acts as a brake shoe bearing against a 1 in. Tyre, while the lower Slide Piece acts as a restricting and holding shoe as it bears against the Tension Spring, as shown. The Coupling on which the brake lever pivots permits adjustment of the Axle Rod to vary the pressure of the lower Slide Piece against the Tension Spring, while the upper Slide Piece may be set above or below the Tyre centre to vary the effective direction of the brake.

The final chapter of this series of 12 articles will appear in the December edition of the Magazine and will deal with some of the Meccano Electrical Parts.

MODEL-BUILDERS (*from page* 539)

1972 Report

Last, but by no means least this month, I give below a brief outline of the activities so far this year of the Stevenage Meccano Club, taken from a report submitted by Club Secretary Mr. Dennis Higginson, 7, Buckthorn Avenue, Stevenage, Herts.

The year got off to a good start with a visit in January to the Model Engineer Exhibition in London. This was enjoyed by all and prompted plans for further outings in the future. On May 13, the Club exhibited at the Pin Green School Fete, Stevenage, where a very large collection of models was shown—too large to list here, in fact. The builders involved included Peter Walton, Peter Brown, Paul Bourbousson, Geoff Long, Chris Buckland, Keith Langdon, Steven Hodges, Stephen Kuc, Peter Phillipson, Bernard Dunkley, Simon Baker and Dennis Higginson combined, and Peter Neville. Peter Neville has not been mentioned in these pages before, but he has been a member of the Club since 1970. Mr. Higginson tells me he is a very keen model-builder with a first-class attendance record at Club meetings. Several models designed by Mr. Roger Le Rolland of Stoke-of-Trent and built by Club members were also exhibited at the Fete. I was delighted to learn that Mr. Le Rolland has been offered, and has accepted, Honorary Membership of the Club—an excellent gesture, I feel, and a

tribute to Mr. Le Rolland's many appealing models. Most of the models shown at Pin Green were also exhibited at a Fete at the Girls' Grammar School, Stevenage, on May 20. This was another successful showing which aroused a good deal of interest.

The Club continues to grow with new adult members including Bernard Dunkley of London, Paul Blythe of Aylesbury, V. Whitehead of Stevenage and G. Katlan of Hoddesdon. New younger members include Chris Buckland, Keith Langdon and Ian Chantley, all of Stevenage.

Anybody else interested in joining the Club should contact the Secretary at the above address. He will be delighted to hear from you.

EXHIBITION (*from page* 536)

previously mentioned. This weighed three-quarters of a hundredweight with its ballast and was traversed along its entire track length by a single Motor with Gearbox, although five other similar Motors were used to drive various other motions. Power for all the Motors was provided by a 12 volt car battery which allowed all the movements to operate at the same time.

Some splendid vehicles were on show including a Saracen Armoured Car complete with replica complex steering geometry, suspension and transmission of the prototype. Beautifully modelled by Paul Blythe of Aylesbury, this was a fine example of vehicle engineering in Meccano parts and was complete with scale gun turret. David Guillaume of Alcester also had a fine demonstration vehicle chassis on display. Fitted in a "glass" (perspex) case, the stripped-down chassis was end-mounted on rotating gymbals, driven in slow sequence to rotate the chassis through 360 deg.longitudinally with sequential operation of the transmission and differential gear inside the chassis. This enabled the public to examine vehicle mechanics literally from every angle. Presented in the latest Meccano colours of Blue, Yellow and Silver, David's chassis would be a credit to any engineering exhibition.

Colour-schemes, in fact, took full advantage of the various hues and shades which have cropped up from time to time in the paint shop of the Meccano factory in Binns Road over the past forty years and more, while even the original nickel-plated parts featured in early model replicas by Jim Gamble of Nottingham. Apart from these genuine early Meccano parts, Jim also brought sufficient of his Nottingham Meccano Collection of historical Meccano products and Hornby Trains to cover the entire width of the Town Hall rear display area – a miniature "Mecca" itself for the enthusiastic historian! A second mini-exhibition was put on by Pat Briggs, also of Nottingham, who displayed the finest range of accurate Meccano time-pieces and striking and chiming mechanisms which have ever been assembled by one builder. Pat is well-known for his specialisation in getting the last dyne of energy out of a standard Meccano Clockwork Motor – 24 hour runs being a piece of cake for Pat's low-friction designs.

Large-scale Showman's Road Locomotives were shown by Bert Halliday, Ernie Chandler and at least one more which obviously came from the Brian Rowe stable (probably built by him some ten years ago in red and green parts). Brian was a pioneer in large-scale traction engines from Meccano parts and although not at the Exhibition, he will probably recall his work. Of the large-scale locomotives on display, the pre-war Super Model L.N.E.R. 1,000 was shown by two enthusiasts, one modelled in original green parts and another in modern zinc-finished parts – both were excellent. Nor was the fair sex out of the running. Heather Burton brought her nicely-scaled narrow-gauge Tank Locomotive, the smoke-box and brass done features being outstanding in the neat way in which Heather had modelled them.

Simplicity models also had their place and were well admired by the public. A special class for youngsters was opened for competition on a "Space Age" theme sponsored by MW Models and these were judged by Bert Love. The task, he tells us, was not an easy one as the youngsters had shown much ingenuity, often with a handful of well-worn Meccano parts. Eventually, the first prize was awarded to 14 year-old Martin Brown for a remotely-controlled Moon Rover vehicle fitted with front wheel drive and steering and a rubber suspension system of novel form. Bert Love presented the prize – a No. 5 Meccano Set – to Martin, but commented on the excellent range of other competitors' models. By courtesy of MW Models, all other entrants received a Pocket Meccano Set as a consolation prize.

Time, like the proverbial wind, flew like magic and there just wasn't time to see and review all of the exhibits. We therefore beg the indulgence of those modellers who did not receive a mention in this report, and hope we have an opportunity of meeting many of them again at a future exhibition.

MODEL RAILWAY EXHIBITS

An additional attraction at the Henley Exhibition was a fine display of model railways organised by Mr. Vic Anger who, in combination with John Dalton, presented a giant OO-gauge layout in the Main Hall as a contrast to the Meccano exhibits. The Lower Hall, however, was given over exclusively to model railways and included the excellent scratch-built, 4 mm. scale layout "Dalcross" by Mr. W. Butler of Swindon which represented a 19th Century iron works complex. The Astolat Railway Circle of Guildford exhibited the "Wanborough Docks Railway", a detailed N-gauge OO layout which we understand is one of three permanent layouts normally mounted in the Circle's club rooms at Guildford. Another very fine N-gauge layout was presented by Mr. R. Perrett of Marlow, while Mr. Barker of Reading showed the very much larger layout "Cymru Lein Bach – The Gowen Valley Light Railway". This also was N-gauge, but, unlike the other OO scale layouts, it was produced to 7 mm., or "O" scale. Further fine layouts were exhibited by Messrs. John Owen and P. Hunt.

From the Meccano historian's point of view, perhaps the most interesting presentation on the railway side was a large layout of obsolete Hornby Clockwork Trains exhibited by Mr. Brian Wright. Although many of these trains could boast a considerable age, they all operated extremely well throughout the entire Exhibition and, after all this time, it was a joy to see them charging round the extensive track system. It brought back happy memories, not only for ourselves, but, judging by the crowds always surrounding the layout, for the vast majority of visitors as well.

Last, but not least, we must mention a final attraction presented by the courtesy of British Rail in the shape of regular film shows which were screened by B.R. at intervals throughout the day. Among other things, these dealt with various aspects of full-size railway manufacture and operation and they certainly made a very interesting "extra" in a day-long Exhibition which we do not hesitate to class as outstanding.