MECCANO® Magazine

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Meccano Magazine, founded 1916

MAP **HOBBY MAGAZINE**

ABC

FRONT COVER

The Swedish car ferry *Black Watch* photographed at Funchal, Madeira. The touch of an old type figurehead on a modern ship is attractive. *(Photo by Alan Bolton)*

NEXT MONTH

Polar bears, cannons, weathervanes, and the forthcoming Olympics are among July's features – plus, of course, another full-size plan for a simple but effective working model.

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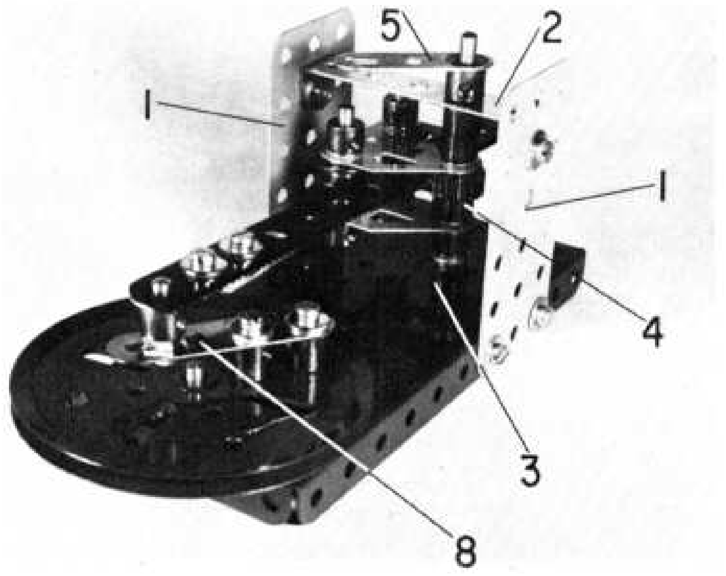


AMONG THE MODEL BUILDERS

With 'Spanner'

THERE are times, I am sure, when contributors to the Meccano section of the M.M. must think of me with violence in their hearts. They all go to the trouble of submitting material for publication; they have it accepted, then—nothing! Month after month they buy the Magazine and month after month they anxiously search its pages, only to find no mention of their masterpiece. I can well imagine their feelings!

I can also understand those feelings, but it doesn't do to give up hope. Don't forget that these articles are usually written at least two months before the Magazine is published and remember that, at any one time, we already have material in hand waiting to be used. We always try to take things in due order and so, between the two, there can be a pretty big delay.

One of the many contributors who can confirm a big delay is Mr. D. C. W. Fairclough of Prescot, Lancs., the builder of our first offering this month. He submitted it a year ago!

The mechanism in question is a Variable Angle Actuator which Mr. Fairclough designed for use in a programmed crane where he required a mechanism that had a wide range of continuously variable angular movement. Although designed for a crane, it does of course have many other uses and, in fact, Mr. Fairclough understands that the type of rack-and-pinion system incorporated is sometimes employed in washing machines to produce the familiar agitator action.

In the demonstration unit illustrated, a framework is provided by a 5½ × 2½ in. Flanged Plate to the side flanges of which two 3 × 1½ in. Flat Plates 1 are bolted, these Plates being braced by a 2½ × ½ in. Double Angle Strip 2. Mounted in this Double Angle Strip and in a Rod Socket 3, fixed in the Flanged Plate, is a 3 in. Rod on which are carried, in order, a Collar, a Flat Trunnion, a ½ in. Pinion 4, another Flat Trunnion, two Collars and a Crank 5, this last part being fixed on the end of the Rod above the Double Angle Strip. The Rod passes through the apex holes of the Flat Trunnions and note that packing Washers are added, as required, to ensure that everything fits snugly, but without binding.

Journalled in the corner base holes of the Flat Trunnions are two 1½ in. Rods, each held in place by Collars and carrying a ½ in. Pulley with boss 6 between the Flat Trunnions, the latter free to turn on the Rod. Again, packing Washers are used as required.

Now fixed in the end row centre hole of the Flanged Plate is a Threaded Pin on which a 3 in. Pulley 7 is journalled. Secured to the face of the Pulley by two Threaded Bosses is a 2 in. Slotted Strip 8, arranged with its slotted hole over the centre bore of the Pulley. A second Threaded Pin is locked in the slot, a Crank being mounted, free, on the Pin as shown. Bolted to the arm of the Crane is a 6½ in. Rack Strip 9, the smooth edge of which locates in the grooves of Pulleys 6 with the teeth meshing with Pinion 4.

In operation, it is Crank 5 which provides the angular movement when the 3 in. Pulley is rotated. Adjustment of the position of the Threaded Pin in Slotted Strip 8 will vary the amount of throw at the Crank and it will be found that the range of operation is between 0 and 200 degrees. This range can be further altered by mounting the Threaded Pin directly on the 3 in. Pulley in one of its four slots. As Mr. Fairclough says, when summing up, "Provided that all parts in the unit are correctly spaced, operation is very smooth, and a wide variation of angular movement is easily obtained."

PARTS REQUIRED

1—16b	9—37	1—55a	1—110a
2—18a	1—37b	7—59	2—115
1—19b	36—38	2—62	2—126a
2—23a	1—48a	2—64	1—19
1—26	1—52	2—73	

Multi-purpose Gear Differential

(see page 303 for photo)

For our second offering we have a fully-operating Differential designed by Mr. G. Relins of Milverton, Leamington Spa, Warwickshire. There is nothing unique in a Meccano differential, of course, but this particular example is the first ever mechanism of its type I have seen using the comparatively new Multi-purpose Gear introduced to the Meccano system in 1970. The unit is easy to make, works remarkably well and is undoubtedly a credit to its designer.

As regards construction, two $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strips are bolted between an 8-hole Bush Wheel 1 and a 2 in. Pulley 2, the bosses of the Bush Wheel and Pulley pointing inwards. Journalled, free, in these bosses are the two half-shafts—in our case supplied by $2\frac{1}{2}$ in. Rods—a Multi-purpose Gear 3 being fixed, boss inwards, on the inner end of each shaft. A loose Collar on the shaft spaces the Gear from its respective Bush Wheel or Pulley. In mesh with Gears 3 are two more Multi-purpose Gears 4 carried, boss inwards, on a 2 in. Rod journalled in the centre holes of the Double Angle Strips. One of these Gears is fixed on the Rod, while the other is loose, being held in place by a Collar 5. Both Gears are spaced from their respective Double Angle Strips by three Washers in each case. Drive is taken to Pulley Wheel 2.

As Mr. Relins points out, the mechanism is suitable for use in any model vehicle which drives on $2\frac{1}{2}$ in. Road Wheels, or 2 in. or 3 in. Pulleys with Motor Tyres. Also, the drive Pulley 2 could be replaced by a 2 in. Sprocket Wheel for chain drive, although, in this case, the spacing Collar on the half-shaft would need to be replaced by three spacing Washers because of the increased size of the Sprocket boss.

PARTS REQUIRED

2—16a	1—24	4—37b	3—59
1—17	4—27f	6—38	
1—20a	4—37a	2—48a	

New Zealand News

Before moving on, I have a bit of news to relate from New Zealand's Christchurch Meccano Club, kindly supplied to me by Club President, Bob Boundy, 53 Greendale Avenue, Avonhead, Christchurch 4. Bob tells me that last December 17 the Club held a highly successful Social Evening which not only included a very impressive display of Meccano models, but also featured a prize-giving ceremony, supper and dancing to music supplied—live—by a local dance band. Relatives and friends of Club members attended in addition to the members themselves and I am delighted to report that a good time was had by all.

On February 4 this year, the Club held its Annual General Meeting and this, I am told, was also a very lively affair. A number of parents attended with the result that the Club committee now has two new adult members to assist in organisation. At the meeting it was decided that the Junior Club associated with the Christchurch M.C., would be joined to the Senior Club to form one large organsiation which, Bob says, "should be extra good"! Members will certainly meet in comfort as the Club is now situated in a brand new hall complete with heating and kitchen facilities. Luxury accommodation, gentlemen!

Hungarian Expert

Moving now from New Zealand to Hungary in Eastern Europe, we find an internationally-known Meccano enthusiast in the person of Mr. Andreas Konkoly of Budapest. Mr. Konkoly is one of those dedicated modellers whose unique and fascinating inventions have not only earned him world-wide recognition among the Meccano fraternity, but which have also won two gold medals for him at International Fairs on the Continent.

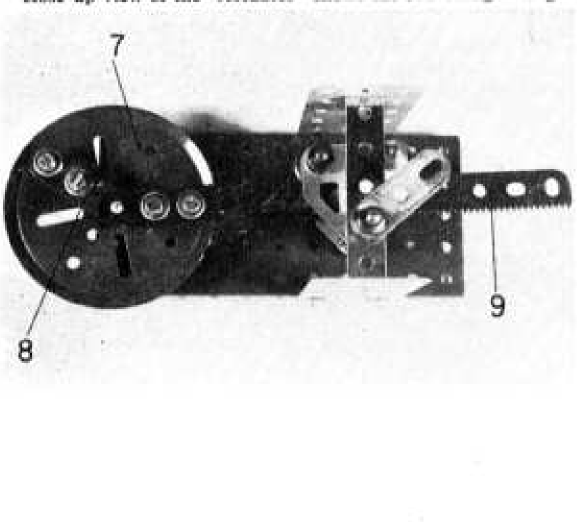
We have featured examples of Mr. Konkoly's work in Meccano Magazine in the past and, in fact, his very latest offering—an utterly intriguing "Meccano Sailor"—appears on page 291 of this issue. By way of a change, therefore, I would like to give here a brief outline of Mr. Konkoly's history, this being of interest to me and, I am sure, to the many readers who are familiar with his work.

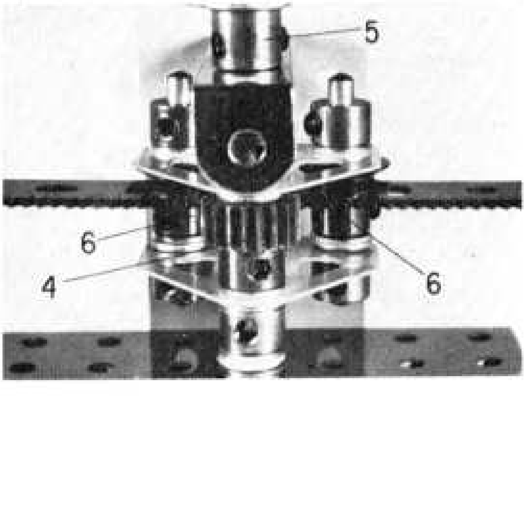
Andreas Konkoly was born in Budapest in 1918, the son of a bank director father and a school mistress mother. He first became interested in model-building at the age of 10, after receiving a small German-made construction set as a Christmas present, and his interest grew with the years. So, also, did his collection, but for more than two decades his experience was limited to Continental systems only. It was not until 1952 that he obtained his first Meccano Set—a pre-war No. 4 Outfit—but from then on he was "hooked". Over the next four years he built the No. 4 Set up into a No. 10 Set and, by 1957 he had started on the course which has now made him famous as a builder of really clever and "different" models of all sizes as well as compact, high-capacity mechanisms. Indeed, compactness is a feature for which Andreas strives in all his model-building activities.

Public recognition for his work first occurred in 1958 when a 3-speed and reverse gearbox he had designed appeared in Meccano Magazine. The following year he had an unusual "Weather Prophet" model published and was also successful in two separate model-building competitions. Since then, we have featured examples of his skill at fairly regular intervals in the M.M., one model which I personally remember very well being a Walking Horse and Chariot which was described in a 1965 issue. In fact, Mr. Konkoly him-

(*continued on page* 306)

Opposite page, full credit for this Variable Angle Actuator mechanism goes to Mr. D. C. W. Fairclough of Prescot, Lancs. Below left, a top view of Mr. Fairclough's mechanism showing the layout of parts with respect to the base. Right, this close-up view of the "Actuator" shows the swivelling rack guide, with one side removed to show the spacing of parts.





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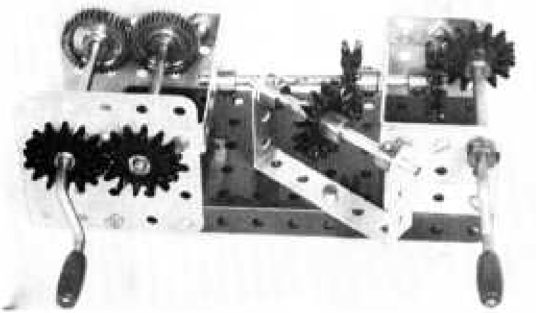

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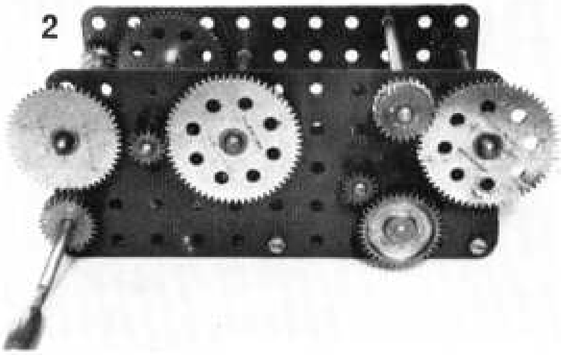


MECCANO PARTS AND HOW TO USE THEM

Part 6 — Basic Gear Trains

By B. N. Love

BEFORE continuing with this part, the reader's attention is drawn to an error in the table of Part 4, on page 202 of the April, 1972 Meccano Magazine. The 1½ × 1½ in. Flat Plate is listed as Part No. 76 but should read Part No. 74.

Basic Gear Trains

Most Meccano modellers would agree that their first sense of real engineering comes when they are fitting up the gear trains in their models. Until a few years ago, it was necessary for the enthusias to have an Outfit well up the list in order to have a versatile range of gears at his disposal, but with the introduction of Part No. 27f, Multi-purpose Gear Wheel, the younger modeller will find all the versatility he could wish for in any Meccano Outfit from 3X upwards. Fig. 1 shows just three applications of the new plastic gear wheel. Looking at the left-hand end of the model, a pair of 27f are mounted on the same shafts as a pair of 1 in. brass Gear Wheels. Although the 1 in. Gears have 38 teeth and the plastic gears have only 14, the rotation of the shafts remains in a 1 : 1 ratio. It is instructive to try this arrangement if only to convince the advanced modeller that he can frequently, without loss of mechanical efficiency, substitute the cheaper plastic gears for the more expensive brass ones when he wants such a ratio at 1 in. centre spacing.

A glance at the right hand end of the rig in Fig. 1 shows how the angle of drive may be varied—virtually through any angle from 0 deg. to 360 deg.—a remarkable achievement of design. At 0 deg. meshing, the two gears would be face to face and would then act as a positive clutch mechanism. Incidentally, the groove form in the plastic gear provides a deep-throated pulley wheel which will take a rubber Driving Band or a hoisting cord. When the Multi-purpose Gear Wheel is used for an angular drive as shown, care must be taken in meshing the teeth with sufficient clearance to give a smooth drive. So long as the gears are adjusted on their shafts so that they engage each other with the same overlap of teeth without binding, they will provide a smooth and quiet drive which requires no lubrication of the teeth. The principal limitation of the plastic gear, however, is that it will give a simple 1:1 ratio. This means that one revolution of the crank handle will cause the second shaft to revolve once, in the opposite direction. At a pinch, the Multi-purpose Gear can be mounted as a driving pinion for a complete circle of large Toothed Quadrants (more about those in a later part of the series). When adjusted to mesh with the external teeth, an exact ratio of 12:1 is achieved which may well be of interest to clock-makers!

Fig. 2 shows the more conventional range of gears in the Meccano system. The left-hand grouping shows a complete chain of gears starting with the 25-teeth Pinion, Part No. 25, on the Crank Handle. This meshes with a No. 27 Gear Wheel having 50 teeth, so two turns of the Crank Handle are required for one turn of the 50-teeth gear. The gear ratio thus obtained is therefore 2 : 1. The chain continues by means of a No. 26, 19-teeth Pinion meshing with a No. 27a, 57-teeth Gear Wheel. Three turns of the Pinion are required for one turn of the Gear Wheel, hence a 3 : 1 ratio. These last two gears are shown at the rear of the framework of Fig. 2. Finally, a No. 26c, 15-teeth Pinion meshes with a No. 27d, 60-teeth Gear Wheel giving a 4:1 ratio.

How many turns of the Crank Handle at the left are required for one turn of the 60-teeth Gear? Adding the ratios 2:1 plus 3:1 plus 4:1 would give 9:1—but this would be wrong as a count of turns would quickly show! The true ratio is obtained by *multiplying*, (2 × 3 × 4); answer, 24:1.

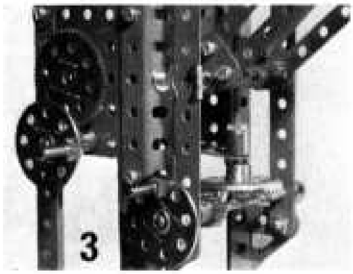
All the gears discussed so far are designed to mesh at 1 in. centre spacing, but unorthodox meshing can be achieved by spacing any pair of gears at critical meshing distance. Two examples of this are shown at the right hand end of Fig. 2. A No. 25 will mesh with a 27d when placed two holes along and one hole down as shown. The No. 26c will mesh with the 31 (1 in. Gear Wheel) when spaced at two holes diagonally, again, as shown. It is interesting to try other parts in the system for their varied hole spacing to see what other unorthodox meshings can be achieved. Advanced constructors make use of this feature in some of their planetary gear-boxes which require some rather peculiar gear ratios.

For normal running, thin Gear wheels should be set to run in the central portion of the wider face of the Pinions unless the model is to run for long periods. There would then be a tendency for the Gear Wheel to wear a groove in the Pinion face. This can be prevented by changing the position of the Gear wheel laterally across the pinion face, or by using two thin gear wheels back-to-back to provide additional contact area. Always test Axle Rods for straightness before setting up gear trains and use the best you can find. Set up the axles with Collars and Washers to take the lateral play out of the shafts and be sure that they are running true before locking the gears to the Axle Rods.

Gears may be mounted inside or outside of the framework forming gearbox journals, as shown in Fig. 3. Here we see a 3:1 gear reduction to a winding shaft of a model crane. A further type of Meccano gearing is also illustrated in this model and it is known as contrate gearing. The Pinion is mounted on the hand wheel shaft and it meshes with a Contrate Gear to give a change of direction (90 deg.) and a gear reduction ratio. Other right-angle drives are illustrated in the remaining figures and they are well worth a little consideration.

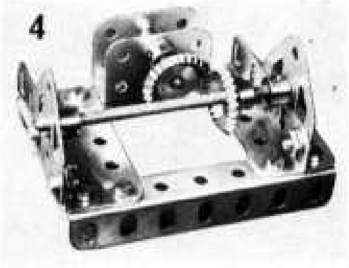
Meccano does not claim to be a high-precision system, although surprising accuracy may be achieved by careful design and construction of a Meccano model. Indeed, the somewhat generous tolerance in hole and axle size is to help the youngster to make a working model without recourse to precision alignment. However, the even greater tolerance permitted by slotted Meccano parts can be put to good use by the modeller in adjusting his shafts for smooth running. the demonstration models in Figs 4, 5 and 6 use a similar module for setting up shaft journals. In each case a pair of 3½ in. Angle Girders is joined by a pair of 2½ in. Angle Girders made rigid by "sandwiching" 2½ in. Flat Girders at each end. Flat Trunnions are mounted as shown, using the slotted holes of the end Girders.

Consider Fig. 4 which shows a simple Bevel Gear Drive. To ensure correct alignment of shafts, a Channel Bearing, Part No. 160, is used as a fixed journal for the driven shaft. The driving shaft is mounted in the Trunnions which are then carefully lined up so that, when the driven shaft is pulled through the Channel Bearing, it makes perfect register with the driving shaft. A final check should then be made to see that both shafts are at right angles. They may then be set up with Collars and Washers after sliding the two ½ in. Bevel Gears into place. Again, mutual meshing of the Bevels is essential for smooth running and they should be adjusted on their shafts accordingly. This is very good practice



for the novice and for the modeller who experiences difficulty in getting his gears to run smoothly. It is quite possible that one or both Bevels may run with a slight wobble causing a binding at a critical point. If this happens, first try unmeshing the Bevels and rotating one half a turn before carefully setting up again. If the wobble is still pronounced, try double Grub Screws in the Bevel Gear bosses, or simply transfer the Grub Screw to the opposite hole. This will often do the trick.

The same principles of setting up apply to Fig. 5, showing a Worm drive. Critical spacing this time is required to ensure a correct depth of the Worm spiral into the 1 in. Gear teeth. Strictly speaking, because the Gear teeth are parallel to its axis and the worm spiral is not, the shafts should be at a greater angle than 90 deg. although a satsifactory drive is usually obtained at standard spacing in the three planes. Fig. 6 shows the Helical Gears, Parts No. 211a and 211b, which require the most careful setting up. When properly aligned they give a smooth right-angle drive where one shaft passes over the top of the other. The Worm Gear moves one tooth of the gear with which it meshes at each turn of the Worm, therefore the gear ratio of a worm drive is the easiest to calculate. It is only necessary to know the number of teeth on the gear being driven by the Worm, and so the gear ratio illustrated in Fig. 5 is 38 : 1, the 1 in. Gear having

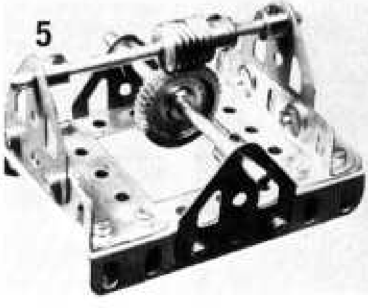


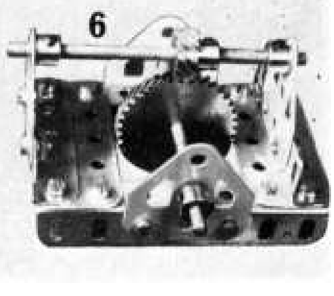
38 teeth.

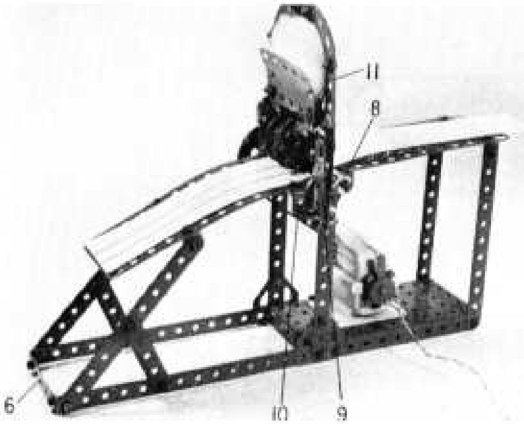
Meccano Worm drives cannot be reverse driven, i.e. from the Gear back to the Worm, but this has the advantage of providing an automatic brake in any mechanism. Helical drives, on the other hand, can be driven by either shaft, but location of one Helical Gear over another is critical. Shafts must be at right angles and at the correct meshing height above each other. The centre line through the gear face of one Helical must coincide with the shaft axis of the other, and vice versa. Any misalignment will cause the Helical Gears to bind, or to fail to mesh. Once set up properly, however, they perform admirably.

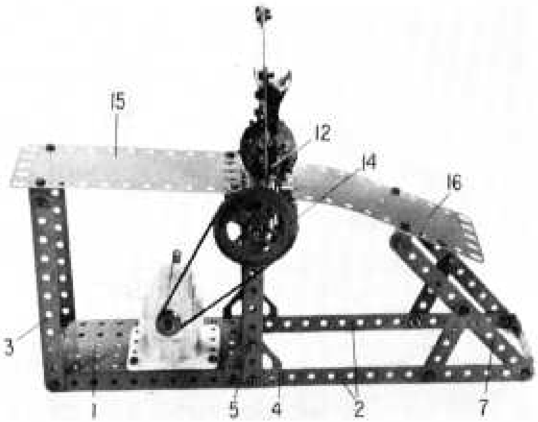
Much of the advice on setting up Meccano gear trains is self-evident to the experienced constructor, but the grinding of overloaded or badly meshed gear wheels still occurs in adult models which are incorrectly adjusted. Given a fair chance, standard Meccano gears will do all that the reasonable and careful builder wants of them—and much more besides in many instances. When accuracies of ratios to 12 places of decimals are achieved and loads of 1 cwt. or more can be raised by standard gearing there is little to complain about in a system which must compete in costs and quality with all of the various available constructional hobbies.

In the next part of this series we will be considering the effect of linking various gear trains together to produce some of the well-known engineering mechanisms.







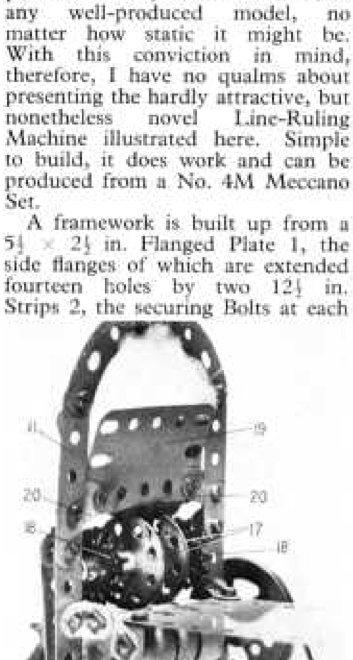


BUILD A SIMPLE RULING MACHINE

A novel model from a No. 4M set, says 'Spanner'

I'VE said it many times before and, no doubt, I'll say it many times again in the future, but "working" Meccano models are generally more interesting than "static" constructions. Of course, I give this primarily as my own opinion, but I think most Meccano modellers would agree with my sentiments, even though we are all pleased to see, admire and build any well-produced model, no matter how static it might be. With this conviction in mind, therefore, I have no qualms about presenting the hardly attractive, but nonetheless novel Line-Ruling Machine illustrated here. Simple to build, it does work and can be produced from a No. 4M Meccano Set.

A framework is built up from a 5½ × 2½ in. Flanged Plate 1, the side flanges of which are extended fourteen holes by two 12½ in. Strips 2, the securing Bolts at each side also holding in place a 5½ in. Strip 3 and a Flat Trunnion 4, the latter overlaid by a 5½ in. Strip 5. The ends of Strips 2 are connected by a 2½ in. Strip 6, attached by Angle Brackets, the side securing Bolts in this case also holding in place two diagonally-positioned 5½ in. Strips 7, each braced by a 2½ in. Strip bolted between the centre hole of Strip 7 and the sixth hole of Strip 2. The upper ends of Strips 3 are connected by a 2½ × ½ in. Double Angle Strip.



Turning our attention to Strips 5 in the centre of the framework, a Fishplate 8 and an Angle Bracket are secured to each of these through its top hole, a second Angle Bracket also being attached through the third hole of each Strip. Secured by a ⅜ in. Bolt to the latter Angle Bracket are two 2½ in. Strips 9 and another Angle Bracket, to which is bolted a ½ in. Reversed Angle Bracket 10. Strips 9 are spaced from each other by three Washers on the shank of the Bolt. The nearest Strip, only is bolted to the upper Angle Bracket.

This same "nearest" Strip is next extended upwards by another 2½ in. Strip 11, using a ⅜ in. Bolt for fixing purposes. Note, however, that the Bolt not only passes through these Strips, but also through the upper hole of second Strip 9. A Spring Clip 12, bend inwards, is clipped onto the shank of the Bolt, between the Strips, and the fixing Nut is added outside the second Strip. The Spring Clip obviously serves as a spacer between Strips 9, ensuring that sufficient room exists between the Strips to receive the lining mechanism Rod which will later be carried between them on the "floating "principle. The upper ends of Strips 11 at each side are connected by two 2½ in. Stepped Curved Strips.

Journalled in the second holes of Strips 5 is a built-up powered roller 13, produced from, in order, two 1 in. Pulleys with boss, three Washers, a ½ in. Pulley without boss, a 1 in. Pulley without boss and another 1 in. Pulley with boss, all fixed on a 4 in. Rod. The bosses of the first two Pulleys point outwards, while that of the last points inwards, the result being that all point the same way. A length of 2 in. wide gummed brown paper is then tightly wrapped round and, at the same time, stuck to the Pulleys to provide the roller face. It will be found that this built-up roller is perfectly adequate for requirements, provided that enough gummed paper is used to result in a thick and firm surface. The 4 in. Rod is held in place by a Spring Clip, on the Rod between the roller and one Strip 5, while a 2 in. Pulley 14 is fixed on the end of the Rod, with two ¼ in. Washers spacing the Pulley from nearby Strips 9. This Pulley is connected by a 10 in. light Driving Band to a ½ in. Pulley fixed on the output shaft of a 4½ volt Reversible Motor bolted to Plate 1 in the position shown.

Fishplates 8, which are angled downwards somewhat, are now connected by a 2½ × ½ in. Double Angle Strip. Bolted to this Double Angle Strip and to the Double Angle Strip joining Strips 3 is a 5½ × 2½ in. Flexible Plate 15, serving as the paper lead-in guide, while another similar Plate 16 is bolted to Reversed Angle Brackets 10. This Plate is curved down and attached to Strips 7 by Angle

Brackets to provide the exit guide.

The lining mechanism is next built up quite simply from a 3½ in. Rod, on which two 8-hole Bush Wheels 17 are fixed. The rims of these Wheels act as the line rollers, and so their positions on the Rod depend on the required positions of the lines to be drawn, although it is advisable for them to coincide with two of the 1 in. Pulleys included in roller 13. The Rod is then located in the gaps between Strips 9 at each side, where it is held in place by two Multi-purpose Gears 18. These Gears in effect serve as Collars to prevent lateral movement of the Rod, but the required vertical movement—to allow for the paper—is still permitted in the slots.

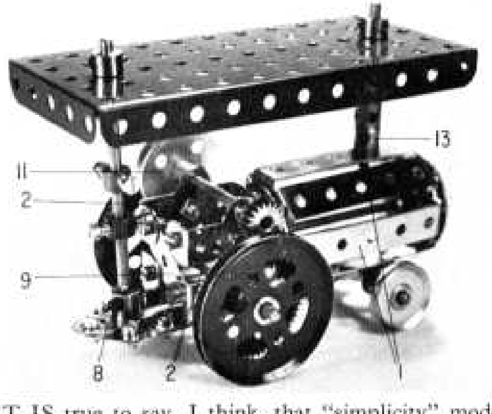
Finally we have the ink pad for the rollers and this consists of nothing more complicated than ordinary cotton wool held between two 2½ × 1½ in. Flexible Plates 19, spaced from each other by Spring Clips on ¾ in. Bolts. These Bolts also fix the Plates to two Fishplates 20 which are in turn bolted to Strips 11, as shown. The cotton wool must project below the holder sufficiently far, not only to make contact with the rollers (Bush Wheels 17), but also to exert a gentle down-pressure on them in order to keep them in firm contact with the paper being ruled. To obtain the best results, the ink pad should be impregnated with a dense ink, rather than ordinary fountain pen ink, but whatever is used, the new model will still give plenty of fun and that's the important thing!

PARTS REQUIRED

2—1	4—22	2—38d	2—188
6—2	1—22a	2—48a	2—192
9—5	1—23	1—52	Piece of Cotton Wool
4—10	9—27f	2—90a	Length of 2 in. Brown
10—12	5—35	6—111c	Gummed Paper.
1—15b	52—37a	2—125	1—4½ volt
1—16	46—37b	2—126a	Reversible Motor.
1—20a	10—38	1—186a	

SMALL & SIMPLE

'Spanner' describes three easy-to-build models from readers



IT IS true to say, I think, that "simplicity" models hold a fascination for most Meccano enthusiasts. I am certainly enchanted by them and I know I am not alone in this. I do not think, however, that our fascination is purely the result of personal sentimental feelings. There is something more to it than that. To my mind, if a simple little model, although it uses only comparatively few components, captures the atmosphere or movement of its subject, then that model confirms the skill of its builder. As we all know, more skill is often required to build a decent model with a few parts than with an unlimited supply of parts.

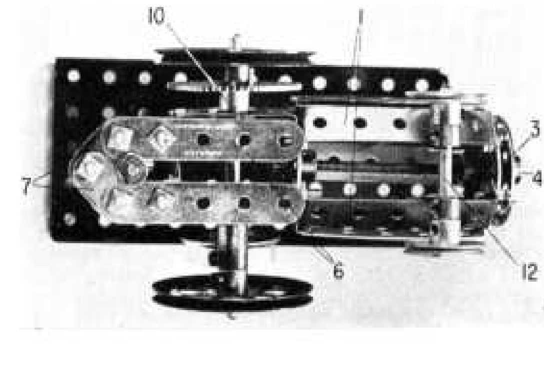
Having made my point (I hope!) I would now like to deal with the matter in hand. Featured here are three "simplicity" models, small in stature, but captivating when built. Two are the productions of adult modellers whose work has been featured in these pages in the past; the third, a Traction Engine, comes from 10-year-old Paul Bourbousson, one of the hard-working members of Hertfordshire's Stevenage Meccano Club.

Traction Engine

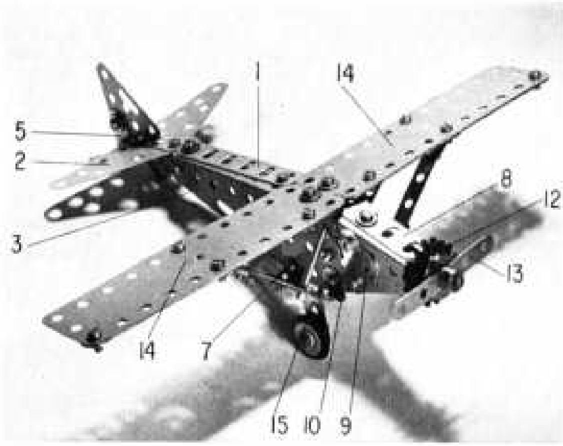
Dealing first with the Traction Engine, the model illustrated is actually a re-built version of Paul's original, incorporating a few unimportant alterations to take advantage of some more suitable parts which Paul did not possess. The boiler consists quite simply of two 8-hole Bush Wheels connected together by seven 2½ × ½ in. Double Angle Strips 1. Note that the Bolts fixing four of the Double Angle Strips to the rearmost Bush Wheel also fix four 1½ × ½ in. Double Angle Strips 2 to the other side of the Bush Wheel in the positions shown. Locked in the bosses of the Bush Wheels is a 3 in. Screwed Rod, on the projecting forward end of which a 6-hole Wheel Disc 3 is held by a Washer and a Collar 4. Two Bolts in the threaded bores of this Collar represent the smokebox door handle.

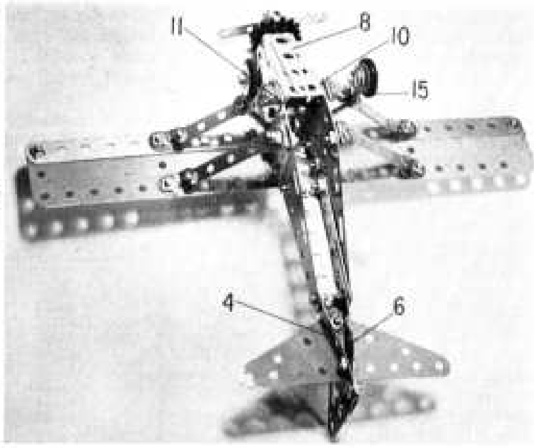
Now secured by Angle Brackets to the lower pair of Double Angle Strips 2 are two 2½ in. Strips 6, the rear ends of these Strips being connected by two Fishplates 7, angled as shown and tightly bolted together. The securing Bolt also fixes a forward-pointing third Fishplate 8 in place by its slotted hole, the circular hole in this Fishplate later serving as the lower securing point for the canopy. The rear lugs of Double Angle Strips 2 are connected by two diagonal 1½ in. Strips 9, as shown.

Journalled in the centre holes of lower Double Angle Strips 2 is a 3 in. Rod serving as the rear axle and held in place by a Collar and a 60-teeth Gear Wheel 10. Two spacing Collars are added to one end of the Rod (opposite side to the Gear) then 2 in. Pulleys are secured in place to act as road wheels. In mesh with Gear



Above, this little Traction Engine is the brain-child of 10-year-old Paul Bourbousson of Hertfordshire. An excellent model, considering Paul's age.
Right, an underside view showing the layout of the chassis.





Left, a good view of the "Spirit of St. Louis"—an extremely life-like model designed and built by Mr. Roger Le Rolland of Stoke-on-Trent, Staffs. Right, an underside view of the aircraft clearly showing the arrangement of the wings, tailplane and landing gear.

Wheel 10 is a ½ in. Pinion on a 2 in. Rod journalled in two Fishplates bolted through their slotted holes to the centre of upper Double Angle Strips 2. A 1½ in. Flanged Wheel 11, fixed on the opposite end of the Rod, represents the flywheel. Note that full use must be made of the slotted holes in the Fishplates to bring the Pinion into mesh with the Gear Wheel.

The front wheels are 1 in. Pulleys fixed on another 2 in. Rod 12 journalled in Obtuse Angle Brackets bolted to the two lowest Double Angle Strips 1. Spacing Collars are added to the Rod, to prevent excessive sideways movement.

In the case of the chimney, a Rod Socket 13, carrying a 2 in. Rod, is secured in the second hole of top Double Angle Strip 1. Mounted on the Rod are a Coupling, a Collar and three Washers, followed by the canopy—a 5½ × 2½ in. Flanged Plate—the last held in place by a second Collar above the canopy. The rear canopy support is a 3 in. Rod held in another Rod Socket fixed in Fishplate 8, the canopy resting on a ¾ in. Pinion fixed on the Rod. A Collar above the canopy holds it in place, two more Collars, each fitted with two Bolts, being fixed down the Rod to provide embellishment.

That completes the model, and, considering the age of the builder, an excellent piece of work it is, too. Well done Paul!

PARTS REQUIRED

2—5	3—17	1—25	4—48
2—6a	1—20	1—26	7—48a
5—10	2—20a	1—27d	1—52a
2—12	2—22	29—37a	9—59
2—12c	2—24a	33—37b	1—63
2—16	1—24b	4—38	1—80c
			2—179

Spirit of St. Louis

Paul Bourbousson's Traction Engine, of course, is a "freelance" model, i.e. it is made to Paul's own design and is not a direct reproduction of an actual real-life original. Our second simplicity offering, however, is based on a real-life original which did exist, and a very famous one at that—"Spirit of St. Louis", the celebrated aeroplane in which Charles Lindbergh made the first ever non-stop solo crossing of the Atlantic Ocean.

The most amazing thing about this model is that, although it genuinely is a small, uncomplicated construction, it really looks just like the real thing. In fact, it captures the atmosphere of the original so well that I think the word "masterpiece" is not an unreasonable description! If this, by implication, makes the builder a "master", then a master is Mr. Roger Le Rolland of Stoke-on-Trent, Staffs., to whom full credit for the model is due.

Construction is not difficult. The fuselage consists of a 3 in. "U" section girder 1, built up from two 3 in. Angle Girders bolted together through their slotted holes, with the rear securing Bolt holding a Fishplate in position. Secured to the free end of this Fishplate is the tailplane 2, supplied by two 2½ × 1½ in. Triangular Flexible Plates, arranged as shown. Bolted to each side flange of girder 1 is a 3½ × 1½ in. Triangular Flexible Plate 3, the rear securing Bolt in this case also holding a 3½ in. Narrow Strip 4 in place, the Strip projecting four holes rearward. Strips 4 at each side are bent inwards and bolted together through their two end holes, the end securing Bolt also holding two Fishplates 5 in position, pointing vertically upward, and the second Bolt also holding another Fishplate 6, this one pointing diagonally downwards to serve as the tail skid. Bolted between Fishplates 5 is a 1½ in. Corner Bracket representing the fin.

Triangular Plate 3 at each side is extended forward by a 1½ × 1½ in. Flat Plate 7, the lower fixing Bolt holding an Angle Bracket in place. This Bracket is bent to an acute angle to later provide the lower anchoring point for the rear wing-stay. Bolted to the forward corners of the Flat Plate are two 2 in. "U" Section girders 8, these being angled together to form the nose of the aircraft and connected by a 1 in. Corner Bracket 9 at each side. Note that the Bolt fixing the lower girder to the Plate also holds a Hinge 10 in position.

Now fixed inside the fuselage, on two ⅜ in. Bolts inserted in the front row centre holes of Plates 7 at each side, is a Coupling 11, the Bolts entering the longitudinal bore of the Coupling. Secured in the centre transverse bore of the Coupling is a 3 in. Rod which projects forward through the nose of the aircraft. A Multi-purpose Gear 12, boss inwards, is fixed towards the front of the Rod, as shown, to represent the original's radial engine (an excellent idea!), then this is followed by five ¾ in. Washers, a 2½ in. Narrow Strip 13 and a Collar. The Strip obviously serves as the propeller.

Finally, we have the wings and undercarriage. Each wing consists of a 5½ × 1½ in. Flexible Plate 14, underlaid along its leading edge by a 5½ in. Strip and attached to the fuselage by an Angle Bracket bolted through the top centre hole of appropriate Flat Plate 7. Wing-stays provided by two 2½ in. Narrow Strips, are attached to the underside of each wing by Obtuse Angle Brackets the lower ends of the stays being bolted to Hinge 10 and the nearby bent Angle Bracket, already mentioned. Bolted by its short lug through the second hole of each forward stay is a 1 × ½ in. Angle Bracket 15 which is opened out to form an obtuse angle so that the long lug is vertical. Note that the Bracket is secured to the stay by a 1⅛ in. Bolt, the long shank of the Bolt thus representing an additional stay. Locked by Nuts in the lowest hole of Angle Bracket 15 is a ½ in. Bolt on which a ½ in. Pulley without boss is mounted to serve as the undercarriage. For added realism, here, Mr. Le Rolland fitted Dinky Toy tyres to the Pulleys, but these, of course, are not vital necessities.

PARTS REQUIRED

2—2	4—12c	5—38	1—133
2—9c	1—16b	5—38d	2—133a
4—9e	2—23	1—59	2—189
4—10	1—27f	1—63	2—221
4—12	37—37a	2—74	2—224
2—12b	35—37b	2—111d	5—235
		2—114	2—235b

Meccano Sailor

Credit for our final model goes to Mr. Andreas Konkoly of Budapest, Hungary who can always be relied upon to come up with something outstanding and "different". A brief outline of Mr. Konkoly's history is given in "Among the Model-builders" in this issue, but, here, we are interested in his model—and this is nothing if not outstandingly different. It's a fantastic working presentation which he has titled the "Meccano Sailor" because it gives the impression of a sailor nipping down the rigging of a ship with great agility; a marvellous little thing which, although it might not be a true simplicity reproduction of something in real life, will utterly delight all who see it!

It consists quite simply of a 12½ × 2½ in. Strip Plate 1 attached to two 12½ in. Angle Girders 2 by twenty-five ⅜ in. Bolts arranged in alternate holes, as shown. The Girders are bolted to the lugs of a 2½ × ½ in. Double Angle Strip which is in turn fixed to a 5½ × 2½ in. Flanged Plate 3. The Girders are angled backwards slightly and are braced by two 5½ in. Strips 4 bolted between the eighth holes of the Girders and the end holes in the side flanges of the Plate.

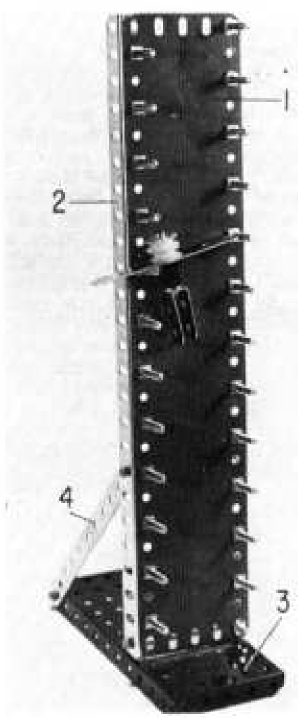
The "sailor" himself is built up from two ½ in. Pulleys without boss 5 bolted, along with two 2 in. Slotted Strips 6 representing the arms, to one end of an electrical Insulating Spacer. Attached to the other end of the Spacer is a Single Bent Strip 7, representing the legs. If any of these parts are not available, a simplified sailor can be built up from a 3½ in. Narrow Strip, to the centre of which an Angle Bracket is attached by a Long Threaded Pin, the Bracket thus representing the head and the shank of the Pin, the legs.

In operation, the sailor is located by his "arms" obliquely on the two top-most Bolts. Immediately he is released, he will slide down the Bolts moving from side to side until he reaches the bottom. It's marvellous!

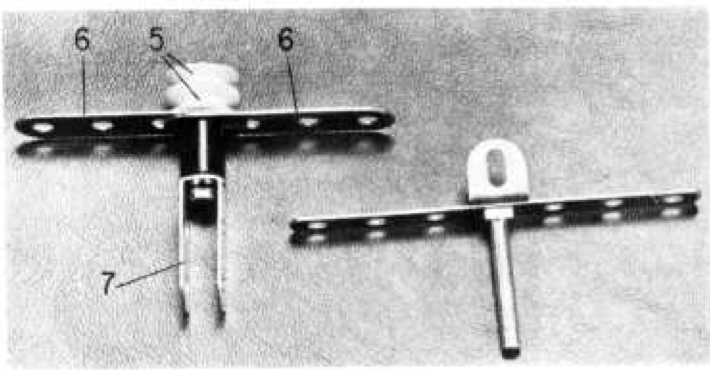
For added enjoyment, a good suggestion is to build two identical models and then to hold competition races between the two. You'll find it great fun.

PARTS REQUIRED

FRAME			
2—2	32—37a	1—48a	24—111
2—8	8—37b	1—52a	1—197
1st SAILOR			
2—23	1—38	2—55a	1—111
			1—564
SIMPLE SAILOR			
1—12	1—115a	1—235b	



Right, seen here is the highly amusing "Meccano Sailor"—another brainwave from Mr. Andreas Konkoly of Budapest, Hungary. Below, the two "sailors" described for use with Mr. Konkoly's model. Left is the recommended figure and on the right is a simple alternative.



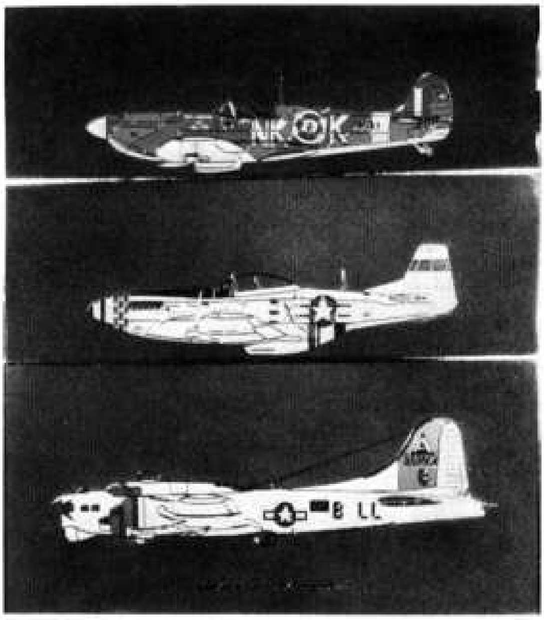
11A, Hawker Hurricane Mk. 1, De Havilland Mosquito Mk. IV, Avro Lancaster Mk. 1, Messerschmitt Bf109F, Junkers Ju88 A4, North American P51D Mustang, Boeing B-17 Flying Fortress, Junkers Ju 87 "Stuka" and Focke Wulf Fw 190. Price, in a gold-finished gift box with acetate window, is 95p each. A very colourful and attractive wall decoration.

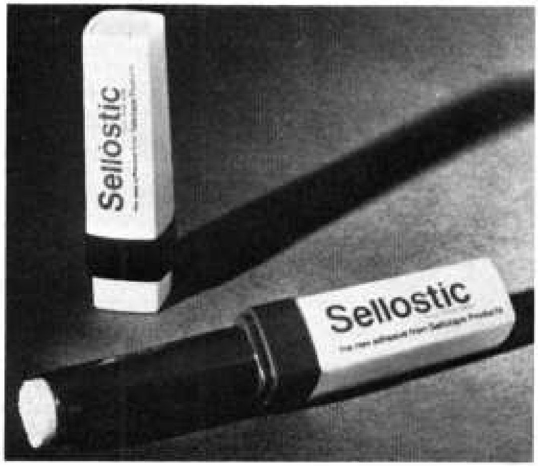
New Books

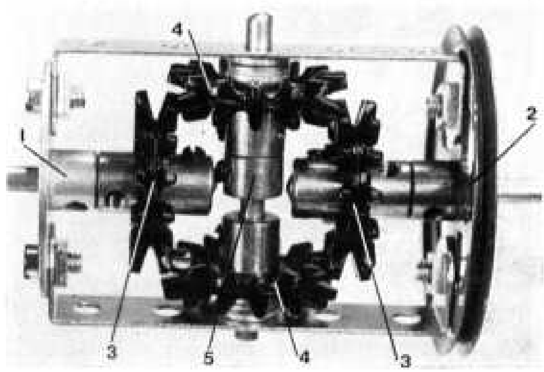
In the book line this month we have two new books published by David & Charles. "Ransome's Steam Engines", by A. Beaumont, opens by introducing steam and its tenuous expansion and progression towards industrial and agricultural use. Following this is a chapter about the steam fitters, which takes the form of a tribute to the men who built these juggernauts. The book also includes a transcript of an old Ransomes, Sims and Jefferies catalogue, displaying various engines and steam driven devices, mainly for agricultural usage. However, moving on from there the rest of the book is devoted to traction engines—their history, construction and purpose, finally winding up with stationary engines. The book retails at £3.25 and is fully illustrated with drawings or plates on each page.

The second book, "Railways since 1939" by H. C. Casserly, essentially consists of two parts, some 70 pages of photographs, all of excellent quality, and about 40 odd pages of writing covering the war years, the immediate post-war years, followed by nationalization and modernisation (including the Beeching era) then the rail tours which covered the years between 1950 and 1960. From there the author goes into the extent of preservation that exists in this country today. The book winds up by covering the present and future status of the railways, their uses and costs etc. Overall this is a comprehensive book and for an enthusiast it is well worth £3.25, if only for the superb photographs that it contains.

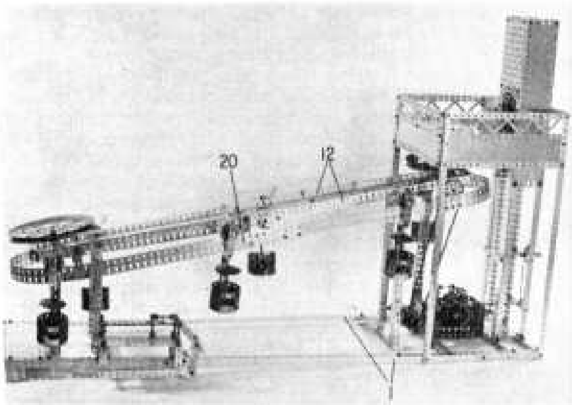
"How to go Railway Modelling", by Norman Simons and published by Patrick Stephens Limited, contains chapters on various types of model railways and what might best suit individual needs and resources as well as practical chapters on layout planning and building, electrical wiring, track laying, locomotives, carriages and wagons, scenery and operating. The informative text is well supported with more than 100 line drawings and over 100 photographs. It also explains the organisation of the hobby, the clubs, the press, the commercial manufacturing, distributing and retail houses, and the accepted model railway standards, scales, and gauges. This book is certain to encourage the beginner as well as offer many valuable hints and tips for the experts. Retail price is £2.60.

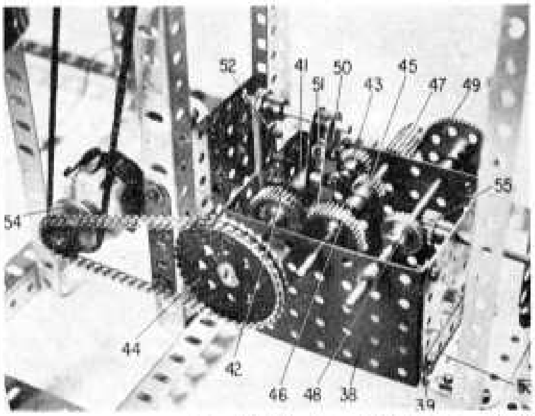






The differential in this photograph is that designed by Mr. G. Relins and descibed on page 277. It may seem strange to have the picture on this page, but this is just one of the odd side effects of the "go-slow" on the railways; the whole story is too complicated to go into here!





CHAIRLIFT

An impressive continual-running display model described in two parts by 'Spanner'.

PART ONE – BASE, TOWERS, TRACK, AND LIFT

SCATTERED throughout the world are numerous modellers who make an invaluable contribution towards the Meccano hobby by building either for exhibitions, or for display in local dealers' windows. Needless to say, these modellers are always looking for suitable display models to build and so I am particularly pleased to feature here the Automatic Chairlift illustrated in the accompanying photographs. This is ideal for display and, in fact, it was designed for that very purpose by Mr. Harold Taylor of Huddersfield—the man to whom Meccano Magazine has been indebted for most of our models for longer than I can remember.

To be effective, a display model obviously requires movement and yet, at the same time, it needs to be sufficiently simple in operation to stand up to continuous running for long periods at a time. In ths case ample movement is present, supplied by six chairs, or "cupolas", moving non-stop up and down an inclined rail, together with a lift at the end of the model which automatically ascends and descends in its shaft, and the fact that the actual model illustrated was displayed for several weeks in a Huddersfield store is sufficient proof that it will run continuously. It therefore qualifies as an ideal Meccano demonstration unit.

Although a large model, construction is not particularly complex. A long rectangular base is built up from two 39½ in. compound angle girders 1 connected at the ends by 9½ in. Angle Girders 2, each compound girder consisting of a 5½ in., a 24½ in. and a 12½ in. Angle Girder, bolted together. Counting from one end, the compound girders are further connected through their fifth, fifteenth, and twenty-third holes by additional 9½ in. Angle Girders, numbered 3, 4 and 5 respectively, while counting from the other end, the seventh and fifteenrh holes are joined by 9½ in. Girders 6 and 7.

Before going any further with the main framework, the chairlift supports and runners should be built. Two vertical 12½ in. Angle Girders 8, each extended one hole upwards by a 1½ in. Angle Girder, are bolted through the seventh and thirteenth holes of Angle Girder 4, two more 12½ in. Angle Girders 9 being bolted through the corresponding holes of Girder 5. At the other end of the model, the corresponding holes of Girder 7 receive two 8 in. compound angle girders 10 (each built up from a 5½ in. and a 4½ in. Angle Girder), while two 7½ in. Angle Girders 11 are bolted to Girder 6. Now secured to the upper ends of these vertical Girders are two 32½ in. compound angle girders 12, each compound girder projecting four holes past Girder 8 and three holes past Girder 11. Note that the Girder 8 securing Bolt also helps to hold a 1½ in. Corner Bracket 13 in position. The compound girders themselves are each built up from a 24½ in. and a 12½ in. Angle Girder and are joined together a little below centre by a 3½ in. Strip 14.

Turning to Corner Bracket 13, the upper two Bolts fixing this to compound girder 12 also fix a 1 in. Corner Bracket 15 in position as shown, the free hole in this Bracket serving as a bearing for a 5 in. Rod held in place by a Collar and a 1½ in. Pulley 16. Mounted on the centre of this Rod is a Worm Gear which meshes with a ½ in. Pinion on a 3½ in. Rod 17, held by Collars in the centre hole of a 3½ × ½ in. Double Angle Strip, bolted between the lower corners of Corner Brackets 13, and in two 3½ in. Strips bolted one on top of the other between compound girders 12. Note that the Double Angle Strip is angled to lie parallel with the 3½ in. Strips, thus ensuring that the Rod is at right-angles to compound girders 12. A 6 in. Pulley 18 is fixed on the upper end of the Rod.

At the lower end of the assembly another 6 in. Pulley 19 is fixed on a 3½ in. Rod held by Collars in two more 3½ in. Strips, bolted between the fourth holes of girders 12, and in a 3½ × ½ in. Double Angle Strip bolted between the third holes down of Angle Girders 11. A tight loop of very stout cord or string is then passed round this Pulley and Pulley 18.

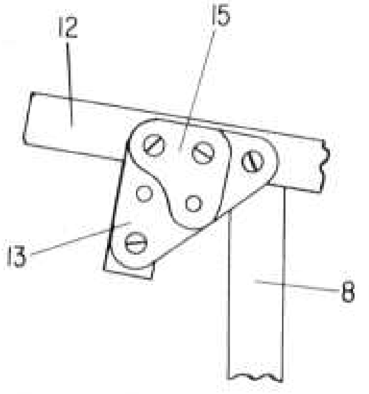
The actual rail 20 on which the cars run is built up from a selection of suitable Flat Girders, bolted together and shaped as shown.

It is of course an "endless" rail, with a circumference of 79 inches, and is attached to compound girders 12 by six 1½ × ½ in. Double Angle Strips (three at each side), each bolted to a 2 in. Strip 21 secured to one or other compound girder 12.

Now bolted to compound angle girders 1 through their end and nineteenth holes are four vertical 18½ in. Angle Girders 22, connected together to form a square at the top by four 9½ in. Strips 23, the securing Bolts along three sides also holding a 9½ in. Braced Girder in place. Note that the front Strip and Braced Girder is not bolted direct to respective Angle Girders 22, but to two 4 in. compound strips 24, attached to the Angle Girders by Angle Brackets. The Braced Girder is extended downwards by a 9½ × 2½ in. Strip Plate 25, the lower edge of which is overlaid by a 9½ in. Strip and bolted to a 9½ in. Angle Girder also attached to Girders 22 by Angle Brackets. Further similar Strip Plates are bolted between side Girders 22, the lower edges of these also being overlaid by 9½ in. Strips. In addition, a 9½ in. Angle Girder 26 is bolted between each pair of side Girders, through their fourth holes down, these Girders at each side being connected through their sixth holes by another 9½ in. Angle Girder 27. Three 9½ × 2½ in. Strip Plates are also bolted between the Girders, as shown, to form a floor area.

Turning to the base, a 2½ × 2½ in. Flat Plate 28, extended one hole inwards by a 2½ in. Flat Girder, is bolted to the centres of Angle Girders 3 and 2. Also secured to these Girders by Angle Brackets are four 24½ in. Angle Girders 29 serving as the lift shaft. These Girders are connected at the top by a 3½ × 2½ in. Flanged Plate, while a 5½ × 3½ in. Flat Plate 30 is bolted to the front pair of Girders and a 12½ × 2½ in. Strip Plate 31 to each side pair of Girders. In addition, each front Girder is connected to nearby Strip 23 by a 3½ in. Flat Girder 32, to which a 3 × 1½ in. Flat Plate is bolted to provide a safety barrier. A 3 in. Stepped Curved Strip is bolted to the lower edge of Plate 30 to serve as a door arch, the securing bolt also holding a 1 × ½ in. Reversed Angle Bracket in place to serve as a lift "stop".

The lift itself consists quite simply of two 2½ × 1½ in. Flanged Plates connected together by two 2½ × 1½ in. Flexible Plates, with the remaining space being enclosed by two 2½ × 2½ in. Flat Plates 33, one at each side. Before finally enclosing the space, however, two Handrail Supports 34 are secured, one through the second row centre hole of each Flanged Plate. A length of Cord is tied to the lower of these and is taken down and around a 1 in. Pulley 35 on a 5½ in. Rod journalled in a 3½ in. Angle Girder, bolted between the thirteenth holes of inner Girders 29, and in a 3½ in. Strip bolted between outer Girders 29. The Rod is held in place by a Collar inside the Strip and a 1 in. Pulley fitted with a Rubber Ring outside the Strip. Free on the Rod, but held in contact with the Rubber Ring by a Compression Spring held by a Collar, is a 1½ in. Pulley 36, this arrangement serving as an efficient friction clutch.



The Cord is now taken up and threaded through the appropriate holes in the Flanged Plates of the lift, then continued upwards and over another 1 in. Pulley on a 3 in. Rod held by Collars in Plate 30 and in a 3½ in. Strip 37, bolted to rear Girders 29. From there, it is taken down and finally tied to a 2½ in. Driving Band attached to upper Handrail Support 34. The Cord, of course, must be pretty taut to prevent it slipping on the 1 in. Pulleys. Guide rails for the lift are provided by tight lengths of Cord running between Flat Plate 28 and the Flanged Plate at the top of the shaft, the Cords passing through the centre end holes of the Flanged Plates in the lift.

The drive system, cupolas, etc., and further photographs will appear in Part Two in the next issue.

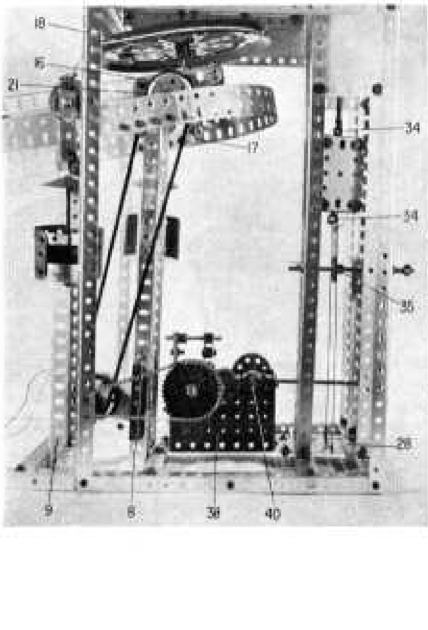
Opposite page, left, this Automatic Chairlift makes an excellent model for display at Exhibitions, or in dealers' windows.

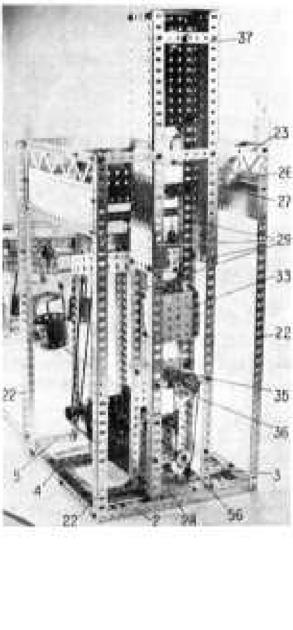
Opposite page, right, the automatic reversing gearbox which controls lift movement.

Top of this page, a diagram (not to scale) showing the top mount for the upper chairlift drive pulley.

Right, a side view of the taller tower showing the upper end of the chairlift rail and the position of the automatic reversing gearbox.

Far right, a rear view of the taller tower showing the assembly of the lift shaft.





GLOBE-TROTTER CONTEST

MODELLERS! Don't forget the current Meccano Globe-Trotter Competition. You still have a chance to win a trip for two to almost anywhere in the world, or maybe one of the 50 runners-up prizes of a No. 5 Meccano Set, or the equivalent in Meccano Parts! Time is advancing, though, so if you haven't already started, now is the time to get down to some serious model-building.

The Competition is open to any U.K. resident aged 16, or under. All you have to do is think of somewhere in the world you would like to visit, then build a model associated with that place out of Meccano. Anything appropriate will do such as the Brooklyn Bridge for New York, the famous Viennese Big Wheel for Vienna, a Hydrofoil for the Caribbean or Baltic, and so on. The only stipulation is that the chosen place must be on or near a B.O.A.C. air route as the winner will be flown out there in style on a B.O.A.C. Earthshrinker Jet—staying in luxury accommodation with all expenses paid!

The model itself must be built out of Meccano parts, although non-Meccano "incidental extras" may be used provided they represent only minor constructional features which cannot otherwise be reproduced using standard Meccano parts. No limit—maximum or minimum—is placed on the number of parts which may be used, or the number of entries submitted, but judging will be based on realism, inventiveness and ingenuity so that a small well-built model will stand just as much chance of success as a giant complicated structure.

HOW TO ENTER

Having built the model, send a photograph (or photographs) of it, together with an official Entry Form and brief description, to Globe-Trotter Competition, Meccano (1971) Ltd., Binns Road, Liverpool L13 1DA. Under no circumstances may the actual model be sent, although it should be available for inspection in the event of the builder winning a prize. Where more than one entry is submitted, each individual entry must be accompanied by a separate Entry Form.

Entry Forms are available from Meccano dealers only, and, *before a Form is supplied, entrants must have purchased or had purchased for them, Meccano goods to a minimum value of 39p.* The Form must be stamped or signed by the dealer concerned to confirm that the purchase has been made. Full conditions for entry are printed on the Entry Form and all competitors automatically agree to abide by these conditions when they enter the contest.

CLOSING DATE

The Competition closes on 30th June, 1972.

AMONG THE MODEL BUILDERS (*Continued from page 277*)

self said of this model only recently, "Although I later built bigger, or more attractive, or perhaps better models, I nevertheless consider this model the chief work of my Meccano activities". It took him two years to perfect, but I remember that the result was well worth the effort.

As many readers will know, one of Mr. Konkoly's specialities is in the realm of mechanical designing machines—Meccanographs and the like. At least two examples have been featured in the M.M. and, of these, one was displayed on the Meccano Stand at a Toy Fair in Milan, Italy, while the other, a Spiralograph, was shown on the Meccano Magazine Stand at the 1967 Daily Mail Boys and Girls Exhibition held at Olympia, London. In the 1965–67 period Mr. Konkoly developed three other designing machines, a "Robotgraph" for world-wide industrial use, a "Polydesigner" as a teaching aid for schools, or for tracing out patterns, and a "Minigraph" which traced out toys. Of these, the Robotgraph received a large Gold Medal at the 1969 International Fair in Vienna, while the Minigraph, appropriately, received a small Gold Medal at the Invention Pavilion of the 1971 International Fair in Brussels, where all three models were exhibited.

In the course of his hobby, Mr. Konkoly has done a great deal to publicise Meccano and Meccano Magazine, the exhibition displays accounting for only part of it. At home in Hungary, for example, he has appeared on television a number of times, demonstrating many different models and mechanisms, and both he and his models have often been reported in Hungarian newspapaers and magazines.

Needless to say Andreas spends a good deal of his spare time model-building and he is at this moment working on plans for several typically unusual constructions—including a Meccano Snake! (This I must see!) Andreas likes to keep abreast of news and events in the Meccano world, of course, and it is clear that he is familiar with the work of fellow enthusiasts around the globe. In fact, in the biographical notes he sent me, he paid tribute to many modellers in several countries, by name, and although this is not the place to list them, I can say that I fully agree with him.

One final word of praise must go to Mrs. Konkoly who, since her wedding in 1949, could be forgiven for thinking that she had married a Meccano Set! The fact that Andreas has managed to produce so much means that he builds with her blessing!