MECCANO® Magazine

MAY 1972 VOLUME 57 NUMBER 5
Meccano Magazine, founded 1916

Editorial Director
D. J. LAIDLAW-DICKSON

Managing Editor
V. E. SMEED

Consulting Editor for MECCANO
J. D. McHARD

Advertisement Manager
ROLAND SUTTON

MAP **HOBBY MAGAZINE**

ABC

FRONT COVER

Stephen Archibald's catapult gliders are capable of fast and exciting flights despite their cheapness and simplicity.

NEXT MONTH

Airships and Dolphins are two subjects among next month's interesting (and dare we say educational!) articles. A full-size plan will appear as usual.

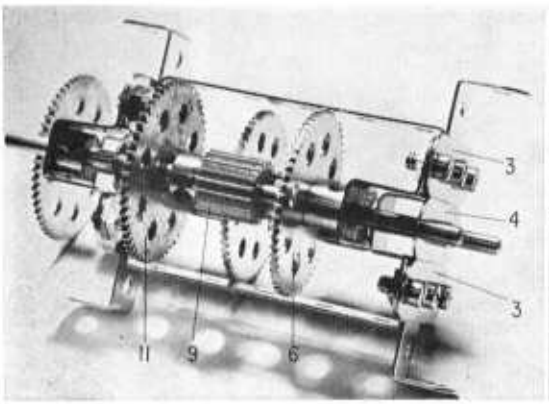
Advertisements and Subscription Offices: Model & Allied Publications Ltd., 13-35 Bridge Street, Hemel Hempstead, Hertfordshire. Tel.: Hemel Hempstead 2501-2-3.

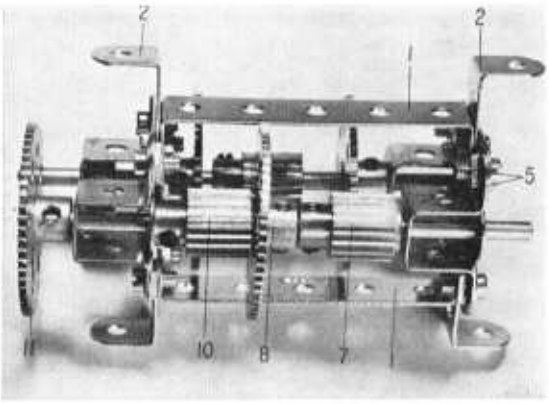
Second class postage rates paid at New York, N.Y. Registered at the G.P.O. for transmission by Canadian Post American enquiries regarding news stand sales should be sent to MECCANO MAGAZINE, Eastern News Distributors Inc., 155 West 15th Street, New York, N.Y. 10011, U.S.A. U.S.A. and Canada direct subscription rates $6 including index.

Publishers of Aeromodeller, Model Boats, Model Cars, Model Engineer, Radio Control Models, Model Railways, Scale Models, Woodworker, Military Modelling.

CONTENTS

MODEL & ALLIED PUBLICATIONS LTD.
13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTFORDSHIRE





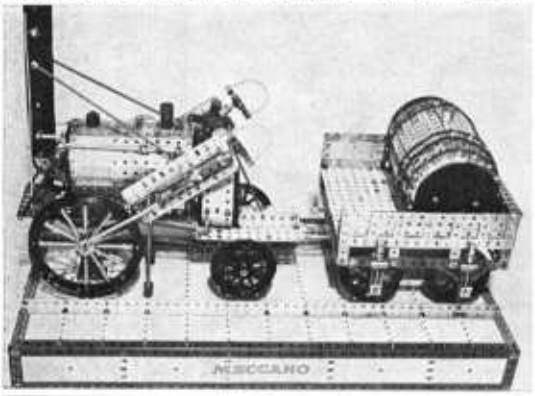
AMONG THE MODEL BUILDERS *with Spanner*

THIS month, I am afraid, I must abandon my usual practice of writing a few introductory words of general comment. We have quite a few things to cover, so rather than waste space, I would like to get straight down to business with the Reduction Mechanism illustrated here. Based on a design by Mr. N. Muallem of Ramat-Gan, Israel, it is an extremely compact unit offering a ratio of 27:1 which could be very useful where a steady but slow speed is required.

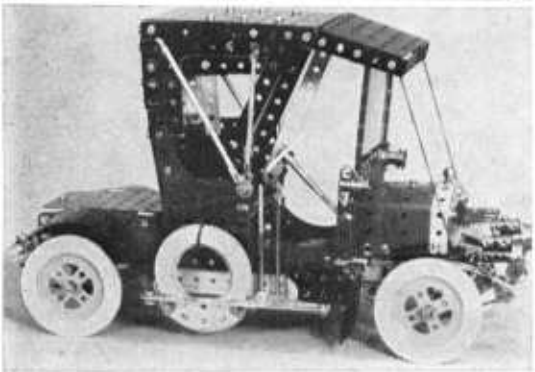
A simple framework is built up from two horizontal 2½ × ½ in. Double Angle Strips 1, connected together as shown by two similar Double Angle Strips 2, vertically-mounted, the securing Bolts in each case also holding two horizontal 1½ in. Strips 3 in position. A third 1½ in. Strip 4 is bolted to the Double Angle Strip, in between the first two Strips, then two Double Bent Strips 5 are secured to Strips 3, one each side of the Double Angle Strip.

Journalled in Strip 4 and one Double Bent Strip 5 at one end is a 2 in. Rod carrying a 57-teeth Gear 6, a 2½ in. Rod in the other Strip and Double Bent Strip carrying a ½ × ½ in. Pinion 7 and a 57-teeth Gear 8. Each Rod is then inserted, free, half-way in the bore of a ½ × ½ in. Pinion, numbered 9 on the first Rod and 10 on the second, Pinion 9 being fixed on the end of a 2 in. Rod and Pinion 10 on a 1½ in. Rod. These last Rods are journalled in Strip 4 and Double Bent Strips 5 at the other end of the framework, both Rods also carrying a 57-teeth Gear 11, positioned as shown. The 2 in. Rod is held in place by a Collar.

Input drive to the mechanism is taken to Gear 11 on the 1½ in. Rod, while the Rod carrying Gear 6 serves as the output shaft. The input Gear, of course, could be replaced by any suitable connecting link, while the lengths of the input and output shafts under operation conditions would depend on the particular uses to which the mechanism was put. The unit as a whole, of course, is a compound gear train, made up of three 3:1 ratios, thus giving a reduction of 27:1 between input and output.



Heading photos, an extremely compact 27:1 Reduction Mechanism, based on a design supplied by Mr. N. Muallem of Ramat-Gan, Israel.



Left, George Stephenson himself could not fail to admire this excellent model of his famous "Rocket" locomotive, built by Mr. C. Potter of Chatham, Kent.

Bottom left, another superb model by Mr. Potter is this detailed veteran, reproducing a 1904 Singer in feature and a atmosphere.

PARTS REQUIRED

6—6a	3—26a	1—38
1—16a	4—27a	4—45
2—17	14—37a	4—48a
1—18a	14—37b	1—59

Ratchet Mechanism

Moving on, we come next to a built-up ratchet mechanism, developed as an exercise by one of our own staff to incorporate the new Cam. Admittedly, as a built-up unit, it is more expensive than the Ratchet Wheel and Pawl in the standard Meccano Part range, but it still makes an interesting item worthy of mention here.

A 1 in. Double Bracket 1 is pivotally mounted by its lugs on a 1½ in. Bolt secured in a Face Plate 2. One end of a Tension Spring is also carried on the Bolt, this Spring being stretched over a ½ in. Double Bracket 3, fixed to the Face Plate, and its other end held on a ¾ in. Bolt fixed by Nuts in the Face Plate. The Face Plate itself is mounted free, on a Rod, being held in place by a Collar on one side and a Cam 4 on the other. The action of the Tension Spring on Double Bracket 1 holds the Bracket in contact with the Cam and thus, because of its shape, the Cam is permitted to revolve only one way.

As already mentioned, the mechanism was developed as an exercise, without too much thought to cost. The cost could be reduced, however, by substituting a Driving Band for the Tension Spring and a ½ in. Bolt for Double Bracket 3, but the following Parts List applies to the unit as illustrated.

PARTS REQUIRED

1—11	7—37 b	1—59
1—11a	1—38	1—109
1—37a	1—43	1—111
		1—111d
		1—131

Stephenson's Rocket

For more general interest, now, I would like to draw attention to the accompanying photograph of that most famous of steam locomotives, Stephenson's "Rocket", modelled for us here by Mr. C. S. Potter of Chatham, Kent. The "Rocket" has, of course, been modelled many times in Meccano and Mr. Potter certainly does not claim his version to be the finest example ever built. In fact, he makes no claims at all, but I, on his behalf, would like to say that, although Mr. Potter's model might not be the finest ever built, it is certainly amongst the best I have ever seen modelled in Meccano.

"The reason for making the Rocket", writes Mr. Potter, "was to get away from the usual method of producing large wheels from Hub Discs. I have built them up from Circular Girders, with Axle Rods providing the correct number of spokes and being held on the outside of the wheel by Rod and Strip Connectors. The centres, when adjusted correctly, are clamped between ¾ in. Washers, while the flanges are formed from 2½ in. Curved Strips.

"As is clear from the photograph, the smaller wheels are standard Spoked Wheels, their flanges being supplied by 2½ in. Stepped Curved Strips gripped on the wheels by Angle Brackets. The boiler is formed from overlapping 5½ in. Strips, bolted to Strip Plates then held neatly in place between two Ball Thrust Race Flanged Discs, all secured in position by one Screwed Rod running through the centre. All the locomotive wheels are sprung, as also are those of the tender, while motive power is supplied by an E15R Electric Motor driving the model through Sprocket Wheels and Chains. Screwed Rods played a big part in helping me to keep the model to scale and to make it more realistic."

The excellent standard of realism Mr. Potter has achieved is perfectly clear from the photograph and, having studied it, I think all readers will agree with my own earlier comment on the model. However, just in case anybody should think that the "Rocket's" realism was achieved more by accident than design, I also feature a photograph of another and equally realistic example of Mr. Potter's skill. Veteran car enthusiasts will immediately recognise the model in question as a 1904 Singer. I am not that much of an expert myself, but I have before me an illustration of the real car and I can assure you that the model is a superb reproduction, not only capturing all the lines of the original, but also its atmosphere as well. It serves as a perfect tribute to Mr. Potter's skill.

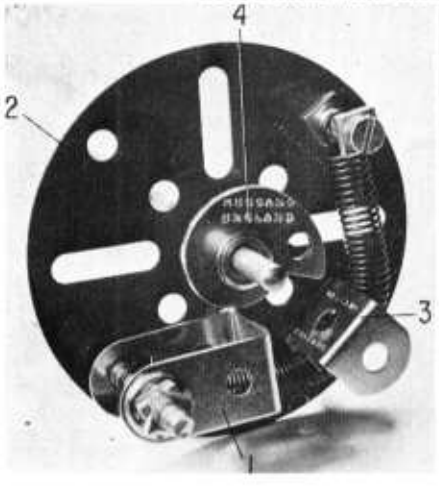
I know of many Meccano modellers who will already be itching to build the Singer, so, before dashing off any urgent entreaties to me for information, take note—I have no additional photographs of the model, or more detailed information. Sorry! Cruel of me to whet your appetites, I know, but can anybody really blame me for showing such a marvellous model?!

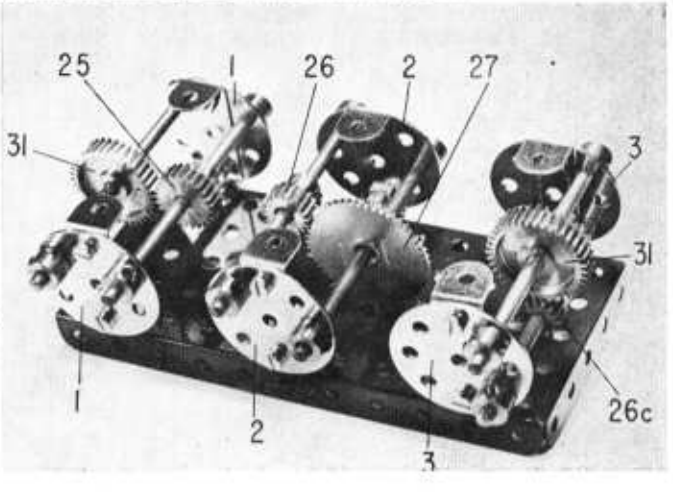
New Club

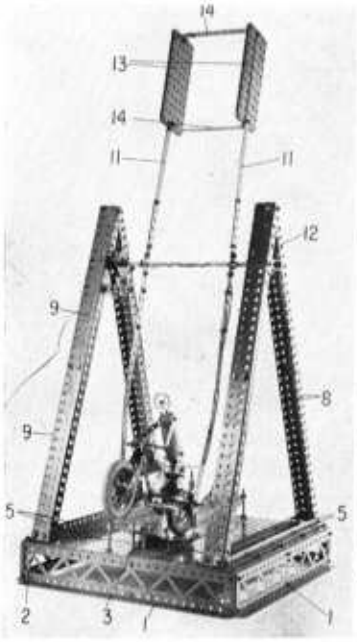
Before leaving Mr. Potter, I have one more very important piece of

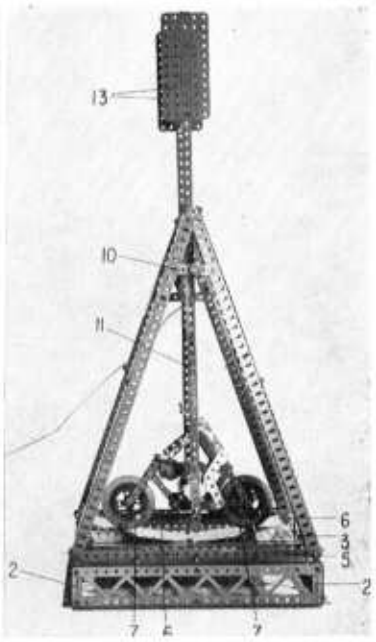
(*Continued on page* 240)

Left, a simple, but effective Ratchet Mechanism, built up as an exercise to illustrate the use of the new Cam. Right, ten-year-old Stevenage Meccano Club member Geoff Long gets full credit for this demonstration mechanism which shows how "odd" Meccano gears can be made to mesh by using Wheel Discs for journals.









CENTRIFUGAL MOTOR CYCLIST

"A thoroughly enjoyable fun-piece" says Spanner

Spanner thinks that this is one of the most appealing "fun" models he's seen for a long time. The two views on the left give a hint of its function. Note the curved shape of Strip Plate 6.

WHEN I was first presented with the model featured in this article, I was puzzled. I could see it was some sort of motor-cycle. But, at first glance it seemed to have an exceedingly large framework for such a small—if realistic—presentation. At this stage, the motor-cycle was locked in position and consequently didn't appear to do anything in particular. I must admit I then made the classic mistake of pre-judging the model before having it explained to me: I was unimpressed—which just goes to show how wrong you can be! In due course, our builder released, not the motor-cycle, but the counter-weighted arm on which it was mounted, coupled up a power unit and proceeded to give me a working demonstration of one of the most appealing "fun" models I have seen for a long time. In very short order, he had me utterly captivated by the sight of his Centrifugal Motor-cyclist, as he called it, whirling round in a spinning vertical circle, controlled by a few skilful "bursts" on his power unit throttle. "A must for the Mag.", I thought, and now here it is!

Framework

Needless to say, with the spinning motorbike feature of this model, a really strong and rigid framework is required to carry it. A fairly heavy base is therefore built up from four 12½ in. Angle Girders 1, arranged in a square and connected together by being bolted to four vertical corner posts 2, supplied by 2 in. Angle Girders, the securing Bolts helping to hold four 12½ in. Braced Girders in position, as shown.

Another square, built up from four 12½ in. Angle Girders, is bolted to the top of the corner posts, the Braced Girders also being secured to this, then the whole top of the base frame is covered in by eight 5½ × 3½ in. Flat Plates and three 5½ × 2½ in. Flat Plates 3, all overlapping each other as required, with the smaller Plates 3 running in a centre strip from one side of the upper square to the other. Note that the ends of this "strip" are attached to the Girders, not by Bolts, but by 2 in. Screwed Rods 4, held in the Plates by Nuts, and note, too, that some of the other Plate fixing Bolts also hold four additional 12½ in. Angle Girders 5 in position, these being arranged in two pairs of two at parallel edges of the frame, with the Girders in each pair separated by a distance of three clear holes.

Secured by Nuts and Washers between the upper ends of Screwed Rods 4 at each side is a 12½ × 2½ in. Strip Plate 6. Taking full advantage of its slotted holes, this Plate is carefully curved so that its centre touches the Flat Plates, to which it is bolted, the curve being held between the centre and the ends by lock-nuts on 1½ in. Bolts 7 passed up through the Flat Plates and through the sixth holes from each end of the Strip Plate. Adjustment of Strip Plate height and curvature may be necessary at a later stage.

Two triangular mountings for the motor-cycle arm are next each built up from two compound channel girders each consisting of two 18½ in. Angle Girders 8 connected together to form the channel by two 9½ in. Flat Girders 9, using the circular-hole flanges of the Angle Girders. The upper ends of the channel girders are simply bolted together, while their lower ends are secured to the ends of Angle Girders 5 on the base. Bolted between the flanges of each pair of channel girders, seven holes from the top, are two 2½ in. Strips 10 which will later provide the bearings for the revolving arm pivot.

Revolving Arm

The revolving arm, itself, is produced from two 27 in. compound strips 11, each built up from a centre 7½ in. Strip extended 19 holes upward by a 12½ in. Strip and 20 holes downwards by another 12½ in. Strip. (For description purposes, I am regarding the lower end of the arm as that to which the motor-cycle will be fitted.) A Double Arm Crank 12 is bolted to the Centre of each 7½ in. Strip.

Counterweights to balance the motor-cycle must of course be provided at the upper end of the arm and, on our model, we found that twelve 4½ × 2½ in. Flat Plates 13 worked out splendidly. These are bolted—half each—to strips 11, the securing ½ in. Bolts also fixing two 4½ × ½ in. Double Angle Strips 14 between the Plates.

Motor-cycle

Turning, now, to the motor-cycle, this is built up round a

Meccano 3–12 volt Motor with Gearbox, as can be seen from the illustrations. Two Fishplates are first bolted to the top of the moulded base of the Motor, one each side, using the holes nearest the Gearbox end, then a Double Bracket 15 is fixed to the free end of each Fishplate. Secured to the lugs of the forward Double Bracket, not by Bolts, but by Nuts on a 3 in. Screwed Rod 16, are two 2½ in. Narrow Strips 17 angled upwards to serve as part of the frame. Bolted to the end of these Strips are two 3 in. Narrow Strips 18, serving as the front forks, the securing Bolts passing through the second holes of the Strips and also fixing in place between the Strips a Double Bracket 19 with its lugs extended by Fishplates to strengthen the upper part of the fork assembly. The upper ends of these Fishplates and Strips 18 are connected by a Large Fork Piece 20, the securing Bolts in this case also holding two 4½ in. Narrow Strips 21 in position to form the crossbar. The handlebars are simply supplied by a 2½ in. Stepped Curved Strip bolted to the boss of the Fork Piece.

Secured to the lugs of rear Double Bracket 15, again using Nuts on a 3 in. Screwed Rod 22, are four 2½ in. Narrow Strips arranged in two pairs, 23 and 24. Pair 23 project horizontally rearwards, while pair 24 project diagonally upwards, their upper ends being bolted, along with two more 2½ in. Narrow Strips 25, to the rear ends of crossbar Strips 21, the securing Bolts also fixing a Double Bracket between Strips 21. A Flat Trunnion 26 is bolted to the back of this Double Bracket to serve as the seat. The crossbar Strips are further connected through the fourth holes from the rear by another Double Bracket, while the fuel tank is represented by two 2½ × 1½ in. Triangular Flexible Plates 27, curved to shape and bolted to an Angle Bracket fixed to the crossbar.

The lower end holes in Strips 25 coincide with the end holes in Strips 23 to provide bearings for the rear axle: a 2 in. Rod held in place by Collars outside the Strips and carrying a Collar and a 2 in. Pulley with Motor Tyre between the Strips. A Cone Pulley 28 is fixed on the end of the Rod, the smallest pulley of the Cone being connected by a 6 in. Driving Band to a ½ in. Pulley on the Motor output shaft. The front wheel is supplied by another 2 in. Pulley with Motor Tyre, mounted, along with a Collar, on a 1½ in. Rod, journalled in the end holes of the front fork Strips.

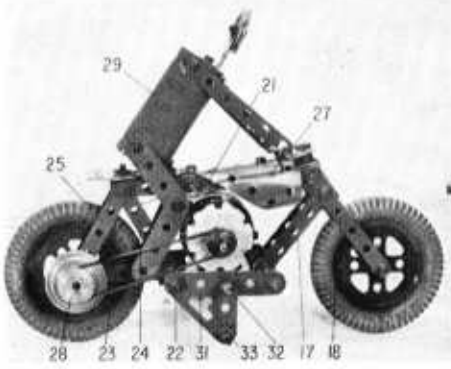
Above, a close up-view of the motor-cycle as it "climbs" upwards off its track. Below, the realistic features of the motor-cycle show up well in this view of the machine, removed from its rotating arm.

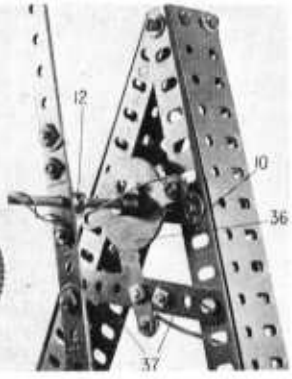
This brings us to the motor-cyclist himself, and construction again is easy. His body consists of two "U"-section Curved Plates 29, bolted together, with two 3 in. Narrow Strips for arms and two 2 in. Strips, bolted together at an angle, for each leg. The head is a 1 in. Pulley without boss 30, fixed to the long lug of a 1 × ½ in. Angle Bracket which is in turn fixed to an ordinary Angle Bracket bolted inside the upper edge of front Curved Plate 29. This latter Angle Bracket is spaced from the Plate by three Washers on the shank of the securing ¾ in. Bolt. The completed rider is attached by the lower edge of front Plate 29 to an Obtuse Angle Bracket bolted to the apex of Flat Trunnion 26, his arms being secured by short lengths of Cord to the handlebars of the bike.

Fixing points to enable the bike to be attached to the rotating arm are now provided. At the right-hand, or Motor output side of the model, a 2½ in. Strip, overlaid by a 1½ in. Corner Bracket 31, is fixed by Nuts on the ends of Screwed Rods 16 and 22. Note that the Corner Bracket is secured to the centre of the Strip by a ¾ in. Bolt 32, shank outwards, another similar Bolt 33 being fixed in the lower corner hole of the Bracket.

At the opposite side of the model, a 2½ in. Strip 34 is held by Nuts on the other ends of Screwed Rods 16 and 22, a 2 in. Screwed Rod 35 being fixed by Nuts in the centre hole of this strip. The lower ends of compound strips 11 of the revolving arm are then curved inwards to the desired shape and the completed motor cycle is then fixed to the arm by locking the strips on Bolts 32 and 33 and Screwed Rod 35, using Nuts in the ordinary way.

With all stationary parts tightly bolted together to ensure rigidity the arm is now mounted in the framework by means of an 11½ in. Rod fixed in Double Arm Cranks 12 and journalled, free, in Strips 10, being held in place by Collars. Also fixed on the Rod is a Flat Commutator 36 (Electrical Part No. 551), in contact with which is a 2 in. Wiper Arm (Electrical Part No. 533). This Wiper is bolted to two 2½ in. Insulating Strips 37 (Electrical Part No. 502), fixed to nearby Angle Girders 8 of the frame through their tenth holes.





Right, another view of the motor-cycle and rider, removed from the rotating arm. The realistic proportions have been achieved by the use of Narrow Strips for the motor-cycle frame. Far right, the apex of one of the triangular mounts, showing the Commutator and Wiper Arm used to take power to the motor-cycle.

All that now remains to be completed is the wiring. The Motor leads are threaded up nearby strip 11 of the arm and wrapped around the 11½ in. Rod. One lead is then earthed by connecting it to one of the bolts in nearest strip 11, while the other lead is connected to one terminal of Commutator 36. Of the leads from the power source, one is connected to the Wiper Arm engaging with the Commutator, while the other is also earthed by connecting it to the frame.

Provided the model is built from current zinc-plated parts, no electrical circuit problems should arise. but if old enamelled parts are used, care must be taken to ensure that the earthed leads make proper contact with bare metal—even if it means removing some enamel. It would also be necessary to remove the enamel from inside the holes in which the 11½ in. Rod is journalled, otherwise the paint might insulate the Rod from the frame and thus prevent a complete circuit.

Operating the Model

Once the model has been built, some adjustments may be required before full-scale operation can begin. The revolving arm, for example, must turn freely, with minimum friction, and it should be fairly well-balanced, although perfect balance is not required. In fact, the motor-cycle must be slightly heavier than its counterweight to ensure that, without power, it will return to its track, i.e. to Strip Plate 6. Most important of all, however, the wheels must make contact with the full length of Plate 6, during operation, and they must do so with just the right amount of pressure—not so lightly that they hardly provide adhesion and yet not so heavily that the friction reduces performance. The height and curvature of the Plate can be altered, as required, by adjusting the fixing Nuts on Screwed Rods 4 and Bolts 7.

Operation itself is not simply a question of switching the motor "on" and watching the model whirl into action. It won't happen! The motor drives only the motor-cycle, therefore this machine must be skilfully manoeuvred until it gains sufficient momentum to "push" the revolving arm through a complete circle and, once done, to keep it spinning for as long as desired. To achieve this, a reversible power source is required, such as a Meccano Battery Box, or a suitable model railway power control unit. Failing this, a reversing switch in the power feed circuit would serve the same purpose, Model No. E3 in the Meccano 4EL Manual being an example of such a switch.

With everything set up, the driving sequence starts with a burst of forward power to the model. This sends the motor-bike forward, off Plate 6 and into the air, but not, at this stage, high enough to "go over the top". Power is cut as soon as the bike is clear of the Plate. Because the bike is heavier than its counterweight, it will swing backwards once its forward movement is exhausted. As soon as its back wheel contacts Plate 6—or slight beforehand—reverse power is fed to the model which, of course, boosts the bike backwards off the Plate. Power is again cut when the bike is clear and again, it will not yet have sufficient momentum to go over the top so and will swing downwards and forwards, As it hits the Plate another burst of forward power is applied and so on, backwards and forwards until the bike does go right over the top in a complete forward circle. From then on, short bursts of power as the bike crosses Plate 6 will keep it spinning indefinitely.

To stop the model, it is sufficient simply to keep power off, as the "dead" motor will act as a brake, but increased braking can be achieved by reversing drive at the appropriate moments. Starting or stopping, however, this model stands out as something really different and I, for one, can recommend it as a thoroughly enjoyable "fun-piece". Meccano Clubs, particularly, may like to study it, as it strikes me as being especially suitable for exhibitions, where members of the public are invited to "have a go". Purely an idea, of course . . .!

PARTS REQUIRED

4—1	1—17	12—70	1—133
2—1b	1—18a	2—80c	2—142a
6—5	2—20a	5—81	1—186a
4—6	1—22a	1—90a	1—197
8—7a	1—23a	4—99	2—199
13—8	190—37a	8—103a	2—222
4—9e	134—37b	2—111	8—235
4—10	50—38	2—111a	4—235a
5—11	2—48c	9—111c	2—235d
3—12	8—52a	4—111d	2—502
1—12b	3—53a	1—123	1—533
1—12c	8—59	1—126a	1—551
1—13	2—62b		

1—3-12 volt Motor with Gearbox.

AMONG THE MODEL BUILDERS (*continued from page 227*)

news to pass on to readers in the Chatham area. In January, Mr. Potter wrote to tell me that he and fellow enthusiasts in the area are forming a Meccano Club for adult enthusiasts over 15 years of age. Unfortunately, as I write this, I do not yet have any specific details as to Club title, officers, or venue, but Mr. Potter did tell me that, in the two months before he wrote to me, they were proving successful. Anyone interested in the Club should contact Mr. Potter at 8 Batchelor Street, Chatham, Kent.

Stevenage Club

Still on the subject of Clubs, I have received some further news of the Stevenage Meccano Club from Secretary, Mr. Dennis Higginson, 7 Buckthorn Avenue, Stevenage, Herts., who writes to tell me that 10-year-old member Geoff Long has developed an interesting way of meshing Part No. 25 with Part No. 31; Part No. 26 with Part No. 27 and Part No. 26c with Part No. 31. (Needless to say, these are parts which do not mesh together when standard Meccano spacing is used.)

I include an illustration of the demonstration mounting suggested to me and you will see from this that the secret of Geoff's success lies in the use of Wheel Discs—both 6-hole and 8-hole—for the Rod journals. By journalling the Rods carrying the gears in the Wheel Disc holes shown, the non-standard engagement can be achieved.

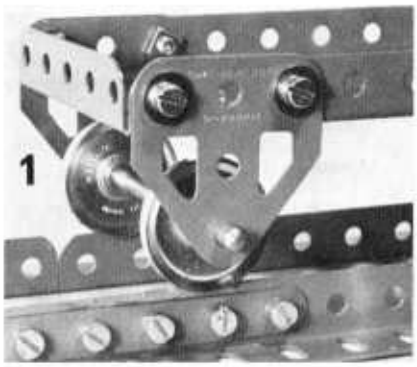
The demonstration mounting is simply produced from a 5½ × 2½ in. Flanged Plate, to which three pairs of 1½ × ½ in. Double Angle Strips are bolted to provide support for the Wheel Discs. Working from left to right, two 6-hole Discs 1 are bolted to the first pair of Double Angle Strips, two 8-hole Discs 2 to the centre pair and two more 8-hole Discs 3 to the right-hand pair. The left hand arrangement supports gears 25 and 31, the centre supports gears 26 and 27 and the right-hand supports gears 26c and 31, the particular holes used being clear from the illustration. Having myself built the unit illustrated from details supplied by Mr. Higginson, I can confirm that everything works as claimed and should consequently like to offer my hearty congratulations to young Geoff for his ingenuity. Well done!

Remaining with the Stevenage Meccano Club, I should like to close this month with an apology to Club member Peter Phillipson. Peter was mentioned in the January issue—only I referred to him as Phillip! My apologies, Peter.

MECCANO PARTS AND HOW TO USE THEM: No. 5

WHEELS and AXLES

BY B. N. LOVE



PROBABLY the greatest appeal of Meccano models lies in the manner in which they may be animated by mechanical movement. Having dealt with the basic components for frameworks, we may now turn to those parts which give us motion in our models, namely, wheels and axles. With more than a dozen lengths of Axle Rods in the system (apart from the special Pivot Rods among the Electrical Parts), the Meccano constructor has a wide range of spindles to choose from and an even greater variety of wheels. These latter include Pulleys, Bush Wheels, Road Wheels, Spoked Wheels, Flanged Wheels and, of course, the entire range of Gear Wheels, although these will be dealt with as a separate class.

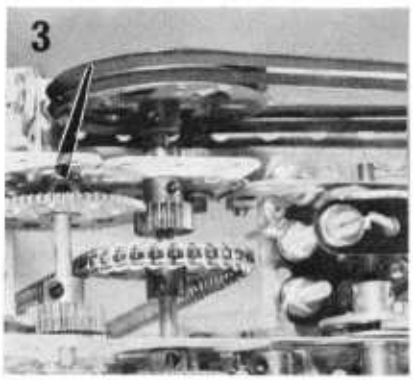
Once again, in using wheels and axles, the emphasis is on not taking things for granted. Both groups need looking after, as too many models are spoiled by bent shafts and distorted wheels, usually caused through rough handling or carelessness. Neither shafts nor wheels will stand up to excessive loads or abuse, but, properly used, they can carry substantial drives and surprising weights. Axle Rods should be carefully chosen whenever accuracy of running is required, especially in belt-driven or gear-driven mechanisms. Give these running parts a fair chance by lining up bearings with care and by seeing that the shafts turn without binding, or undue side play. Part of a simple four-wheeled truck shown in Fig. 1 demonstrates this principle. 1 in. Pulleys, mounted on 3 in. Axle Rods, are journalled in a pair of Flat Trunnions attached to the side of the standard Flanged Plate, but Washers are used under the Bolt heads for firm grip and the careful alignment of front and rear Axle Rods permitted this model to run on Girder rails.

Although not apparent from the illustration, each of the Axle Rods on the simple truck carry Washers between the Pulley Wheel bosses and the inside of the Trunnions. The principle is illustrated in Fig. 2 where a similar construction is used for a model tram. By inserting the Washers shown, the 'scrubbing' action of the Pulley Wheel boss against the Trunnion is very much reduced and, if a small drop of sewing machine oil is applied to the bearing, scrubbing, and subsequent scoring of enamelled surfaces, is almost eliminated. Both the Trunnion and the 2½ in. Stepped Curved Strip appear in the majority of Meccano Outfits, so are readily available for the journals shown in Figs 1 and 2.

The Pulley Wheel comes into its own when used for a belt drive, an outstanding example of which is illustrated in Fig. 3. In this instance two 2 in. Pulleys, Part No. 20a, are used to receive a belt drive in a fairground model, the doubling-up of the belts providing a very powerful drive. A full range of Rubber Driving Bands are provided in the Meccano system, ranging from 2½ in. to 20 in. in light and heavy gauge to suit a wide range of models and power requirements. The smaller and lighter bands, Part Nos. 186, 186a and 186b, are used in junior models with hand or clockwork drive, while the longer and heavy-gauge Bands, Part Nos. 186c, 186d and 186e may be used with electric motor drive in the heavier models.

Several advantages arise in using the Driving Bands. They enable moving parts located at a distance across the model to be coupled by Pulleys. They are silent in operation, have sufficient stretch to accommodate awkward shaft spacing, and a single twist in the loop of the Driving Band gives a reversal of drive.

When running models on rails, the Meccano Flanged Wheels, Part Nos. 20 or 20B, should be employed. These are wheels which can be easily put out of shape by carelessness or overloading, but it is a fairly simple matter to straighten them to run without wobbling. They should always be spun on an Axle Rod before use to ensure that they are running true or they will not give a level performance on rail-mounted models. Fig. 6 shows the larger Flanged Wheels as a pair, sandwiching a Wheel Disc to form a centre flanged wheel. This provides a very strong component for heavy



model cranes etc. and it will track on a hollow rail made from Perforated Strips and Angle Girders.

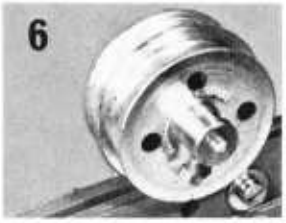
Fig. 4 shows an extension of this idea in which some of the 'disc' type wheels in the system are put to good use. In this case, a Face Plate, Part No. 109, forms a central flange and provides one boss with Grub Screw. Two Wheel Flanges, Parts No. 137 are clamped on either side of the Face Plate using an 8-hole Bush Wheel for extra rigidity. The hollow rail construction can be clearly seen in Fig. 4.

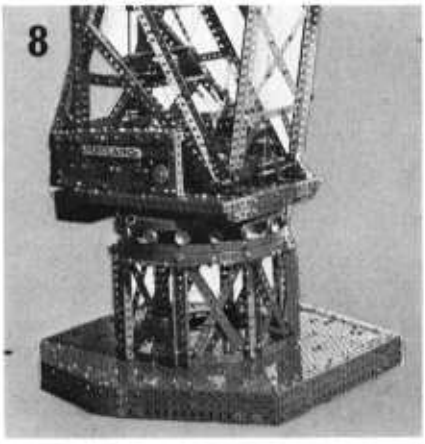
A further use of the Wheel Flange is shown in Fig. 5, where it is used to simulate the drum brake of a model motor cycle. This time, the 3 in. Pulley, Part No. 19b, is employed with the Meccano Motor Tyre supplied to fit this particular size of Pulley. The resulting combination is both neat and realistic.

Constructors who are fond of building vintage road vehicles have employed the 3 in. Spoked Wheel, Part No. 19a, to advantage. In Fig. 7 we can see an early and common use for the Spoked Wheel on the front axle of a model Traction Engine. Because of its smooth rim, it is not normally thought of as a suitable wheel for rubber-shod vehicles, but it has been used quite successfully in a number of vintage car and lorry models in conjunction with the 3 in. Motor Tyre. However, the Meccano Motor Tyres have central ridges moulded into them so that they locate positively in the Vee grooves of the Pulleys. In order to use the standard Meccano Motor Tyre with the 3 in. Spoked Wheel, it is therefore necessary first to remove this central ridge from the Tyre by means of a sharp-bladed modelling knife.

In many cases, modellers have preserved or inherited some of the earlier Meccano Motor Tyres, many of which have lost a degree of elasticity and have become slightly stretched so that they are no longer a good fit on the original 3 in. Pulleys. Such Tyres are ideal for trimming to fit the 3 in. Spoked Wheels, particularly if the vintage car model is to be exhibited as a "glass case" model and is not expected to do a great deal of running about. Good Tyres, carefully trimmed, can be made quite a tight fit on the Spoked Wheels and in this case, the model may be run in the normal manner.

Finally, Fig. 8 combines much of what this series has been about so far. The obvious Strip and Girder construction of the rugged base on the model of a French Floating Crane and the use of Flat Plates ties up the first four parts of the series and the neat application of the smaller Flanged Wheels for an elegant roller bearing gives a further application of our Wheels and Axles theme. We shall see these basic essentials occurring again and again through the discourse on various models and mechanisms so that we shall be able to revise and establish the use of Meccano Parts in each succeeding chapter. Part 6 will extend this idea with a discussion on simple gearing.





DINKY TOY NEWS (*Continued from page 225*)

incorporates, like the original, a 3-part telescopic jib fitted with simulated hydraulic rams. The jib is raised and lowered by a positive rack and pinion mechanism, controlled by a knurled handwheel at the left-hand side of the crane body. A ratchet mechanism is included in the movement to ensure that the jib remains in the chosen attitude under load, the ratchet being disengaged for lowering by pulling the control wheel outwards. Its shaft, incidentally, is spring-loaded so that the wheel is automatically pulled in to engage the ratchet, when released.

On the opposite side of the crane body is another knurled handwheel, controlling the load-hoisting cord. This does not incorporate a ratchet mechanism, but it does include a friction brake which effectively prevents the weight of the load unwinding the cord on its own. In fact, a simple test I have carried out as I write (pulling the cord by hand!) shows that the model will tip over before the cord unwinds without the control wheel being turned.

Thanks to its telescopic nature, the jib itself will extend from approximately 7 in. when closed to nearly 13 in. when fully extended. Extension is achieved by pulling the sections out by hand and care must be taken here that sufficient cord is first run out so that the load hook does not prevent the sections from being extended. The cord passes down the centre of the jib and the hook will thus foul the jib if the length of "free" cord available is less than the length by which the jib sections are to be extended. For travelling, the closed jib is lowered onto a special support bracket on the cab roof, the load hook being located on another special bracket projecting from the front of the chassis, beneath the radiator-grille. Projecting from the front of the crane body is a simulated spare wheel, incorporated in the body casting, but carrying a removable spare tyre.

As already mentioned, the Dinky is also fitted, like the original, with stabiliser legs to support it during

(*Continued opposite*)