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FRONT COVER

The original pithead gear of the De Beers diamond site at Kimberley, now preserved as a museum piece, is a "natural" Meccano subject (see page 61) *Photo by Alan Bolton*

NEXT MONTH

Full-size plans for a simple Messerschmitt Bf 109 control-line model will be a popular feature in the March issue.

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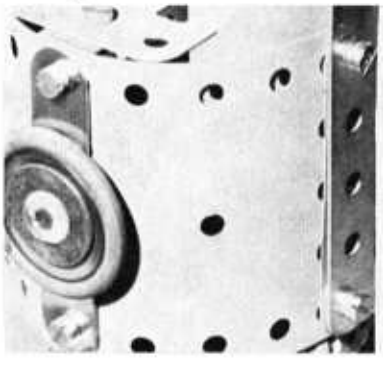
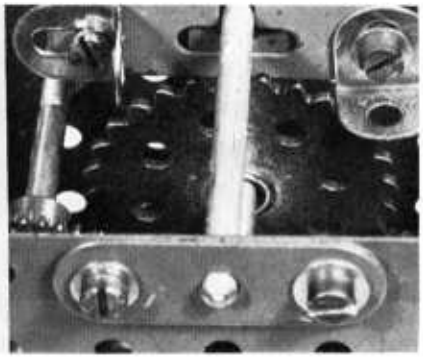




Far left, Fig. 3a
Left, Fig. 3b.
Bottom of page, left, Fig. 5a, and right, Fig. 5b

MECCANO PARTS AND HOW TO USE THEM

Part Two — The Perforated Strip

By B. N. Love

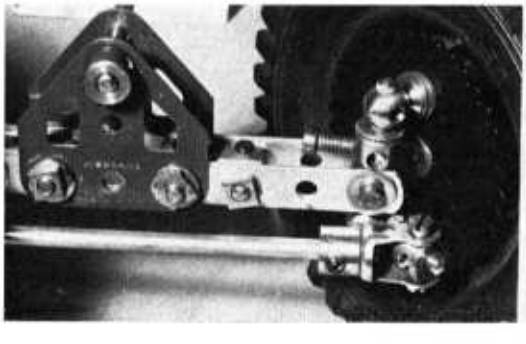
SO common is the Perforated Strip in the Meccano system that the majority of us take it for granted. Its elegant simplicity however, gives a solution to modular construction which taxed the brains of its inventor, Frank Hornby, to a considerable degree at the beginning of this century. His formula of using ½ in. stock material with ½ in. spaced holes has been a successful one for nearly three-quarters of a century and it has been avidly copied by many a competitor from 1901 until the present time.

Today we are bound up internationally with a decimal system and one might perhaps wonder if the pressures for metrication will oblige the Meccano factory to go over to centimetre dimensions. This would require the re-tooling of the factory at a quite uneconomical cost and it is significant that at least two of the continental manufacturers of competitive systems adhere rigidly to the original Frank Hornby module of ½ in. spacing. This format is likely to stay with us for a long period to come.

Steel for Perforated Strips is supplied to the Binns Road factory in coils of the correct width and thickness, or gauge, for the relevant length of Strip. Meccano Perforated Strips longer than 5½ in. are made from a thicker gauge of steel than those of 5½ in. and below. This gives the necessary strength to the longer components. Early parts were made from thin tinplate with folded edges to give the material some rigidity, but Frank Hornby soon realised the advantage of using steel strip for a superior product if it was to achieve world-wide fame and reliability. Squared ends on the first Perforated Strips represented a danger to young children and Frank Hornby put a curved end on the Strips before patenting his invention in the first decade of this century. Fig. 1a shows the early radius adopted and this is still in use today for the Perforated Strips of 7½ in. and longer. When re-designing the punch tools for the shorter Strips, a sharper radius was employed to give an elegant curvature to a right angled corner made up in Perforated Strips as shown in Fig. 1b.

As the popularity of Meccano spread, Frank Hornby was inundated with suggestions for improvements to his basic designs and an early improvement, almost from the outset, was the provision of slotted holes in various Meccano parts. This allowed structures other than those bound by the rigid ½ in. spacing concept and the Slotted Strip was introduced in two versions, the 2 in. and the 5½ in. The smaller one is illustrated in Fig. 2 and this arrived on the scene during the '20s.

Shown alongside the 2 in. Slotted Strip is the latest addition to the range of Meccano Perforated Strips, Part No. 6, which is now supplied with a central hole giving a ½ in. spacing of holes at the centre. Vehicle gearboxes are very popular in Meccano models and it often happens that a 2 in. width is just right for an approximate scale. Previously, the 2 in. Strip had no

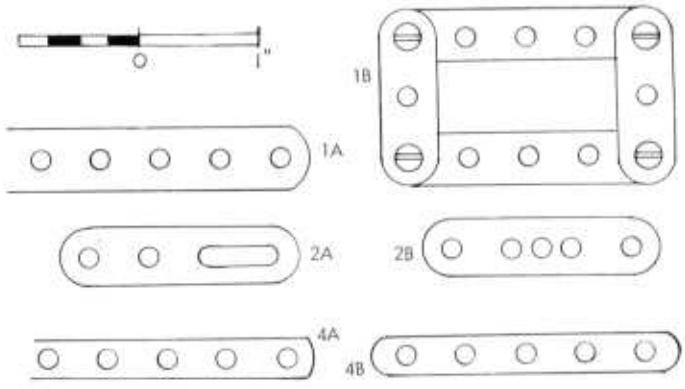


centre hole, making it difficult to centralise the main shaft of the gearbox. The new design overcomes this difficulty and shows its versatility in other applications which will be covered later in this series.

How does one use the Perforated Strip? It is so obvious, is an explanation really necessary? Experienced constructors who get the most out of their models and produce the best results are always looking for the full potential offered by *any* individual Meccano part and the Perforated Strip is no exception. Essentially, as a structural part, the Perforated Strip is a strut and will stand up to quite heavy loads if subjected to tension (a stretching force) rather than to compression (buckling force). This should be borne in mind when assembling crane jibs, parts of which are always in tension and where the Strip is an excellent component choice.

Two other applications of the Perforated Strip, used as an ideal reinforcing item, are shown in Fig. 3a. Overlying the ends of Flexible Plates gives a neat appearance by masking the slotted Plate holes beneath and holds the thinner components securely in place. As a bearing for Axle Rods, the Strip has considerable 'slop', deliberately so, to ease construction for junior builders and even to give the advanced constructor some latitude in getting that awkward joint assembled! Fig. 3b, however, illustrates that, by several layers of Strips, the 'slop' can be evened out and a much better bearing surface provided for Axle Rods doing heavy duty. Such a bearing is also needed where an Axle Rod needs to run absolutely concentrically, as required in the case of Fig. 3b which shows the escapement spindle in a Meccano clock.

In 1962, Meccano made a break with tradition by introducing the Narrow Strip range, illustrated in Fig. 4. Although these Strips,



Part Nos. 235–235f, were introduced as experimental parts originally, and not included in junior outfits of the time, their potential was soon exploited by the advanced constructor. They provided a nice scaling down of the standard width of Perforated Strips and made the modelling of connecting rods on railway engines and frameworks of vehicle cabs much easier in terms of an acceptable scale. The ratio of perforation to remaining metal, however, is quite high so they are not made in lengths greater than 5½ in. At this length, they are still excellent components for tie-struts in crane jibs, etc.

Two distinct applications are shown in Fig. 5, the tractor axle shown in Fig. 5a being an example of improved scale, while Fig. 5b shows the narrow Strip as a decorative overlay on a Hub Disc, giving a striking impression of narrow spokes in the rear wheel of a showman's engine. The Meccano Price List does give metric dimensions for the range of Narrow Strips from 60 mm to 140 mm, the width in each case being 9 mm.

The drawings of Fig. 4 show up an anomaly among the Narrow Strips in terms of the shape of the Strip ends. Note that Fig. 4a, which shows the end shape of Narrow Strips 235b, 235d, and 235f (90 mm and upwards) has an end radius of $\frac{5}{16}$ in., similar to that used for 'cropping' the end of steel strip used for standard Perforated Strips of 7½ in. upwards. The shorter Narrow Strips 235 and 235a are not punched from strip material; they are pierced in plate form and then blanked out by a multiple punch which has semi-circular ends. This is just a matter of simpler design in the punching tool, but it explains the difference in curvature illustrated in Fig. 4. There has been some conjecture in the past by older Meccano enthusiasts concerning these different shapes, giving rise in some cases to pretty tall stories! However, it is all a question of tool design being most suitable.

Finally, the versatility of the Narrow Strip is shown in Fig. 6, where two forms of leaf springs for model vehicles are illustrated. Fig. 6a shows the normal semi-elliptic spring usually supported at each end with the axle attached at the centre. The second leaf spring in Fig. 6b is known as a "cantilever spring" being secured at one end with the axle attached to the other. Note the close lapping of the 'leaves' effected by clamping up the 'leaves' in 1 in. Triangular Plates secured by Pivot Bolts.

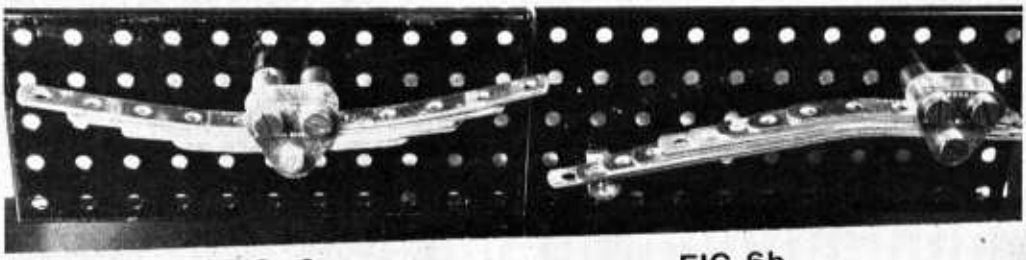


FIG 6a FIG 6b

mission to repair a cable only 27 miles off Cherbourg, just at a time when the Allies knew well a major air attack was about to be launched by the enemy. For this hazardous undertaking the *Iris* was given heavy surface escort, with a complete squadron of fighter planes overhead to provide adequate air cover. The repair was completed only an hour before the massed Luftwaffe planes took off.

Early in 1944, when it was apparent that operation "Overlord" would not be long delayed, active preparations were put in hand to ensure the success of laying the communication cables required by the armies of liberation.

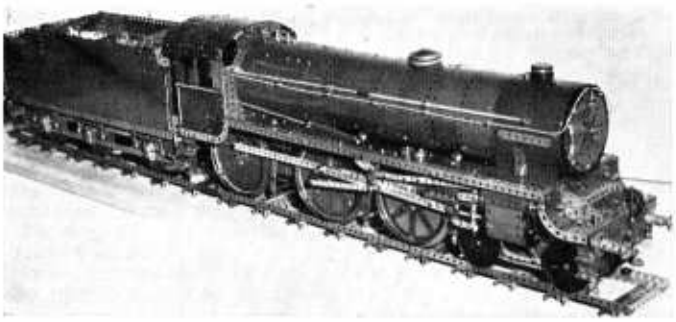
On D-Day, *Iris*, *Alert* (predecessor of the present *Alert*) and the predecessor of today's *Monarch*, together with a Naval cable ship, assembled off the south coast near Bournemouth where two shore ends of cable had been laid in readiness to be spliced to the main length of cable. Immediately the beach at Longues across the Channel had been cleared of the enemy, the *Iris* and *Alert* proceeded to lay the first cable. In just over 24 hours the cable was connected at the Normandy end.

Within 48 hours a second cable was called for. The *Monarch* and the Naval vessel were allotted this task. All went well until all but ten miles of this cable had been laid. Then came tragedy. Owing, presumably, to her unusual design, the *Monarch* was mistaken for an enemy warship and fired on by an Allied destroyer. Before the error could be rectified, five of the *Monarch's* crew were killed, thirteen injured and the vital cable severed. The cable ship limped back to Portsmouth in a sinking condition.

But the gallant little *Alert* stepped into the breach and the last length of cable was successfully laid.

It was, alas, one of *Alert's* last jobs. Not many months later a midget sub. sent her to the bottom and not one of the 55 officers and men aboard her survived. The present-day *Alert* has taken her name as a tribute to a gallant ship and a gallant crew who for close on five years had lived and worked on the brink of eternity.

The loss of the *Alert* was soon to be followed by that of the *Monarch*. She was torpedoed one night by a small enemy submarine only a few weeks before the end of hostilities. So badly holed was she that she sank within the hour, but fortunately it was possible to rescue 69 out of the 72 men aboard.



Ralph Clark's 4-6-2 mixed traffic loco complete with Walschaert's gear and scale tender.

MECCANO CLUB NEWS

REPRINTED below are detailed reports of meetings held by two of the largest Meccano modellers organisations in Great Britain, the "new" Holy Trinity Meccano Club and the now well-established Midlands Meccano Guild, the latter catering for adult enthusiasts. We feature the reports, not only for the interest of the respective organisation's members, but also for that of enthusiasts the world over and we hope that all Meccano modelling organisations—no matter how small—will keep us informed of their movements. Please address all news to: "Spanner", Meccano Magazine, Northern Office, Binns Road, Liverpool L13 1DA.

3rd Meeting of the Holy Trinity Meccano Club

Report by P. Matthews, Secretary.

"A good time was had by all"—a very suitable phrase, I feel, to describe our latest meeting, held on 23rd October, 1971 at the Scout Headquarters, Hurstpierpoint, Sussex. We were of course overflowing and I must apologise to any member who could not find space to display his model adequately.

The attendance was very good indeed, being 27 compared with 14 at the first meeting. It is hoped to hire a larger hall in the village for our next meeting to cater for the increase in membership. Although 27 members were in attendance the actual membership stands at 34.

The club Meccano Guild Certificate was on show for the first time, signed by Mr. H. J. Fallmann, Chairman and Managing Director of Meccano (1971) Ltd. As a complete surprise it was announced that all members of the Holy Trinity Meccano Club had also been made members of the Meccano Guild. Members were then duly presented with their certificates and badges. Of historical interest is the fact that the Club's certificate bears the same club name as the very first certificate to be issued in 1919 by the Meccano Guild and that the founder and club leader of that first club, Stuart H. Wilson is also our Hon. President—a span of some 52 years!

There were so many fine models on display that it would be impossible to describe them all in detail. Leslie Dougal again gave a fine display of models from the "Nickel Period", most notable of which was a pre-war Super Model Travelling Gantry Crane. Phil Bradley showed his Southampton Dock crane and Tony Homden had an 8 ft.-plus model of a cargo ship complete with working derricks, lifeboat davits, hatches and anchor winches. Both Phil and Tony gave

demonstrations of their models, an item which I hope will continue with other members at other meetings.

A new member, Mike Nickolls brought along a very clever and amusing 'Sawing the Lady in Half' model. This was another case of originality of thought paying off and I hope to persuade Mike to write an article for the M.M. on this model so that other people can get as much pleasure from building it as we all got from watching it.

Among other members present at the meeting was Noel Ta'bois. Noel is an enthusiast from the 1938–45 period and if you look up your Meccano Magazines for this period you will see many of his ingenious mechanisms described therein. He also swept the hall out after the meeting! Many thanks Noel.

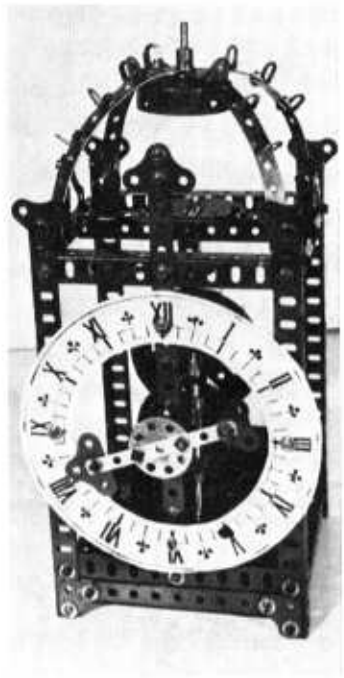
Jim and Diane Gamble journeyed down from Nottingham to help out, and it must be said that Jim was a great help with erecting tables and humping models etc. Diane, together with Margaret Ta'bois and Anne Matthews, did us all proud from the kitchen area and members will, I know, wish to thank them for their splendid efforts.

The date of the next meeting was fixed for Saturday, 29th April, 1972.

All that remains for me to say is thank you all once again for your wonderful support and I look forward to our next meeting very much indeed.

Anyone interested in joining the Holy Trinity Meccano Club should contact the Secretary at 7 Trinity Road, Hurstpierpoint, Sussex. An S.A.E. should be supplied.

Historical working clock by Pat Briggs with replica verge escapement entirely in Standard Meccano parts.



9th Meeting of the Midlands Meccano Guild

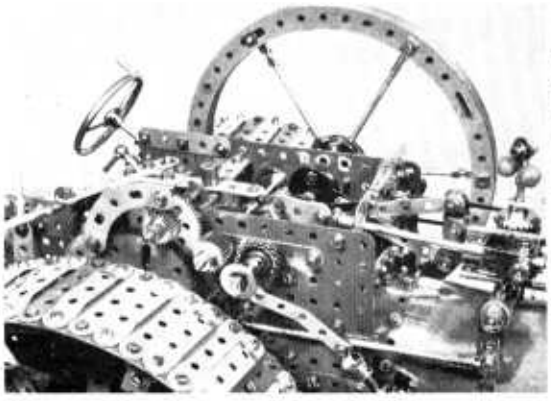
Report and pictures by Bert Love, Secretary.

On 2nd October, 1971, members of the Midlands Meccano Guild arrived at the St. John Ambulance Hall, Stratford-upon-Avon to be greeted, not only by the other members, but by one of the warmest October Saturdays on record! A good omen for the start of yet another successful meeting. Long distance travellers, dusty from trips as far afield as Dundee, Newcastle-on-Tyne, East Kent and Somerset revived themselves with welcome cups of tea brewed by volunteer wives and the meeting started promptly at 2 p.m. with a short address of welcome and an introduction of new members by the Hon. Sec.

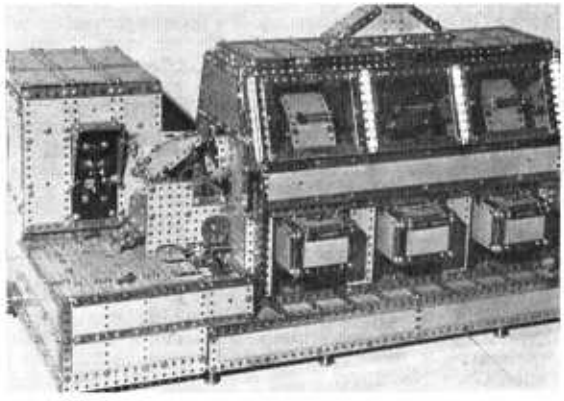
A number of principal models had been selected for demonstration and the first member on the platform was David Guillaume of Alcester who showed a fine model of an industrial processing machine which passed ball bearings from one rotating barrel to another through a complete battery of drums until the polished product was churned out through the delivery chute. Made in the latest Meccano parts, the mode performed splendidly, being completely programmed through an automatic gear-box.

Dennis Perkins of Rugby then demonstrated his beautiful 1½ in. scale model of a Clayton & Shuttleworth Agricultural Traction Engine constructed with the highest degree of modelling skill and requiring close inspection to establish that it was actually constructed from Meccano parts. Very careful selection of pieces, in various shade of Meccano colours across the years, contributed in no small way to the astonishing realism of Dennis's first-class model. All motions worked as in the prototype, of course, and the engine performed like its veteran ancestor.

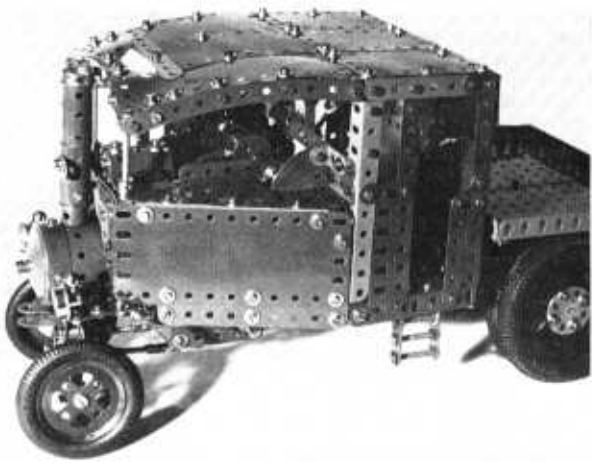
Detail of the flywheel and crankshaft gearing of Dennis Perkin's superb large scale Traction Engine.



Working model "Barraflow" industrial washing plant by David Guillaume. Oscillating drum drive and feed cycling by automatic gear-box.



Well detailed Collis Crane Truck by Eric Jenkins. Power is provided to chassis via a differential. Crane luffing and hoisting by separate motor. All movements battery driven



Short wheel base Foden Steam Lorry neatly executed by Brian Edwards

Coming down from the large Supermodel class a little, Eric Jenkins showed a very neat Ransomes Electric Crane Truck. This was modelled from a small illustration of the original truck printed in the January 1958 M.M. and Eric had really brought this model to life. Built in a very short time, it was battery-powered, the chassis being fitted with differential drive, parallel steering operated by a tiller bar from the driver's stand, while the rotating pillar crane mounted on the chassis was self-powered by an Emebo Motor with a compact gearbox giving hoist and luffing control.

Blind member John Lorimer of Bromsgrove brought along his industrial planing machine based on a heavy-duty type found in large steelworking plants. John has never been able to see either the prototype or pictures of it and, having no engineering background whatsoever, he has had to build up word pictures in his head to 'visualise' the actual machine. His reproduction was an excellent working model with quick-return motion fitted to the planing table and screw-driven tool-post. John built this machine entirely unaided.

Stephen Lacey of Hinckley demonstrated a model of the Snowdonian rack railway locomotive and passenger car working with great realism on a substantially inclined rail section. Some six feet of track were enough to show the ability of his model to haul up the slope with absolute positive registration on the rack, the new Large-toothed Pinion, Part No. 167c, being used to engage with the edges of $\frac{1}{4}$ in. Washers mounted on extended Axle Rods lying between the rails. Spacing of the rack was achieved by packing with the smaller standard Washers—a novel use for Washers altogether! Details and valve gear on the locomotive were excellent as usual.

Phil Bradley's model was that of the 1950 Southampton Docks 50-ton Travelling Crane. This ran on no less than 32 wheels, all of which were equalised. Luffing was via heavy-duty screw rams and all movements, including main and auxiliary hoists, were reproduced up to Phil's usually high standard.

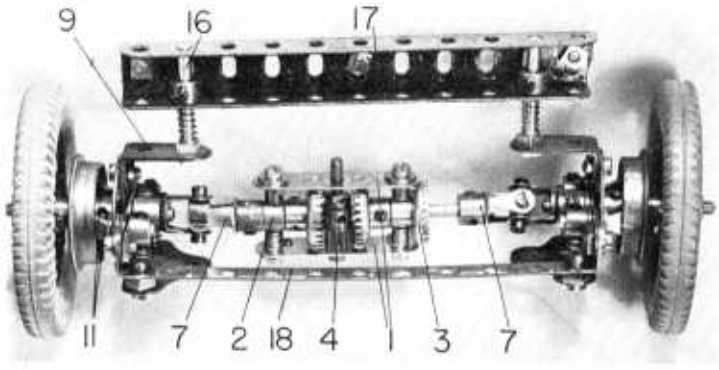
Beautiful working clocks were displayed by Pat Briggs and Leslie Dougal, two of the Guild's 'resident' clockmakers. One of Pat's examples used four clockwork motors with differential inter-connections for long-running performance plus power for strike and chime mechanisms. Pat also produced a genuine 'antique' movement by showing a Meccano clock using a verge, crownwheel and foliot balance escapement, circa 16th century 'Nuremburg' design. Again, the standard Meccano Clockwork Motor was employed and the clock ran like a jeweller's piece. Leslie's clock was a beautiful 'Granddaughter' clock clad in Flexible Plates from the blue/gold era of Meccano, but blended very skilfully with early nickel plated parts to produce an elegant case clock. This was electrically driven, the motor being made from standard parts and a strike was included.

Tony Homden brought along a merchant ship model some 8½ ft. long with a great deal of true-to-type working gear included. This comprised anchors and cables in hawse pipes with working capstans, working derricks over the cargo hatches operated from masthead switches, a jumbo lifting derrick forward for heavy cargo, four ship's lifeboats with automatic release and lowering gear plus authentically positioned navigation lights. The usual deck fittings such as bollards, cleats, ventilators and gangways were all skilfully modelled by Tony, a former Merchant Navy man himself!

Jack Partridge showed the pre-war L.N.E.R. Locomotive 1,000 while Ralph Clark's model from the same region was a 1 in. scale model of the 1942 B.1 Class general duty locomotive with working Walschaert's valve gear.

The Hall was alive with models and enthusiasm and when the demonstration talks were over, members were free to roam among the model-builders to see the rest of the many exhibits and to swop ideas. Afternoon tea, deliciously laid out by the 'canteen staff' was much appreciated and a very happy meeting continued until members left for home as darkness fell.

Anyone interested in joining the Midlands Meccano Guild should contact the Secretary at 61 Southam Road, Hall Green, Birmingham 28. An S.A.E. should be enclosed with the enquiry.



Among the Model-Builders

with 'Spanner'

THROUGHOUT history, distinguished men of the times have been honoured with popular titles, bestowed on them by their contemporaries. The Roman commander Alexander, for example, was known as "The Great", or King Richard I as "The Lionheart" and, more recently, Alexander Graham Bell became famous as the "Father of the Telephone". If it was customary to bestow such titles on Meccano modellers today, one man who would undoubtedly deserve recognition is James Grady of Dundee, Scotland, and the title I would give him is "Champion of the Small-Scale Vehicle Builders"!

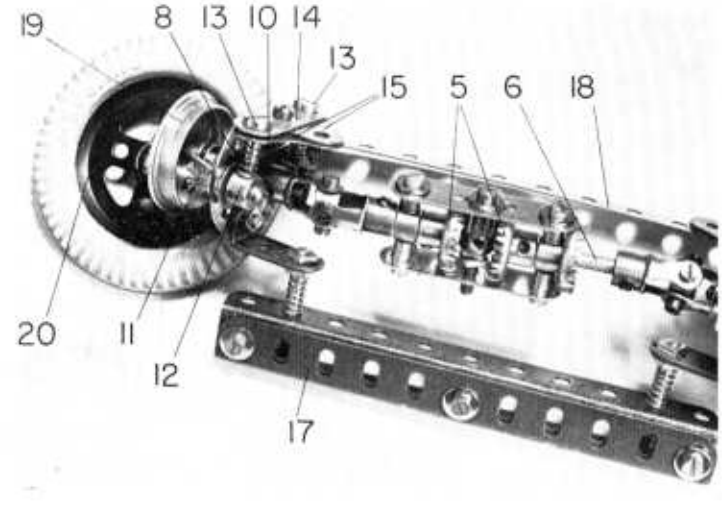
James is fast becoming an expert on useful mechanisms for small motor vehicles and you can bet your last new halfpenny that, if we feature in these pages a motor chassis mechanism designed for use with 3 in. Pulleys and Tyres, it won't be long before James turns up with a similar, but much more compact mechanism suitable for smaller wheels, and hence, smaller models. As James himself said in a recent letter, "My favourite battle cry is "Why should the lads with the big Sets have all the fun?" Why, indeed, James, and my sincere thanks go to you for all the valuable material your crusade has led you to design.

To get down to business, in last October's M.M. we featured a front-wheel drive mechanism using 3 in. Pulleys with Tyres as road wheels and, sure enough, James has now supplied me with a smaller, yet very comprehensive Unit of a similar type. It is shown in the accompanying illustrations fitted with 2 in. Pulleys and Tyres for road wheels, but it can also be used with 1½ in. Pulleys.

It will be noticed by regular readers that the Unit makes use of a differential and a braking system, also designed by James, which have previously been mentioned in these pages. The differential consists of two of the latest style of 2 in. Strips 1 which are attached by ⅜ in. Bolts at one end to a Collar 2, a Cord Anchoring Spring on the shank of each Bolt and a Washer under the bolthead acting as spacers. At their other ends, the Strips are similarly attached to, but spaced from, a ¾ in. Contrate wheel 3, care being taken that the fixing ⅜ in. Bolts do not foul the central bore of the Contrate. (This also applies to Collar 2).

Mounted in the central holes of the Strips is a 1¼ in. Bolt, on which a ⅞ in. Pinion 4 is free to rotate, but is prevented from sliding on the Bolt shank by two lock-nuts. In constant mesh with the Pinion are two ¾ in. Contrate Wheels 5, one fixed on a 1 in. Rod journalled free in Collar 2, and the other on a 1½ in. Rod 6, journalled free in Contrate 3. Secured on the outside end of each of these Rods is a Universal Coupling 7.

Each hub assembly is similarly built up from an 8-hole Bush Wheel to which a 1 × 1 in. Angle Bracket 9 and a 1 × ½ in. Angle Bracket are bolted, one on top of the other for strength. A 2 in. Strip 10, at right-angles to the lug of Bracket 8, is also secured to the face of the Bush Wheel, but note that, instead of Bolts, this is fixed with two Centre Forks 11 and Collars 12. Each Centre Fork is first fitted with a Washer, then the shank of the Fork is inserted through a hole in the Bush Wheel face, is fitted with two packing Washers, passed through



Top, a compact but highly effective Front-wheel Drive Unit designed by Mr. James Grady of Dundee, Scotland, for use in smaller motor vehicles. It will operate with 1½ in. or 2 in. Pulleys and Tyres as road wheels.

Left, a close-up view of Mr. Grady's first Front-wheel Drive Unit showing the brake drum partially removed.

First of Mr. Grady's "simple" Front-wheel Drive Units, suitable for 1½ in. Pulleys with Tyres. Although it does not incorporate a differential, it is nonetheless interesting in operation and Meccano historians will also be interested in the very old-design Tyre Mr. Grady has fitted for the photograph!

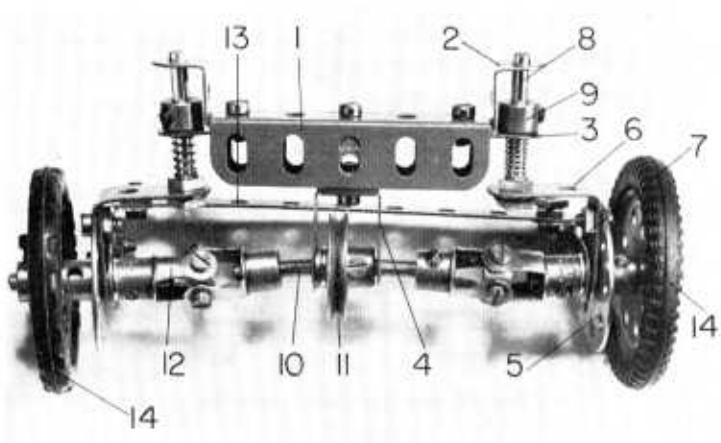
the respective hole of Strip 10 and is finally secured with one Collar 12. The "empty" threaded bores of Collars 12 must point vertically downwards. Screwed into these bores are two Pivot Bolts 13, each fitted with a Compression Spring and the two are connected by a 1½ in. Strip 14 and two 1 in. Corner Brackets 15, arranged as shown to form a bell shape. The apex hole of the "bell" should be in line with the end hole in the spare lug of Angle Bracket 9. A Long Threaded Pin 16 is then tightly fixed in this end hole of the Bracket to complete the hub.

With both hubs similarly built, a Compression Spring is added to Pin 16 in each assembly, then a 5½ in. "U"-section channel girder 17 is mounted on the Pins, being held in place by a Collar mounted on each Pin between the flanges of the girder. The girder itself is built up from two 5½ in. Angle Girders. Compression Springs on the Threaded Pins, of course, serve as a good independent suspension system. The rear ends of Strips 10 in each hub are connected by a 5½ in. Narrow Strip 18, lock-nutted to Angle Brackets attached to Strips 10, to serve as the steering tie-bar.

A 2 in. Rod, serving as the stub axle, is next passed, free, through the boss of each Bush Wheel 8, to be fixed in the free end of one or other Universal Couplings 7. A 1⅛ in. Flanged Wheel 19 is mounted on the Rod with its flange over the heads of Centre Forks 11, then the road wheel 20 is secured in place.

Under operating conditions, drive is taken to Contrate Wheel 3, while a suitable brake linkage (Strip or Cord) is connected to the apexes of the "bell" assemblies. Movement of the bell assemblies causes Centre Forks 11 to turn, thus bringing their heads into contact with the flanges of Flanged Wheels 19 to give effective braking. The Compression Springs on Pivot Bolts 13 ensure automatic brake release when braking pressure is released.

The compact design of this, the smallest of Mr. Grady's Front-wheel Drive Units, is evident from this illustration. The mechanism is suitable for use with 1 in. Pulleys and Tyres as road wheels, although "modellers' licence" has again been used in that there is no differential.



PARTS REQUIRED

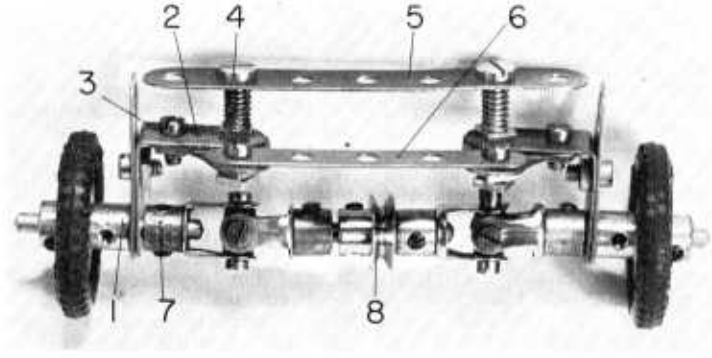
4—6	1—18a	15—37a	2—115a
2—6a	1—18b	11—37b	6—120b
2—9	2—20	20—38	4—133a
2—12	2—20a	7—59	2—140
2—12a	2—24	4—65	2—142a
2—12b	1—26c	4—111c	4—147b
2—17	3—29	1—111d	4—176
			1—235f

Simple Units

Mr. Grady has also supplied me with two considerably less complicated Front Wheel Drive Units which, although they are not engineeringly correct in that they do not incorporate differentials, could nonetheless be used in simple models where the privilege of "modellers' licence" may be invoked. The first, designed for 1½ in. Pulley-based road wheels, consists of a "U"-section cross-member 1, built up from two 2½ in. Angle Girders connected together, with each end connecting Bolt also holding a ½ in. Reversed Angle Bracket 2 and a 3½ in. Strip 3 in place. A centre connecting Bolt holds a Double Bracket in place by one lug, a 1 × ½ in. Double Bracket 4 being bolted to the lower lug of this Double Bracket as shown.

Each hub assembly is supplied by an 8-hole Bush Wheel 5, to which a 1 × 1 in. Angle Bracket 6 and a 1½ in. Strip 7 are bolted, the latter spaced from the Bush Wheel by a Washer. Fixed in the end hole in the spare lug of Bracket 6 is a Long Threaded Pin 8, on which a Compression Spring is mounted, the Pin then being inserted in the spare lug of Reversed Angle Bracket 2 and the end hole of Strip 3, where it is held in place by a Collar 9. This arrangement again provides effective independent suspension.

Journalled in the end holes in the lugs of Double Bracket 4 is a Flexible Coupling Unit 10, held in place by a 1 in. Pulley 11 between the lugs of the Bracket, three Washers at one side being used for spacing purposes. A Universal Coupling 12 is fixed on each end of the Flexible Coupling, the stub axle—a 1½ in. Rod—being passed, free, through the centre of the hub and into the other side of the Universal Coupling, where it is fixed in



place. A Washer spaces the Couplings from the hub. Strips 7 in the two hub assemblies are connected by a 4½ in. Narrow Strip 13, locknutted between Angle Brackets bolted to Strips 7, while the road wheels 14 are of course fixed to the stub axles to complete the Unit. In operation, of course, a belt drive would be taken to Pulley 11.

PARTS REQUIRED

1—3	1—12a	12—37b	2—140
2—6a	2—18a	8—38	2—142d
2—9d	2—21	2—59	1—175
1—11	1—22	2—115a	1—235d
1—11a	2—24	2—120b	
2—12	14—37a	2—125	

Mr. Grady's third and final offering is a delightfully effective little unit, designed for use with 1 in. Pulleys with Tyres and, again, a working suspension system is included. Each hub assembly in this case consists of a Crank 1, to the arm of which a 1 × 1 in. Angle Bracket 2 is bolted. Tightly fixed to the spare lug of the Angle Bracket is a 1 in. Corner Bracket 3, but note that the apex fixture is achieved by a Pivot Bolt 4 instead of by an ordinary Bolt. Each Pivot Bolt carries a Compression Spring and the Pivot Bolts in the two assemblies are also connected, as shown, by a 3½ in. Strip 5. Locknutted between the spare holes of the Corner Brackets in each hub is a 2½ in. Narrow Strip 6, serving as the steering tie-bar.

Each stub axle is provided by a 1½ in. Rod, journalled free in the boss of Crank 1, and held in place by a 1 in. Pulley with Tyre outside the Crank and by a Universal Coupling 7 inside the Crank. The inner ends of the two Universal Couplings at each side are connected by another 1½ in. Rod, on which a ½ in. Pulley with boss 8 is fixed. As with the previous mechanism, a belt drive would be taken to this Pulley.

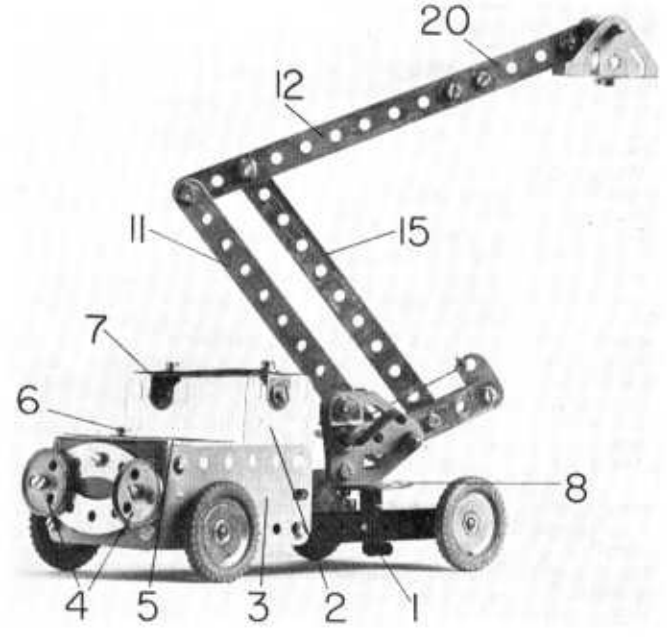
PARTS REQUIRED

1—3	1—23a	2—62	2—142c
2—12a	8—37a	2—120b	2—147b
3—18a	6—37b	2—133a	1—235
2—22	2—38	2—140	

Hydraulic-lift Truck

A No. 2 Set model built and described by Brian Turpin

Meccano Set No. 2 contains all the parts needed to build this working Hydraulic-lift Truck, designed by the author of this article.



THE more familiar one becomes with the Meccano system, the more apparent it is that the model possibilities are limited only by the imagination and mechanical ingenuity of the builder. So, with a wide range of pieces available, it is easy to forget those frustrating early days when all the most interesting models in the book seemed to need a larger outfit than one yet had. Going back to explore the possibilities of the number 2 outfit was the result of a challenge to construct an interesting and original working model from a low-numbered set and I think the Hydraulic-lift Truck featured here does prove the point that there are lots of unexploited resources even in the most basic Meccano outfits.

Chassis & Cab

At one end of a 5½ × 2½ in. Flanged Plate 1, a 2½ × 1½ in. Transparent Plastic Plate 2 and a 5½ × 1½ in. Flexible Plate 3 are fixed by the same two Nuts and Bolts at each side. The Transparent Plates are upright to form the cab side windows, while the Flexible Plates go outside them, and overlap the Flanged Plate by three holes. The two Flexible Plates are now carefully bent towards each other to overlap by five holes, and are fixed together by a Nut and Bolt at each bottom corner of the vehicle bonnet thus formed. Two 1 in. Pulleys (without boss) 4 are fixed to a pair of Curved Strips by a Nut and Bolt each, to serve as headlamps. The complete radiator and headlamp assembly is then fastened to the front of the bonnet by a single Nut and Bolt at the top, which also completes the fixing of the overlapped Flexible Plates.

A Double Angle Strip 5 joins the two sides of the bonnet by the top corner holes at the front of each side and to this is fixed a 2½ × 1½ in. Plastic Plate forming the bonnet top. Note that the single Nut and Bolt with Washer 6 used here also serves as the radiator cap. Another Double Angle Strip 7 joins the centre holes at the top of the cab side windows, while a 2½ × 1½ in. Plastic Plate fixed to this by two Nuts and Bolts forms the cab roof Do not use Washers on the top two Nuts and Bolts here, unless you have extra ones.

Before fixing two pairs of 1 in. bossed Pulley Wheels on 3½ in. Axle Rods to provide road wheels, a Reversed Angle Bracket is bolted underneath the chassis in the centre hole fourth row from the back of the Flanged Plate, its free end in line with the third hole from the back. This, together with the Flanged Plate, forms the bearing for the rotating arm.

Hydraulic Lift Arm and Working Platform

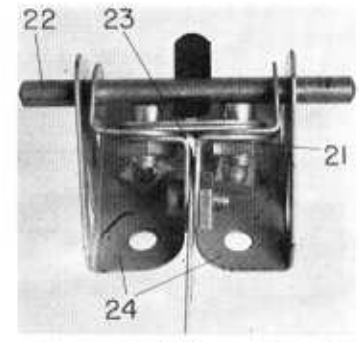
A Bush Wheel 8 on a 1 in. Axle Rod fits into the bearing just made, and is held by a Spring Clip, with a Washer. To the flat upper side of the Bush Wheel a pair of Angle Brackets 9 is fitted, using the round hole of one and the elongated hole of the other and sliding them as far apart as possible before tightening the single fixing Nut and Bolt. To the vertical lug of each Angle Bracket is now fixed a Flat Trunnion 10, a well-tightened Nut and Bolt going through the base corner hole of each, with the side of each Trunnion resting on the Bush Wheel. This assembly forms the hydraulic arm support, but the arm itself should be built up separately and fixed to the support when completed.

Construction of the arm is not difficult. A ⅜ in. Bolt is fastened tightly with a Nut through the end hole of a 5½ in. Strip 11, a second 5½ in. Strip 12 then being added to the Bolt shank, again using the end hole. The Bolt is finally fixed tightly through the end hole of a third 5½ in. Strip 13, parallel to the first, using two Nuts, this leaving the two outside Strips (11 and 13) firmly secured alongside each other, with the centre Strip 12 free to swivel.

Right, the simple but effective construction of the working platform is clear in this "bird's eye view" of the top of the elevating arm.

Below left, a close-up view of the elevating arm mount in place on the mobile chassis of the model.

Below right, an underside view of the arm mount as it appears when removed from the chassis.



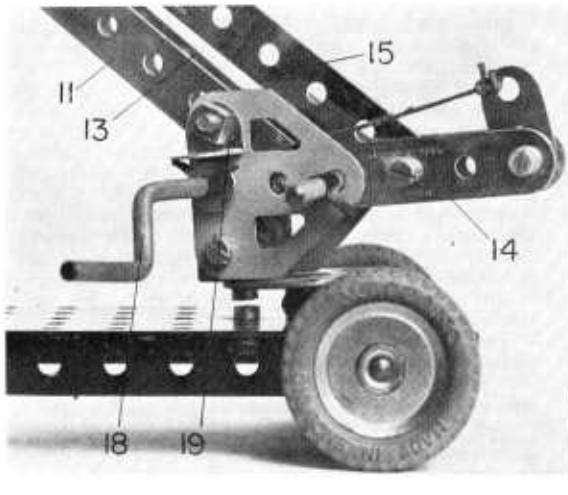
To the opposite or lower ends of the two fixed 5½ in. Strips, a pair of 2½ in. Strips 14 are secured by a ⅜ in. Bolt through their end holes. The 2½ in. Strips are positioned on the outside of the 5½ in. Strips 11 and 13, with two Washers between the 5½ in. Strips acting as spacers, and the ⅛ in. Bolt is lock-nutted so that the 2½ in. Strips can swivel. One end of another 5½ in. Strip 15 is now held by a ⅜ in. Bolt passing through the centre holes of the pair of parallel 2½ in. Strips 14. This Strip 15 should swivel freely on the ⅜ in. Bolt between the 2½ in. Strips, three Nuts being used on the ¾ in. Bolt to keep the 2½ in. Strips spaced apart. The opposite end of 5½ in. Strip 15 is lock-nutted through the third hole of the other swivelling 5½ in. Strip 12, thus completing a narrow parallelogram movement.

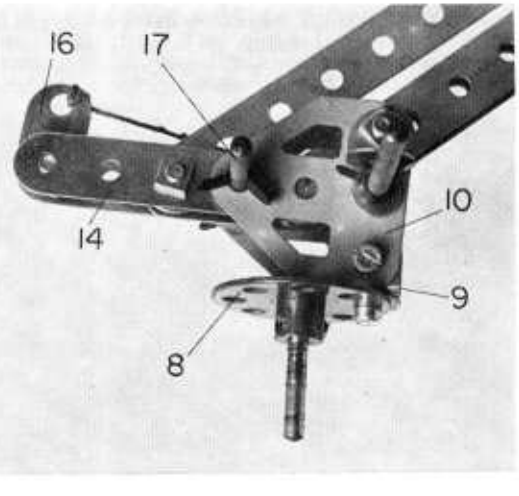
Firmly attached to the far end of one of the two 2½ in. Perforated Strips 14 is a Fishplate 16, secured at right angles to the Strip by its elongated hole. A 2 in. Axle Rod 17 is passed through the apex holes of the two Flat Trunnions and through the "empty" holes of Strips 14 furthest from the Fishplate, with a Spring Clip at each end to retain it. Through the central base holes of the Flat Trunnions goes a Crank Handle 18, held centrally by two Spring Clips with Washers. The upper base hole in each Flat Trunnion carries an Angle Bracket 19 positioned to prevent the Spring Clips rotating with the Crank Handle, forming in this way a simple friction brake on the Crank Handle.

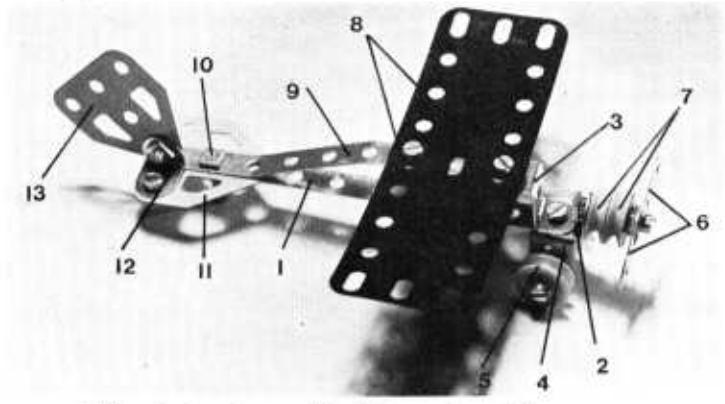
A short length of Cord is firmly fixed to the Crank Handle, and the free end fastened to the Fishplate at the end of the 2½ in. Strips. The lifting arm assembly now rests with the two parallel 5½ in. Strips 11 and 13 against the Crank Handle. When the Crank Handle is turned, the Cord pulls the Fishplate, so that the two 2½ in. Strips move slightly up at the far end, while the 5½ in. Strips slide downwards against the Crank Handle supporting them, giving a lifting motion to the arm. The Spring Clip brake enables the arm to remain in any position.

The upper end of Strip 12 is now extended three holes by a 2½ in.

(*Please turn to page 93*)







This early Aeroplane model, which netted one of the runners-up prizes in Section 2 of the Competition, was the work of Timothy Haylett of Poole, Dorset.

More from Pocket Meccano

By 'Spanner'

The extremely well-proportioned Lawn-Mower, below left, designed by Mark Powell of Thurmaston, Leicester, was a deserving runner-up in Section 1 of the recent Pocket Meccano Competition. Another delightful little model which gained a runners-up prize in the Pocket Meccano Competition is the Sewing Machine from Section 3, shown below right. Designer was Raymond Anderson of Morpeth, Northumberland.

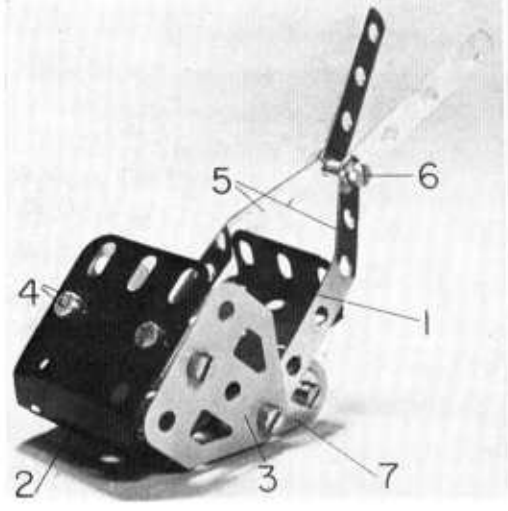
IN these pages last month we reported on the outcome of the recent Pocket Meccano Competition and we also gave building instructions for the three models which gained 1st places in the Competition's three age Sections. At the same time, we promised to bring you more contest entries over the coming months and, true to our word, here are three particularly pleasing examples—a Lawn-Mower from Section 1, an Aeroplane from Section 2 and an "Electric" Sewing Machine from Section 3. These particular models, incidentally, have been chosen from the runners-up, but future presentations might well include non prize-winning models.

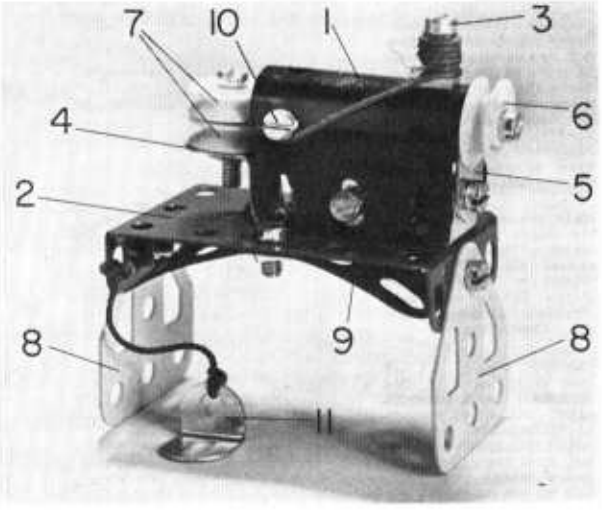
When building the Lawn-Mower and Aeroplane, it is necessary to bend some of the parts. This may not appeal to some modellers, but, if done properly, it should not cause any damage and, with equal care, the components can be straightened to their original shape.

Lawn-Mower

Beginning with the Lawn-Mower, the most attractive feature of this model, apart from its originality, is its compactness, with every part representing an easily-recognisable section of the original. Full marks go to its designer, 5½ year-old Mark Powell, of Thurmaston, Leicester.

Attached to the underside of a 2½ × 1½ in. Flanged Plate 1 is a 2½ × 1½ in. Plastic Plate 2 which is bent around the flange forming the front of the machine. Two Flat Trunnions 3, one on either side of Flanged Plate 1, are attached to the free end of Plastic Plate 2 by means of two Angle Brackets held by Bolts 4.





The handles of the Mower are made from two 4½ in. Narrow Strips 5, bent into the formation shown and strengthened by a ½ in. Bolt 6 passed through the fourth hole of the Strips.

Along with the apexes of Trunnions 3 and two Fishplates 7, which hold the rollers, the Strips are connected to Flanged Plate 1 by two Angle Brackets 8. The rollers themselves consist of four ½ Pulleys 9, two at each side, mounted on ½ in. Bolts, fixed to Fishplate 7.

PARTS REQUIRED

4—12	13—37a	1—51	2—126a
4—23	10—37b	3—111a	1—194
			2—235d

Aeroplane

Moving onto the interesting little Aeroplane, it is necessary when building this to bend one of the two 4½ in. Narrow Strips making up the fuselage, to give it a more streamlined appearance. The designer of this authentic "Early Aeroplane", as he calls it, is Timothy Haylett, aged 9, of Poole, Dorset.

Attached to the forward end of the straight Narrow Strip 1 is an Angle Bracket 2 and a ½ in. Reversed Angle Bracket 3 which overlap as shown, the Bolt securing them also connecting two Angle Brackets 4 to the underside of Strip 1. Fixed by Nuts in the spare lugs of these Brackets are two ½ in. Bolts, on which ½ in. Pulleys 5 are mounted to serve as the undercarriage wheels.

The propeller unit consists of two Fishplates 6, tightly fixed by a Nut on a ¾ in. Bolt. Two ½ in. Pulleys 7 are added to the Bolt shank, which is then lock-nutted to the spare lug of Angle Bracket 2.

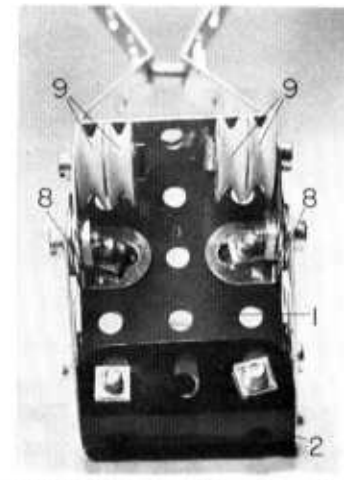
Two 2½ × 1½ in. Plastic Plates 8 serve as the wings, these being bolted to one end of the bent Narrow Strip 9, with the forward Bolt also fixing the Strip to the spare lug of Reversed Angle Bracket 3.

Fixed between the rear ends of Narrow Strips 1 and 9 by two Nuts on a ½ in. Bolt 10, head downwards, is a Flat Trunnion 11, representing the tailplane. Secured to this Flat Trunnion, in the position shown, is an Angle Bracket 12, to the vertical lug of which another Flat Trunnion 13 is Bolted to serve as the tail fin and complete the model. Note that the downward-protruding head of Bolt 10, by the way, serves as the undercarriage tailwheel.

PARTS REQUIRED

2—10	15—37a	1—111a	2—194
4—12	8—37b	1—125	2—235d
4—23	1—111	1—126a	

An underside view of the Lawn-Mower showing the arrangement of the ½ in. Pulleys representing the roller.



Sewing Machine

In the case of the Sewing Machine, this is a delightful little model designed by 13-year-old Raymond Anderson of Morpeth, Northumberland. The body is formed by bending a 2½ × 1½ in. Plastic Plate 1 to the shape shown and bolting the ends to two overlapping Angle Brackets secured to a 2½ × 1½ in. Flanged Plate 2, the Bolt shank protruding upwards through the Plate.

A ½ in. Bolt 3 is held by Nuts in Plate 1 as shown, this later serving as a cotton reel. Also bolted to Flanged Plate 2 are a ½ in. Reversed Angle Bracket 4 at one end of the "machine" and an ordinary Angle Bracket at the other end. The vertical lug of the Angle Bracket is extended by a Fishplate 5, to which a ½ in. Pulley 6 is bolted to represent the handwheel, while two more ½ in. Pulleys 7 are secured by a ¾ in. Bolt to the spare lug of the Reversed Angle Bracket to represent the sewing head. Note that the downward-protruding shank of the 3 in. Bolt serves as the sewing needle.

Flanged Plate 2, of course, serves as the sewing table, its legs being provided by two Flat Trunnions 8 bolted to the flanges of the Plate. Another 2½ × 1½ in. Plastic Plate 9 is curved slightly to fit between the flanges of the Plate, being fixed to the underside of the Plate by Bolts passed through the centre edge of both Plates. A short length of Cord, representing cotton, is then wound several times round Bolt 3, is brought along and trapped under the head of a Bolt 10, fixed to Plate 1, and is taken back and over Reversed Angle Bracket 4 which lies beneath the "needle".

One last and very important item needs to be added. The model is intended to represent an electric sewing machine and, as no motor can obviously be included, a foot-switch is provided by way of "electric" identification. It consists simply of an Angle Bracket 11 on a length of Cord tied to one corner of Flanged Plate 2, but it serves the purpose admirably!

PARTS REQUIRED

1—10	13—37a	1—111	2—126a
4—12	9—37b	2—111a	2—194
3—23	1—51	1—125	1—Length of cord

HYDRAULIC LIFT TRUCK

(*continued from page* 83)

Strip 20, to which the working platform is attached by means of a fork 21 made from four Angle Brackets. Two of these are fastened to the arm by their elongated holes, with one Nut and Bolt, the other two being bolted to the first two also through their elongated holes, leaving the round holes free to carry a 2 in. Axle Rod 22. The same two Nuts and Bolts joining the Angle Brackets also hold two Fishplates 23 against the inside of the fork, these being provided simply to space the Bolt heads so that they only just clear the Axle Rod, and this allows the single Spring Clip remaining in the Set to hold the Axle Rod centrally. Two Trunnions 29 can now be slid on to the two ends of the Axle Rod, and joined together by a final Fishplate to complete the model.

PARTS REQUIRED

4—2	1—19s	7—38	2—126
3—5	4—22	1—40	2—126a
4—10	2—22a	2—48a	4—142c
8—12	1—24	1—52	2—189
2—16	6—35	2—90a	2—193
2—17	39—37a	3—111c	2—194
1—18b	30—37b	1—125	