MECCANO® Magazine

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MAP **HOBBY MAGAZINE**

FRONT COVER

The story behind this Tri-ang-Hornby layout is that it was first designed and constructed for the Model Railway Club Show in 1967. It was later redesigned and used at the Association of Model Railways Clubs in Scotland for their 2nd Annual Exhibition in March of this year. From there, it went to Selfridges for their Easter Promotion, and then to Lewis's of Argyle Street, Glasgow. The layout itself measures 14' x 6', and is constructed in two sections each measuring 7' x 6'. The layout consists of four independently controlled circuits for Railways and four independently controlled circuits for Motorways, together with Through Stations, Terminal Stations, Engine Sheds, Model Land Buildings, Automatic Signals, Tri-ang Scenic Materials and many other interesting Tri-ang-Hornby-Minic accessories.

NEXT MONTH

November Meccano Magazine will have a bright Disneyland Monorail Railway cover. The cover heralds the first part of a complete history on Monorail development, application and future uses by Harry McDougall. Meccano models are again with us in force, and include a "Plastic Aircraft Fairground Roundabout," a "Post Boring Tractor," a "Go Kart" model and "Among the Model Builders." Railway fans need not be disappointed as we have "A.B.C. of Model Railways" whilst "Trackside Construction" describes the construction of a simple commercial kit. For the more scientifically inquisitive readers, we have features on "Weather Satellites," "Sonic Glider Train" and "Great Engineers."

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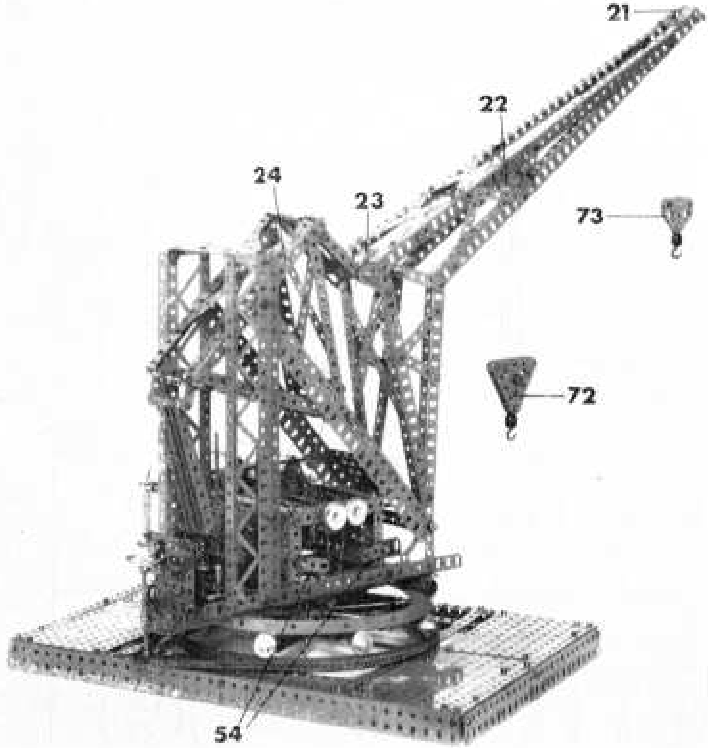
NEW 40 YEAR OLD MODEL



by Spanner

The final part of a giant Pontoon Crane rebuilt from the March 1925 issue of Meccano Magazine. A Supermodel for those with lots of Meccano.

IN MECCANO Magazine last month we began describing this extremely interesting advanced model by detailing construction of the pontoon and general superstructure. Before continuing with the building instructions this month, however, I would like to give a brief resume of the reasons why the model is so special.

Irrespective of its intriguing appearance and completely realistic movements, its main claim to fame is the fact that it is a reproduction of a model which was first featured in the March 1925 issue of the M.M., later appearing in pre-war Super Model Leaflet No. 28. This alone says a good deal for the continued reliability of the Meccano system; a reliability which is further attested to by the fact that the model is an almost scale reproduction of a crane that existed in real-life. This was "Crane Lighter No. 4"—an enormous floating crane owned by the British Admiralty. The dimensions of the pontoon alone were 242 ft. long by 86½ ft. wide, while the crane as a whole was capable of lifting a load of 250 tons to a height of 77½ ft. above the sea, to then deposit it anywhere within 100 ft. radius from the crane. Even by modern standards, these figures are impressive, as I am sure you will agree.

The Meccano model reproduces all the actions of the original crane, and, talking of the model, it is time now to continue with the building instructions.

Motor and gear arrangements

In this model, two distinct gear arrangements are included, the main gearbox controlling the two load hooks, and a secondary unit controlling the swivelling motion of the superstructure as well as the vertical movement of the jib. The main box is constructed from two 9½ in. Angle Girders joined at one end by a 5½ × 3½ in. Flat Plate 32. A 5½ × 2½ in. Flanged Plate 33 is bolted to the other end of each Girder, then the lower flanges of these Plates are joined through their first and seventh holes by two 4½ in. Angle Girders 34. The upper flanges are joined by a similar Angle Girder 35 and a 4½ × ½ in. Double Angle Strip 36, both of which supply the bearings for two 5 in. Rods each held in place by a 1 in. fixed Pulley 37 at one end and a Collar at the other. A ⅞ in. Bevel Gear 38 is mounted on the inside end of each Rod.

Before going any further, the sideplates of an E15R Electric Motor, bolted to Flat Plate 32, are extended two holes forward by 3 × 1½ in. Flat Plates 39. A ½ in. Pinion on the Motor output shaft drives a 57-teeth Gear 40 on a 2½ in. Rod journalled in the Motor sideplates. A ½ in. Pinion on the centre of this Rod in turn drives a second 57-teeth Gear 41 on a 3½ in. Rod held by Collars in Flat Plates 39. Mounted on one end of the latter Rod is a ¾ in. Sprocket Wheel 42, a ½ × ¼ in. Pinion being mounted on its opposite end. This Pinion meshes with another 57-teeth Gear 43 mounted above it on a second 3½ in. Rod *free to slide in Flat Plates* 39. Also fixed on this Rod are two ⅞ in. Bevel Gears 44, outside the Plates, and a Crank 45, trapped between two Collars inside the Plates. The Bevels must be so positioned that, when the Rod is slid in its bearings, one or another of the Bevels engage with appropriate Bevel 38.

Movement of the Rod is controlled by a 5 in. Rod 46 fixed in the boss of Crank 45 and journalled in two Trunnions bolted one to the upper flange of each Flanged Plate 33, Collars acting as stops for the Rod. Pivotally attached to one of these Collars is a 5½ in. Strip 47 which is lock-nutted to a Double Bent Strip attached to a 5½ in. Angle Girder. This, in turn, is bolted to Flanged Plate 33 and attached to one of the 9½ in. Girders by a 2½ in. Strip 48. A similar Strip is attached to a second 5½ in. Angle Girder 49 bolted to the other Plate 33.

Sprocket Wheel 42 is now connected by Chain to a 1½ in. Sprocket fixed on a 5 in. Rod 50 held by Collars in Flanged Plates 33. A ½ × ¾ in. Pinion mounted on the Rod meshes with a 57-teeth Gear 51 on an 11½ in. Rod 52 free to slide in Plates 33 but being prevented from moving too far in one direction by a ½ in. Pinion 53 outside the Plates.

Journalled in the end flanges of each Plate 33 is an 8 in. Rod held in place by a Crank 54 and a Collar. A Coupling, carrying a 2½ in. Rod 55 in its longitudinal bore, is mounted transversely on the end of the Rod nearest the Motor, then the complete gearbox is fixed in position in the model by bolting Girders 34 to Girders 9.

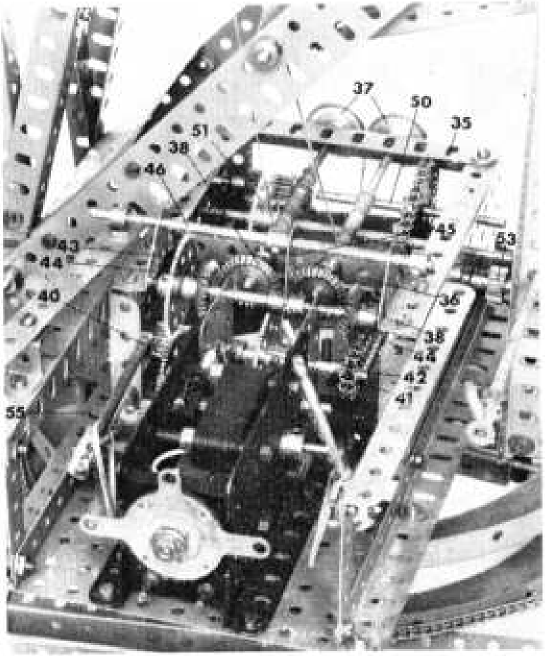
Next, two 3½ × ½ in. Double Angle Strips 56, a distance of two holes separating them, are bolted between rear Girders 10, two and five holes respectively from their lower ends. Journalled in the centre holes of these Double Angle Strips is a 2 in. Rod carrying a Coupling and a 1½ in. Contrate Wheel 57 between the Strips and held in place by a Collar above the upper Strip and a 1 in. Gear 58 beneath the lower Strip. The Rod, incidentally, passes free through one of the Coupling's end transverse bores, its longitudinal bore providing one bearing for a 3½ in. Rod, the other end of which is mounted in nearby Flanged Plate 33. Fixed on this Rod are two ½ in. Pinions 59 and 60, the former in constant mesh with Contrate 57 and the latter meshing with Pinion 53 when Rod 52 is moved towards the jib. Movement of Rod 52 is controlled by a 1 in. Rod fixed in a Coupling 61 which is in turn fixed on an 8 in. Rod journalled in inner Girders 10. A Crank 62 on this Rod is pivotally connected to a loose Collar mounted between two fixed Collars on Rod 52.

Returning to 1 in. Gear 58, this is in constant mesh with a further two 1 in. Gears 63 positioned one each side of it on Adaptors for Screwed Rods 64 mounted in lower Double Angle Strip 56. Fixed in each Adaptor is a 5 in. Screwed Rod mounted in upper Double Angle Strip 56 and in a 1 × 1 in. Angle Bracket bolted to appropriate Angle Girder 10. Each Rod is also screwed through one transverse tapped bore of a Short Coupling 65, mounted on the end of a 1½ in. Rod passed through the end holes of Strips 28, the Strips being spaced by Collars and Washers as before.

A 4½ × 2½ in. Flat Plate 66 is now bolted to the ends of Girders 9, as shown. Attached to this Plate by a 2½ in. Angle Girder is a 2½ × 2½ in. Flat Plate which helps to support Rod 52 and to which a Flat Trunnion 67 is attached by a 1½ in. Angle Girder. A 3½ in. Rod carrying a 1½ in. Contrate 68 and a 1 in. Sprocket Wheel 69 is journalled in the apex hole of the Flat Trunnion and in Plate 66, being held in place by a Collar. Contrate 68 meshes with a ½ in. Pinion 70, fixed on the end of Rod 52, when the Rod is moved away from the jib towards the rear.

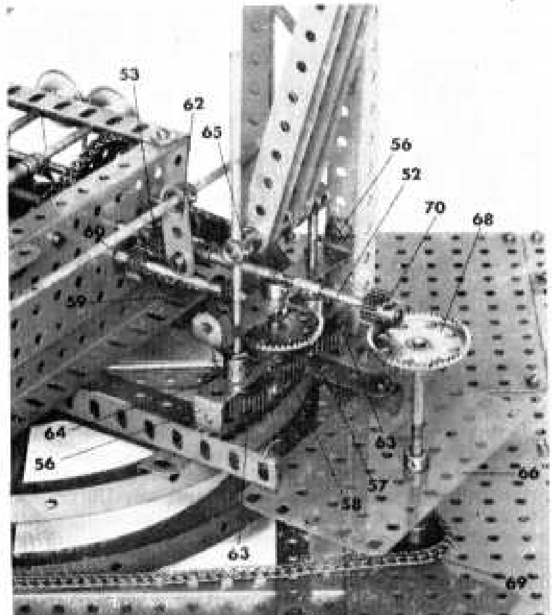
Roller race

Before the superstructure of the Crane can be mounted on the pontoon, a roller race to facilitate the swivelling movement must be produced. This is built up from a Face Plate 71 to which eight radiating 2½ × ½ in. Double Angle Strips are bolted. Held by a Collar and a Spring Clip in the lugs of each one of these is a 5 in. Rod on the end of which a ¾ in. Flanged Wheel is fixed. The finished race is then mounted between



A close-up view of the main gearbox including the E15R Electric Motor which drives all the movements of the model.

In this close-up view of the secondary gearbox, left-hand Girders 10, like Flat Trunnion 67 and the Plate to which it is fixed, have been removed to aid description.



the 9½ in. Flanged Rings on the pontoon and superstructure and a 3 in. Rod is passed through the centre holes of Strips 6 and 7 as well as through the boss of Face Plate 71. Being loose in the boss, the Rod is held in place by Collars above and below Strips 6 and 7.

With the superstructure in position on the pontoon, a length of Sprocket Chain is passed round the circumference of the lower Flanged Ring and round Sprocket Wheel 69. The Chain must be as tight as possible so that, when the Sprocket rotates, the Chain tends to grip the Flanged Ring causing the Sprocket to travel round the Chain thus rotating the Crane.

All that now remains to be built are the pulley blocks, two of which are included in the model. The larger, numbered 72, consists of three 2½ in. Triangular Plates connected together at the corners by ½ in. Bolts, Washers on the shanks of the Bolts spacing the Plates sufficiently far apart to allow two 1 in. loose Pulleys to be mounted between them on a central 1 in. Rod held in place by Collars. A Loaded Hook is secured on the lower Bolt, as can be seen. The smaller pulley block, numbered 73, is built up from two Flat Trunnions separated by a Collar at each upper corner and with a ½ in. loose Pulley mounted on a ½ in. Bolt fixed in the upper centre hole. A Loaded Hook is mounted on a Bolt fixed to the apex of the Flat Trunnions.

Both pulley blocks work independently of each other, each having its own operating Cord. In the case of the smaller block, a length of Cord is tied to the 1½ in. Strip joining the ends of Girders 17, is passed round the ½ in. Pulley in block 73, is taken over Pulley 21, is brought down the jib and is finally taken over one of the Pulleys between Bush Wheels 23 to be attached to a Cord Anchoring Spring fixed on the front Rod carrying Pulley 37. A second length of Cord is tied to one Bush Wheel 22 in the jib, is passed round one of the Pulleys in block 72, is brought up and around one of the Pulleys between Bush Wheels 22, is taken down and round the other Pulley in the block and is again brought up and passed over the other Pulley between the Bush Wheels. From there it is taken over the remaining Pulley between Bush Wheels 23 and is then tied to another Cord Anchoring Spring on the rear Rod carrying Pulley 37.

Brakes for the winding Rods are provided by two short lengths of Cord tied to outside Angle Girder 34. Each length is passed over one Pulley 37 and is tied to the corresponding Crank 54. The brakes are held in the "on" position by an elastic band which is slipped onto one Rod 55, then taken beneath Flat Plate 32 and slipped onto the other Rod 55. The Rods, of course, act as the brake levers.

Owing to the drive mechanism built into this model it is possible to operate one of the main gearbox movements at the same time as one of the secondary box movements, although both movements of any one box cannot be operated simultaneously. The main gearbox controls the pulley blocks, movement of Strip 47 bringing one or the other Bevel Gear 44 in mesh with corresponding Bevel Gear 38, thus turning the respective winding Rod.

In the case of the secondary box, movement of the 1 in. Rod in Coupling 61 in one direction brings Pinion 53 into mesh with Pinion 60, setting the jib control linkage into motion. Movement of the Rod in the opposite direction, however, disengages Pinions 59 and 60, but engages Pinion 70 with Contrate Wheel 68 to bring the swivelling mechanism into action. Note that in both gearboxes the gearing must be so arranged that there is a neutral period between movements. All movements, incidentally, are reversed by simply reversing the Motor.

BRITISH STOCK CAR RACING—*Continued*

motor sport. The rest of the cars battle on like this for twenty laps, and slowly the red topped men avoid the abandoned cars, pass slower drivers, and pick their way to the front—although not every time. Men like Ellis Ford (3), Andy Webb (763) and Trevor Frost (68) all at the top of their chosen sport whose cars are groomed to perfection, a credit to them and to Stock Car Racing.

Stock Car Racing's biggest night is that of the respective World Final for each class. Preliminaries for this event take place during each season, when selected meetings at differing venues count, on a points basis, for entry to the big night. Often, as in the Football Association Cup competition, fancied men fall in early rounds and many lesser known faces can find themselves in a position to have a crack for the title. When the big night arrives, drivers not only have to face competition from their own country, but also entrants from France, Belgium, Holland, South Africa and other countries. Many of our drivers compete regularly at overseas meetings, and 1967 saw the triumphant return of F.II driver Tony May (364) from Holland complete with the European Championship Trophy, the first time that a British driver has won a major foreign award. Whichever the class raced, the technique remains the same. The prime object is to win, and this is done by skill of man and machine and nothing else. Slower cars can legitimately be pushed or spun off, but deliberate charging or fencing is not allowed and such an action would result in the offender receiving dire penalties for such behaviour. Tactics vary according to driver and racing surface, be it shale or tarmac. Gearing, back axle ratios and the type of tyres fitted all have to be carefully considered. Star graded Formula I driver Geoff Harrison (127) is a past master of the calculated tail slide, taking the same line both in and out of the bends with unbelievable precision for lap after lap. Veteran Junior driver Chick Woodroffe (601) whose car seems glued to a tight inside line all through a race and young Todd Sweeney (531) whose rapid rise to F.II fame has been his uncanny ability to "read the track" well in advance.

Remember that all these incidents take place on a track of which the majority are less than 440 yards per lap, and bounded on the outside by a three strand wire fence supported by railway-line type uprights at regular intervals and on the inside by oil drum sized markers. These only add to the hazards of getting round the track for twenty or so laps, with all the other drivers breathing down your exhaust pipe, at speeds which average 45-50 m.p.h.

Stock Car Racing has, for some time, suffered from its dubious early days and is still regarded by the "purists" as something of a circus act. However such days are well and truly past and whatever the thoughts are on Stock Car Racing, the skill of driver and ingenuity of construction of the cars cannot be denied. It's a fast, skilful and entertaining sport, which combines speed with spectacle, and can be seen at Stadiums all over the Country, during a season which lasts from November to February and includes such famous circuits as Cadwell Park in Lincolnshire and Brands Hatch in Kent.

Readers can obtain details of their nearest Stock Car track and details of all fixtures from: The British Stock Car Racing Supporters Association, 2, Enfield Court, Ruthall Close, Abdon Avenue, Selly Oak, Birmingham, 29.

start with very cold water.

Note that although you will use up quite a bit of 'hypo' with this formula the solution can be saved and used for photographic fixing baths, provided it has not got dirty.

Formula B—ammonium chloride

This is a more economical 'freezing' mixture for you only need up to one third the amount of ammonium chloride in proportion to the amount of water. The temperature realised should be about the same as that with 'hypo'—another true 'freezing' mixture, provided you start with really cold water.

Formula C—ammonium nitrate

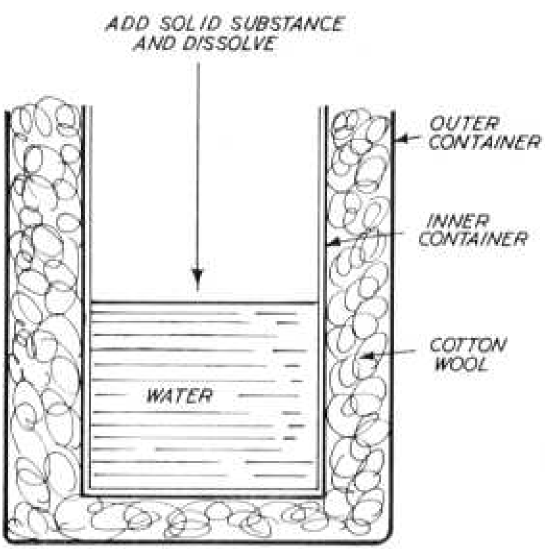
This chemical will dissolve in water up to about equal proportions but will not give a temperature quite as low as with the two previous formulas. It should, however, reach freezing point or slightly below.

Formula D—equal parts of ammonium chloride and potassium nitrate. This will produce a lower temperature than any of the above formulas.

Formula E—1 part ordinary salt mixed with 3 parts crushed ice. This is by far the most economic freezing mixture, and also produces the lowest temperature of all (well below freezing point). You do, however, need ice to start with. All the other formulas produce 'cooling' or 'freezing' mixtures starting with chemicals and water at ordinary room temperature.

Incidentally, with some chemicals the very reverse effect applies. When dissolved in water these chemicals produce a considerable *rise* in temperature of the solution. These can, therefore, be used as chemical heaters rather than freezers.

One such chemical is calcium oxide. Dissolve this in water and the resulting solution will get very hot—it may even boil. The same thing happens when a strong acid or strong alkali is added to water and stirred. Heating solutions like this are toxic or poisonous, so do not use them like freezing mixtures for changing the temperature of anything you may be considering drinking or eating.



A diagrammatic representation of a simple home made freezer. Note the cotton wool layer.

AUTOMOBILE OLDIE

A No. 3 Outfit Model by Spanner

WHILE IT is possible to produce all sorts of true scale models with Meccano, builders would soon be hard pressed finding new things to make if they were limited to scale reproductions only. To get the most out of the system you need a bit of licence or, in other words, you need to be able to make models which, although recognisable as particular types of thing, are not based on specific prototypes. You might, for example, build a model of a crane, rather than a model of a specific make of crane, or a car rather than a particular car—and this is precisely what our model-builder has done. He has produced the simple model featured here which is roughly based on a coupé of the type popular in the 1920s. It can be built with the parts contained in Outfit No. 3.

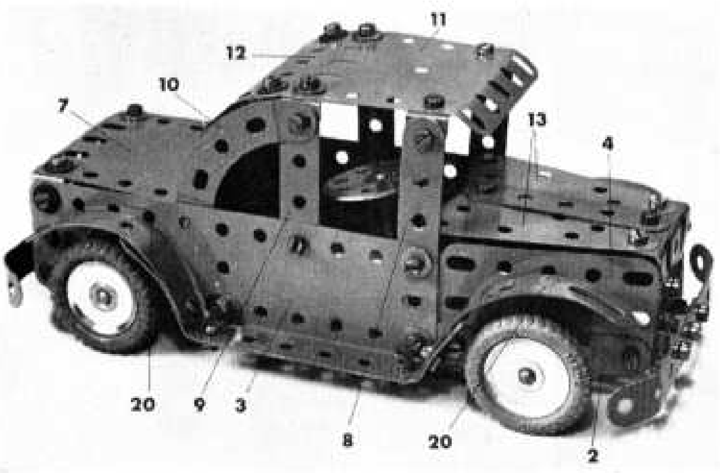
The chassis consists of a 5½ × 2½ in. Flanged Plate 1, to each side flange of which a bent 5½ in. Strip 2 is bolted, the securing Bolts helping to fix a 5½ × 1½ in. Flexible Plate 3 in place. Strip 2 projects a distance of five holes past the end of Plate 1, a 2½ × 1½ in. Flexible Plate 4 being secured to the projecting section.

At the front, the lower corners of Plates 4 at each side are joined by a Flat Trunnion 5, attached by Angle Brackets, while at the rear, Plates 3 are joined by two 2½ × ½ in. Double Angle Strips held by Bolts 6. The Bolts securing the upper Double Angle Strip in position also hold in place two Angle Brackets to which a shaped 4½ × 2½ in. Flexible Plate 7 will later be fixed. Before this is done, however, two 2½ in. Strips 8 and 9 are bolted, as shown, to each Plate 3. Attached to the upper end of each of these is an Angle Bracket, the securing Bolt in the case of Strip 9 also fixing a 2½ in. Stepped Curved Strip 10 in place. Bolted to the Angle Brackets is a shaped 2½ × 2½ in. Flexible Plate 11, extended one hole by a 2½ × 1½ in. Plastic Plate 12.

Plate 7 is now fixed in position, one end being attached to Plate 12, the other end being bolted to the earlier-mentioned Angle Brackets.

The bonnet is built up from two 2½ × 1½ in. Triangular Flexible Plates 13, overlayed down the centre by a 2½ in. Strip, all three items being bolted to a Trunnion 14. This, in turn, is bolted to Flat Trunnion 5. Both the front and the rear bumpers are supplied by two shaped 2½ in. Strips 15, bolted together and fixed on ⅜ in. Bolts held by Nuts in Flat Trunnion 5 and Plate 1. An imitation steering wheel is represented by an 8-hole Bush Wheel fixed on a 2 in. Rod held by a Spring Clip in Flanged Plate 1 and in a ½ in. Reversed Angle Bracket 16, bolted to the underside of the Plate.

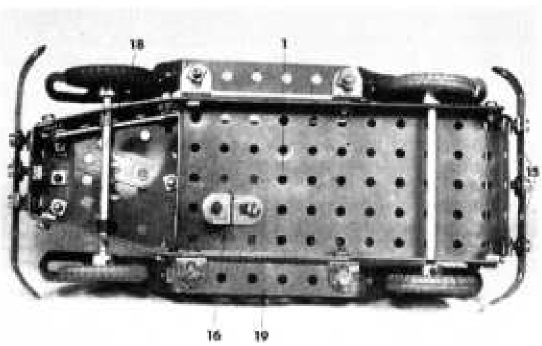
All the wheels are obtained from 1 in. Pulleys fitted with Motor Tyres and mounted in pairs on two 3½ in. Rods forming the axles. The rear axle is journalled in

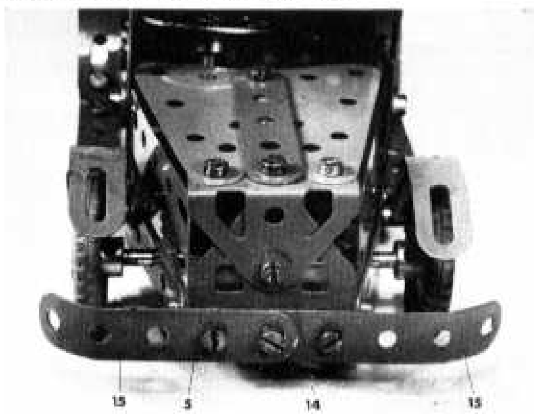


A simple model roughly based on a coupe of the type popular in the 1920's, built with Meccano outfit No. 3.

PARTS REQUIRED			
4—2	1—24	2—90a	2—189
9—5	2—35	4—111a	1—190
2—11	57—37a	1—125	1—191
10—12	46—37b	1—126	1—194
2—16	10—38	1—126a	4—215
1—17	1—48a	4—142a	2—221
4—22	1—52	2—188	

the side flanges of Plate 1, while the front axle 18 is held by Spring Clips is Strips 2. Two running boards are next each supplied by a 5½ in. Strip 19, with its ends bent upward, attached to the side of the model by Angle Brackets. Finally a Formed Slotted Strip 20 is bolted to each of these bent ends to represent a mudguard and the model is finished.





Below left: Underside view of the model showing the layout of the chassis and axles. Below: The front of the model in close-up. Note the use of trunnions to serve as a radiator-grille.

AMONG THE MODEL BUILDERS—cont.

Also attached to Coupling 6, this time by two 1 in. Screwed Rods in the end transverse tapped bores is another Coupling 8, Nuts again preventing the 1½ in. Rod from being fouled. Fixed tight in the centre transverse bore of this Coupling is a second 1½ in. Rod which is passed free into the "spider" of a Swivel Bearing 9 mounted on the end of a 4 in. Rod journalled in Flanged Plate 1 and Double Angle Strip 2. Finally, a third 1½ in. Rod is passed through the appropriate hole in the 5½ × 2½ in. Flanged Plate and is fixed in the boss of Large Fork Piece 7.

When building this unit, you may have difficulty fixing Coupling 8 to Coupling 6 with the Screwed Rods. The system to follow, therefore, is to first screw both the Rods a good way into the transverse tapped bores of Coupling 8. Two Nuts should then be added to each Rod, leaving plenty of room at the lower ends of the Rods which should next be screwed as far as possible into the tapped bores of Coupling 6 without fouling the central 1½ in. Rod. When this has been done the Screwed Rods are locked in place by the Nuts which are tightened against the Coupling.

PARTS REQUIRED			
1—10	20—37a	1—52	2—111
2—15b	12—37b	1—53	1—116
1—16a	4—38	1—59	2—116a
3—18a	2—48	4—63	1—126a
1—27	1—48b	2—82	1—165

ENERGY CONVERSION

by Chris Jelley

Three Meccano models to illustrate how energy is changed in form as it goes through a sequence of operations.

"ENERGY CONVERSION"—a term used to describe the transformation of one type of energy into another. A battery, for example, is a source of electrical energy (obtained from the reaction between the chemicals contained in the battery), yet, if you connect a battery to an electric motor, the output shaft of the motor imparts, not electrical energy, but mechanical energy. You have, in other words, converted electrical energy into mechanical energy, the motor acting as the "Energy Conversion Unit".

Besides the electric motor, another common Energy Conversion Unit is the dynamo or generator, which changes the mechanical energy used to drive it into electrical energy at its output. It is worth mentioning here, by the way, that any permanent-field electric motor incorporating a commutator and operating from Direct Current will also serve as a dynamo if the usual sequence of operations is reversed. (In basic terms, a permanent-field motor is one containing a permanent magnet.) Normally, an electric current is applied to the terminals of such a motor to drive it, but if it is driven, say, mechanically by revolving its output shaft, then the motor actually *generates* electrical pressure which can be tapped at the terminals.

Featured in this article are three simple Meccano models in which an electric motor is used to serve as a dynamo in this way at the same time acting as an Energy Conversion Unit to derive electrical energy from a variety of quite different energy sources. In the following text the motors are referred to as dynamos for descriptive purposes.

All three models are extremely easy to build, the first (figure 1) consisting of little more than a 5½ × 2½ in. Flanged Plate 1, to the top of which a Power Drive Unit 2 is bolted and to one end flange of which a 2½ × 2½ in. Insulating Flate Plate 3 (Elektrikit Part No. 511) is fixed. Attached to this Flat Plate are two Lamp Holders with lamps 4, the upper secured by ½ in. Bolts and the lower by ⅜ in. Bolts. Note that a Fishplate is used to connect each ½ in. Bolt to the adjacent ⅜ in. Bolt behind the Plate before the securing Nuts are fitted. A Washer is added to each ½ in. Bolt, then the leads from the Power Drive Unit are connected to the same Bolts, to be held in place by Terminal Nuts 5 (Elektrikit Part No. 542). Finally, a handle built up from a Crank to which a Long Threaded

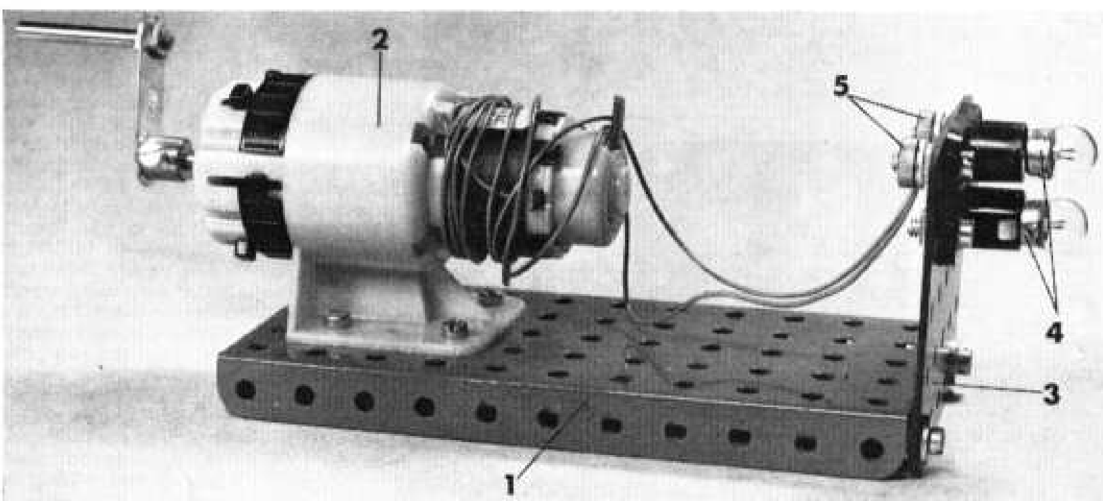


Figure 1. This basic form of Energy Conversion Unit consists of a hand-driven dynamo powering two lamps. A Meccano Power Drive Unit serves as the dynamo.

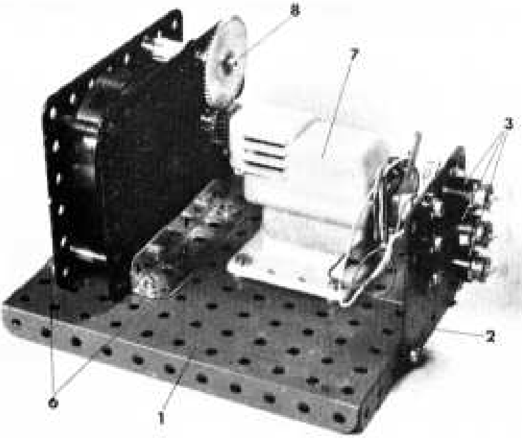
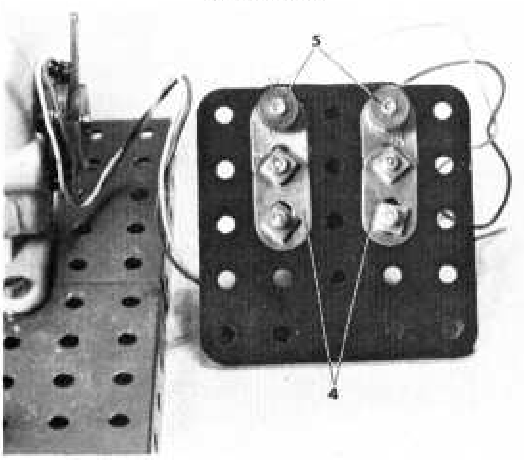


Figure 2. A more-complicated Energy Conversion Unit in which a Meccano No. 1 Clockwork Motor is used to drive a dynamo which in turn generates electricity to power the lamps shown. The dynamo is provided by a Junior Power Drive Unit.

Figure 3. A close-up view of the Fishplate connectors at the back of the Insulating Flat Plate attached to the clockwork-driven model.



Pin is bolted, is mounted on the shaft of the P.D.U. which, incidentally, should be switched "on" and be set on the 12 : 1 or 16 : 1 ratio.

It must be stressed, here, that in this model or, indeed, in all three models, Elektrikit Lamps should not be used as their resistance is too high. The best results will be obtained from a low-voltage lamp (2.5v. or 3.5v.) with a current rating of 0.1 amps. These are easily obtained from any electrical supplier.

Let us now look at the operation of the model. When the handle is turned manually, the physical energy expended in turning it is converted into electrical energy by the dynamo. When this electrical energy is applied to the resistance of the lamps, however, it is converted into heat energy which is, in turn, converted to light energy, provided the electrical energy generated by the dynamo is sufficient to overcome the resistance of the lamps. At the light energy stage, of course, the lamps light up, but they will not do so if there is not enough electrical energy to heat the lamp filament sufficiently to produce light.

You may be wondering why two lamps are included in the model. This, in fact, has been done to illustrate another point involved in Energy Conversion Units of the type at which we are looking. One lamp requires a specific amount of current to illuminate it, this current placing a particular load or "demand" on the dynamo. Two identical lamps require twice the current, resulting in a proportional increase in the load on the dynamo. The dynamo, in turn, requires an increase in energy to drive it. To put it simply, therefore, the dynamo is harder to turn when the second lamp is screwed into place.

This increase in the input energy required is perhaps not too noticeable in our hand-driven model, but it becomes very obvious in our other two mechanically-driven examples. The first of these, illustrated in figures 2 and 3, consists of a dynamo driven by a Meccano No. 1 Clockwork Motor and powering, not two, but three lamps.

Construction, again, is simple. Two 5½ × 2½ in. Flanged Plates 1, placed side by side, are bolted together with a 2½ × 2½ in. Insulating Flat Plate 2 being secured across their end flanges at one end and a 3 in. Strip at the other end. Attached to the Flat Plate are three Lamp Holders 3, the securing Bolts again being connected by Fishplates, two at each side in this case, and numbered 4 in figure 2. Also, a Washer and Terminal Nut 5 are added, as before, to each Bolt holding the upper Lamp Holder in place. A No. 1 Clockwork Motor is fixed, by two 3½ in. Angle Girders 6, to the top of the Flanged Plates as also is a Junior Power Drive Unit 7, a Washer on the shank of each securing Bolt spacing the Unit from the Plates. A 50-teeth Gear 8 on the Motor output shaft engages with a ¾ in. Pinion on the shaft of the Junior Power Drive Unit, while the leads of the J.P.D.U. are connected to the securing Bolts of upper Lamp Holder 3. The J.P.D.U. switch should be in the "on" position.

As already mentioned, this model clearly illustrates the increase in the dynamo input energy requirement when the load on the dynamo is increased. If, for instance, the Clockwork Motor (which can only supply a fixed amount of energy) is set in motion when only one lamp is in place, the Motor will run at a certain speed, while the dynamo will generate sufficient electricity to light the lamp. If the second lamp is added, however, the speed of the Clockwork Motor will immediately drop as the load on the dynamo, and thus on the Motor, is increased. When the third lamp is added, the speed drops even further, while the electrical

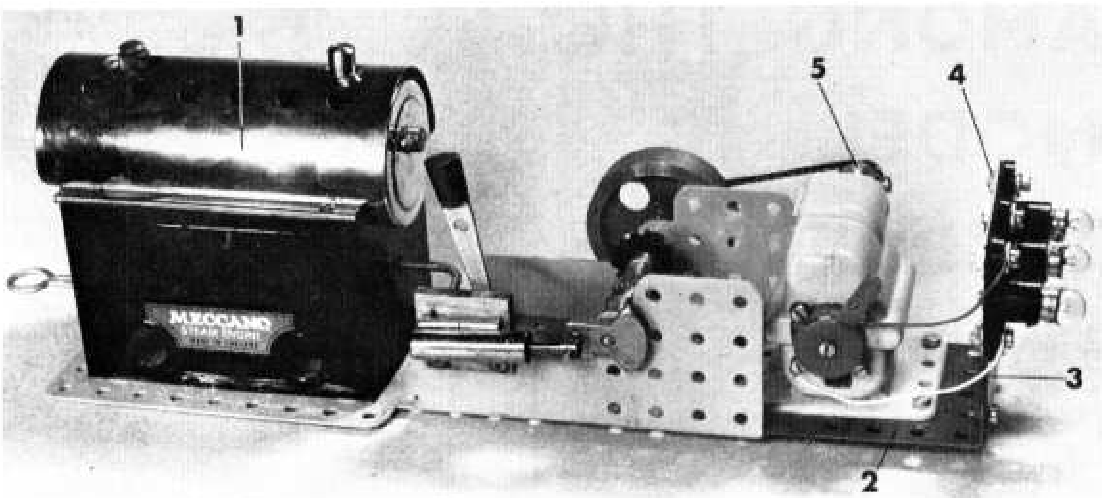


Figure 4. Numerous conversions of energy are illustrated by this particular model in which a Meccano Steam Engine is used to drive a dynamo, supplied by a Junior Power Drive Unit.

energy generated by the dynamo is insufficient to pass through the heat energy stage into light energy. In other words, it is insufficient to light the lamps.

Before passing onto our third and final model, it is interesting to follow all the energy conversions performed by this model. When the Clockwork Motor is wound up, the physical energy expended in winding it is "stored" in the Motor spring in the form of *potential* mechanical energy until the Motor is set in motion, at which time it actually gives mechanical energy. The dynamo then converts this energy into electrical energy which is subsequently converted by the lamps into heat energy, this, under the right conditions, changing to light energy.

You will see from the above that there are quite a number of complicated changes taking place during the operation of one simple little model and, believe it or not, even more changes occur with our equally-simple final model! Illustrated in figure 4, this is a steam-driven dynamo connected to a bank of three lamps and it is built as follows: the baseplate of a Meccano Steam Engine 1 is extended five holes by a 3½ × 2½ in. Flanged Plate 2, the securing Bolts helping to fix a Junior Power Drive Unit to the top of the Plate. Bolted to the end flange of Plate 2 is a 2½ × 2½ in. Insulating Flat Plate 3, to which three Lamp Holders are secured. The upper terminals of these Lamp Holders are connected together, this time by a 2½ in. Strip 4, as also are their lower terminals, the J.P.D.U. leads being connected to the terminals of the nearest Lamp Holder. A ½ in. Pulley with Boss 5 is mounted on the shaft of the J.P.D.U. and is connected by a Driving Band to the small pulley incorporated in the flywheel casting of the steam engine.

This model is much the same as the above clockwork-powered example, except that, here, the Steam Engine drives the dynamo to power the lamps. The work done is similar and, as with the other model, the more lamps which are in use, the slower the Engine will run owing to the increased load. If the work done is similar, however, the number of energy conversions occurring is definitely higher.

To begin with, the burning methylated spirit in the Steam Engine burner creates heat energy. The action of the heat on the water in the Engine's boiler makes steam, which is stored as pressure energy, and so the heat energy has been converted into pressure energy. The steam pressure in the boiler drives the piston and thus the flywheel shaft of the Engine—a mechanical action—therefore the pressure energy has now changed into mechanical energy. From here, the energy changes are similar to our second model—the dynamo converts the mechanical energy into electrical energy which is in turn changed by the lamps into heat energy and then finally into light energy.

All in all, Energy Conversion is a fascinating subject and these simple Meccano models clearly illustrate the progress of such Conversion through a given set of operations.

PARTS REQUIRED

(Hand-driven Model)

2—10	1—52	1—511
10—37a	1—62	2—542
8—37b	2—111c	2—539
4—38	1—115a	2—2.5 v. or 3.5 v., 0.1 amp. lamps

1—Power Drive Unit

PARTS REQUIRED

(Clockwork-driven Model)

1—4	1—27	2—52	2—542
2—9c	24—37a	2—111a	3—539
4—10	18—37b	4—111c	3—2.5 v. or 3.5 v., 0.1 amp. lamps
1—25	10—38	1—511	

1—No. 1 Clockwork Motor. 1—Junior Power DriveUnit.

PARTS REQUIRED

(Steam-powered Model)

2—5	8—37b	1—511
1—23a	6—38	3—539
14—37a	1—53	3—2.5 v. or 3.5 v., 0.1 amp. lamps

1—Meccano Steam Engine. 1—Junior Power Driven Unit.

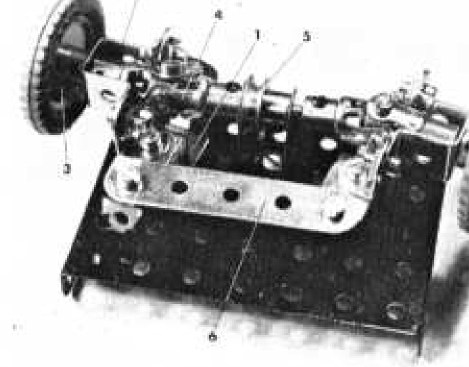
AMONG THE MODEL BUILDERS

with Spanner

IT IS generally assumed that Meccano front wheel drive mechanisms are only suitable for fairly large models and, under normal circumstances this is quite true. The complexity of an F.W.D. system is such that the Meccano parts required to make a working reproduction result in a good-sized mechanism which, of course, needs a good-sized model to accommodate it. However, it is certainly possible to produce a simple front wheel drive system for small models which, although not based on a real-life mechanism, nonetheless operates perfectly successfully. M.M. reader James Grady of Dundee, Scotland has in fact sent me details of just such a system he has designed and which you will find featured here.

Construction is pretty obvious from the accompanying photograph. The mounting, which might vary in a model, is supplied here by a 3½ × 2½ in. Flanged Plate to which two Double Bent Strips 1 are lock-nutted. Attached at right-angles to each of these Double Bent Strips by Angle Brackets is another Double Bent Strip 2, in the centre of which a 1 in. Rod is held by a 1 in. fixed Pulley with Motor Tyre 3. One end of a Universal Coupling 4 is mounted on the inside end of the Rod.

Below: Suggested by James Grady of Dundee, Scotland, this simple, belt-driven Front Wheel Drive system is ideal for small models. At right: A multiple Drive Mechanism rebuilt from the pre-war Meccano Standard Mechanisms Manual. It is based on a type "frequently employed in multiple drilling machines and similar apparatus . . ."



The free ends of the Universal Couplings at each side are now joined by a 1½ in. Rod centrally journalled in a Stepped Bent Strip 5. A ½ in. Pulley with boss is fixed on the Rod between the lugs of the Bent Strip, as shown, then two Fishplates are bolted one to the rear lug of each Double Bent Strip 1. To complete the unit, a 2½ in. Strip 6 is lock-nutted between these Fishplates.

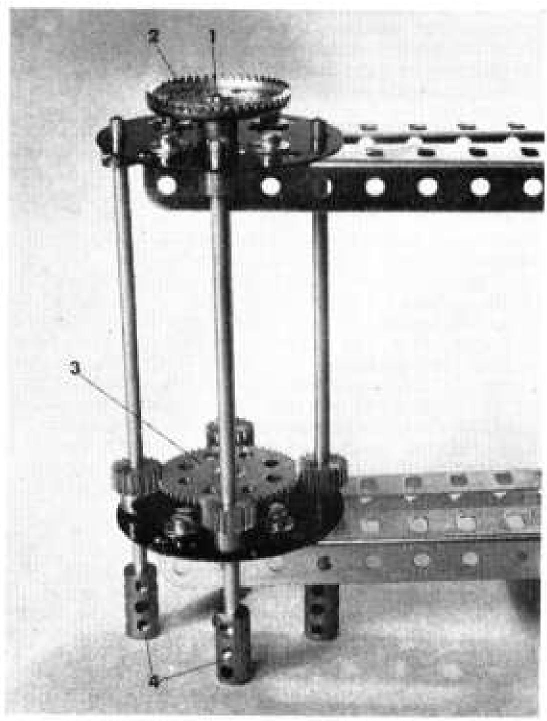
I leave the last word on the subject to James, only adding that I heartily agree with him. "Many of the smaller set users," he says, "will I think, like the idea of being able to make a front wheel drive that steers and can be fitted with 1 in. Pulley Wheels with Tyres and can be driven from a Magic Motor, using a Driving Band and a ½ in. Pulley".

PARTS REQUIRED

1—5	2—22	4—45
2—10	1—23a	1—53
4—12	17—37a	2—140
1—18a	13—37b	2—142c
2—18b	1—44	

Pre-war mechanisms

Changing the subject, now, I have been looking through a file copy of the old Meccano Standard Mechanisms Manual which was published before the last war. I don't know if many readers have seen this rare publication but it contains a wealth of mechanisms of tremendous variety, the great majority of which are just as applicable today as they were thirty or so years ago. For interest's sake I have re-built a couple of the items shown and I think you will agree that their age in no way limits their present usefulness.



Item No. 1 is a Multiple Drive Mechanism reminiscent of a type which, according to the original manual, " . . . is frequently employed in multiple drilling machines and similar apparatus where several shafts are required to rotate at a uniform speed and in the same direction." The unit is really very simple, consisting of little more than five Rods journalled in two Face Plates and carrying various Pinions or Gears. The input shaft 1, free in the bosses of the Face Plates, has a 1½ in. Contrate Wheel 2 and a 57-teeth Gear 3 fixed to it. This Gear is in constant mesh with four ½ in. Pinions fixed one on each of four countershafts, held by Collars in the outside circular holes of the Face Plates, while Couplings 4, mounted on the lower ends of the countershafts, are used to carry the drilling bits. The Face Plates are of course secured to the body of the machine in which the mechanism is fitted, the drive being transferred via a Pinion to Contrate Wheel 2.

In operation, the length of the Rods and the method of mounting the Face Plates depends entirely on the "parent" model, but, for demonstration purposes, I have used one 5 in. and four 5½ in. Rods, and have mounted the Face Plates in a framework of Angle Girders. The following Parts List applies to the unit as illustrated.

PARTS REQUIRED

2—6a	4—26	8—38
4—9	1—27a	4—59
2—9a	1—28	4—63
2—14a	20—37a	2—109
1—15	20—37b	

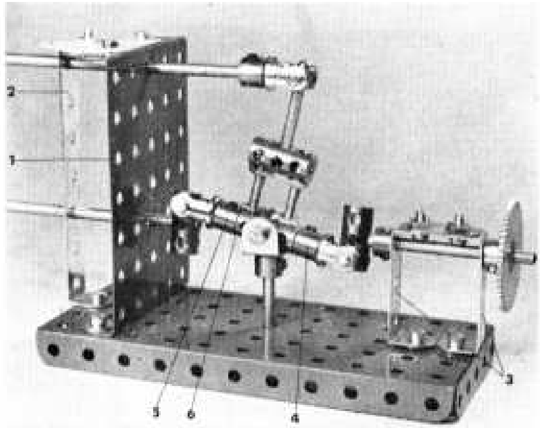
Swashplate

Item No. 2 from the Standard Mechanisms Manual is a Swashplate Unit. This is a mechanism which acts as a sort of cam to give a reciprocating (back-and-forth) motion to a rod, but it is unlike the normal cam in that the motion is in a direction parallel to the revolving input shaft of the mechanism. As you know, the reciprocating movement resulting from a normal cam is at right-angles to the input shaft.

The mounting shown in the original Manual and reproduced here consists of a 5½ × 2½ in. Flanged Plate to which are bolted a 3½ × 2½ in. Flanged Plate 1, a 3½ × ½ in. Double Angle Strip 2 and two 1½ × ½ in. Double Angle Strips 3, the last spaced from the larger Flanged Plate by one Washer in each case. The tops of Flanged Plate 1 and Double Angle Strip 2 are joined by a Flat Trunnion, while a Fishplate connects the upper lugs of Double Angle Strips 3.

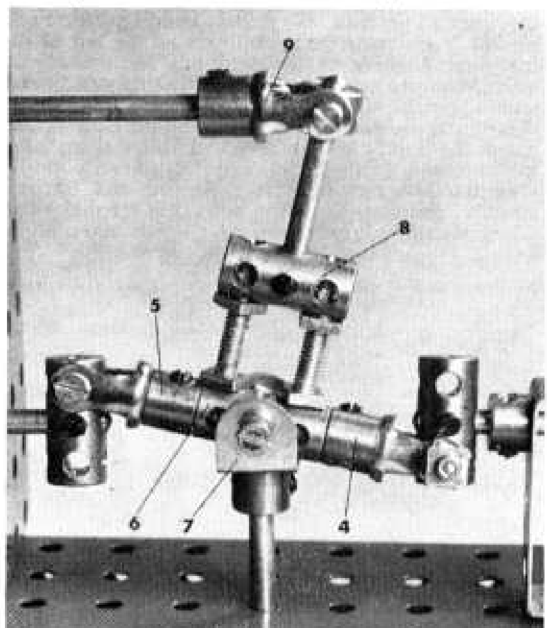
Held by a 50-teeth Gear and a Collar in Double Angle Strips 3 is a 2½ in. Rod, serving as the input shaft. On the inner end of this a Coupling is fixed, the Rod passing through its centre transverse bore, while a Small Fork Piece 4 is pivotally attached to one end of the Coupling by a lock-nutted ⅜ in. Bolt. Another similar Coupling/Small Fork Piece arrangement 5 is mounted on the end of a 4 in. Rod journalled in Flanged Plate 1 and Double Angle Strip 2, then the two Small Fork Pieces are joined by a 1½ in. Rod on which a Coupling 6 is *loosely* mounted. A Large Fork Piece 7 is attached to the centre of this Coupling, the securing Bolts being prevented from fouling the 1½ in. Rod by a Nut on the shank of each.

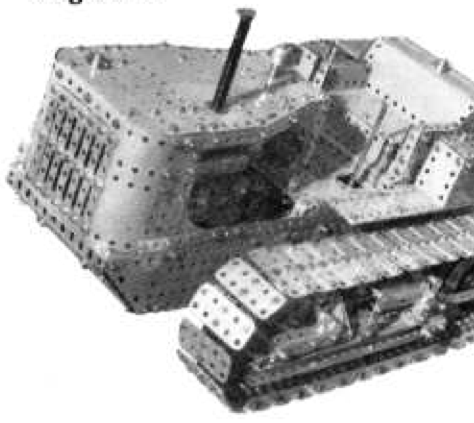
(Text continued on page 550)



Also rebuilt from the pre-war Standard Mechanisms Manual, this Swasplate Unit serves as a type of cam to convert rotary motion into reciprocating motion which acts in a line parallel to the input shaft.

A close-up view of the Couplings and Fork Pieces, etc., making up the conversion section of the Swashplate Unit.





MASTERPIECE

Although its complexity prevents us from giving detailed building instructions, we just had to show you this marvellous Heavy-duty Crawler Tractor built by ERIC TAYLOR of Nuneaton, Warwickshire. BERT LOVE of Birmingham took the photographs and supplied the following general description based on Eric's original notes

ILLUSTRATED IN the accompanying pictures is a model Crawler Tractor that serves as an outstanding example of the combination of the versatility of the Meccano system and the application of sound engineering practice in model building. Strangely enough it evolved from a challenge arising out of the Inaugural Meeting of the Midlands Meccano Guild when Members voiced the opinion that they had never seen a published Meccano model which had really rugged and satisfactory caterpillar tracks. Eric Taylor, one of the Guild's leading modellers, took this challenge to heart and finished the design stages very shortly after the first meeting. He proceeded with its construction and completed it in good time for the second Guild Meeting where it proved a star attraction.

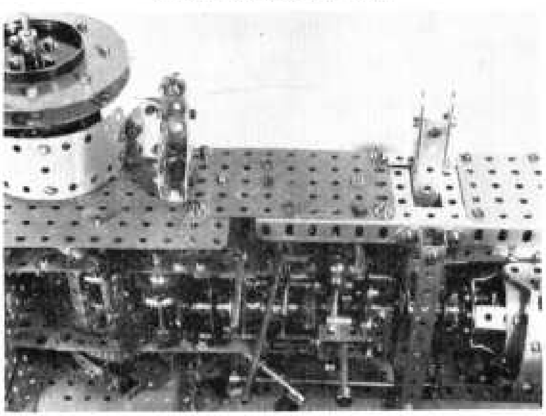
The type of crawler represented is found wherever large civil engineering works, road building or heavy pulling and pushing jobs are required and is a true "Maid of All Work" for the site engineer. Equipped with an angled dozing blade, the full-sized tractor sweeps all before it and the model illustrated was designed and fitted for such an attachment, the "U" frame pivots being provided at the rear of the track frames and the control gear in a 'tank' conveniently placed to the right hand side of the driving seat. Design of the model is not based on one particular type although the general outlines are similar to those of a famous American caterpillar tractor. The model weighs over 30 lb., but is adequately powered at all speeds by a single Power Drive Unit, running from a 12 volt D.C. supply, the motor being mounted in the appropriate place, i.e., inside the engine housing.

Particular attention has been given to main frame rigidity and the accurate alignment of transmission bearings in order to reduce friction to a minimum. To this end the main 'hull' of the model follows the design of the largest British-made crawler tractor as do the three-point suspension arrangements of the track frames. These completely relieve the hull of torsional stresses which would otherwise cause bearing misalignment and related friction over uneven ground. The final drive and steering arrangement is also of British design, having been developed in wartime for tank production, and was selected for the model owing to its simplicity, reliability and compactness.

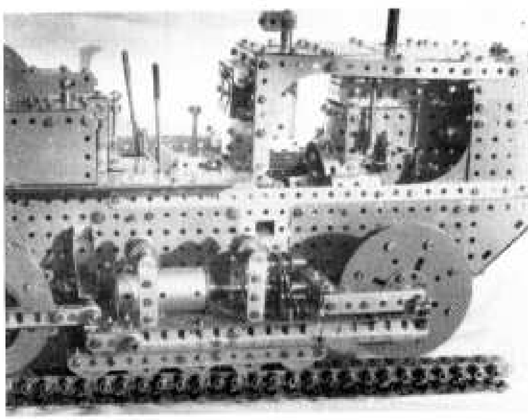
The "Engine" simulates a fan-assisted, water-cooled 6-cylinder diesel unit of approximately 150 B.H.P. with electric starter motor. The cylinder block is fitted with fuel pump, centrifugal governor and injectors on its right hand side. Above this is the exhaust manifold built up from fibre Elektrikit Strips or Fishplates surmounted by an Elektrikit Magnet Holder which conveys the exhaust fumes up the 'pipe' of Elektrikit Insulating Spacers to the rain flap at the top of the pipe. Similar detail is built onto the far side of the engine where fuel lines are run in transparent plastic-covered wire to simulate the prototype. Starter motor, generator, water pump and fan are also included.

In accordance with modern design, the bonnet tapers towards the driver so that the leading portion of each track and a large portion of the angled dozing blade are clearly visible in his line of vision. The taper finishes at the width of the instrument panel which

An upper view of the "hull" showing the gearbox and transmission to the driving shaft.



In this side view of the model, construction of the track frame is clearly shown.



carries the all important, water temperature, oil pressure and ampmeter gauges. The tapered end of the bonnet also covers a large vertical cylindrical centrifugal air filter, the intake for which is situated above the rear of the bonnet to be as free from ground dust as possible. The radiator filler cap is offset to one side so that the driver may inspect the water level by standing on the offside track. From this position the driver may also inspect the dipstick and oil filling cap.

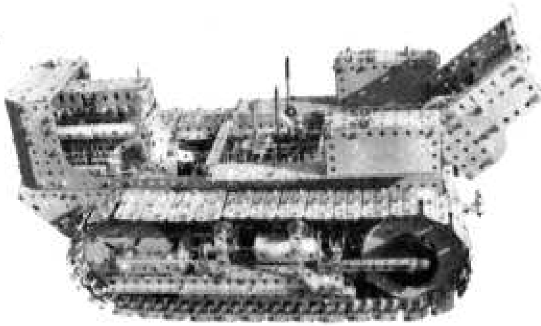
A heavy duty Single Dry Plate pedal-controlled clutch is provided and incorporates an automatic brake which eliminates 'spin' and permits the quick and easy changing of gears. A roller type of release bearing, shown at the rear of the clutch bell housing, is provided to take up operational pressure and a small ball race inside the clutch prevents friction between the clutch shaft and the engine main crankshaft when the clutch is disengaged. A similar thrust bearing is provided at the forward end of the crank shaft to take up the thrust when operating the clutch. With the Power Drive Unit set on the 16 : 1 gear ratio, a designed clutch speed of 360 r.p.m. is obtained and this is variable, by operation of the electrical speed controller, right down to 'tick-over' revs without stalling, thanks to the thrust bearings which also greatly reduce power losses when the drive is being taken up by the clutch.

The four-speed gear box, of orthodox Meccano design, is fitted with a four-position gate change for selection of ratios only. Forward and reverse are selected by an independent gear lever, situated conveniently at the driver's left hand so that he can reverse the tractor in any of the four speeds—a very useful time-saving function when the machine is making swift return movements from bull-dozing runs. The reversing gear consists of a sliding shaft carrying 1 in. and ½ in. Pinions which either mesh respectively with a 1 in. Pinion or two ½ in. Pinions in "series" the lower of these ½ in. Pinions being the gear which operates directly on to the differential crown wheel. The differential half shafts are fitted with supplementary reduction boxes each half shaft also being fitted with a rubber-shod brake disc around which an external contracting brake strap is fitted to effect track steering. Each band brake is linked to a steering stick at either side of the driver and brake tension is adjustable by screw from below the crawler. A 'kick-proof' locking device is fitted to the left hand brake to lock the left hand track when the tractor is parked on a gradient.

Placing the brakes in this part of the transmission reduces proportionately the torque required from the differential and the retardation required from the brakes for steering purposes.

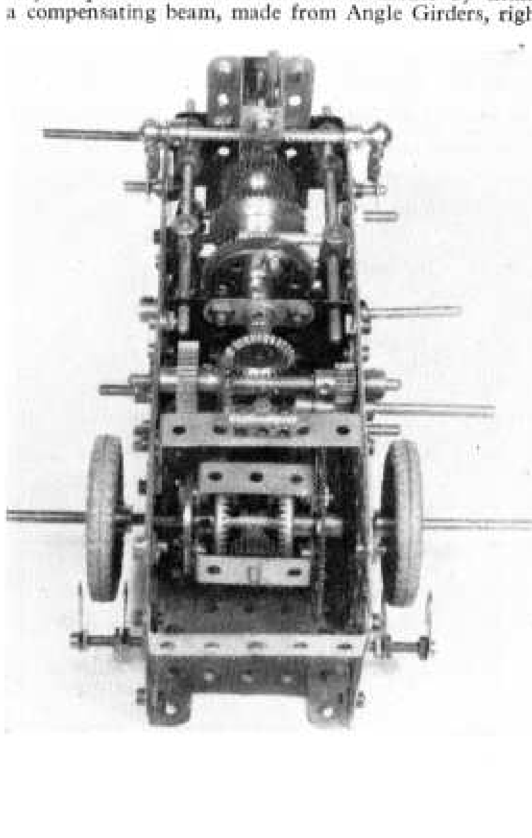
Final drive to the rear track Sprockets is via a 9 : 1 reduction from the differential, positive spur gearing relieving any final axle torque. These track Sprockets are journalled on dead axles, braced at their extremities against track tension and recoil by brace links incorporated in the dust covers on the outer face of each Sprocket. This arrangement prevents sprocket shaft deflection with resultant misalignment of track links and related components.

To ensure that the drive (and idler) Sprockets are not unduly loaded by tractor weight, they are mounted to clear the surface of the ground and the main frames carrying the tractor weight are carried on a series of track rollers, of which there are five on each side of the model, set up in heavy bearings. Each of the front

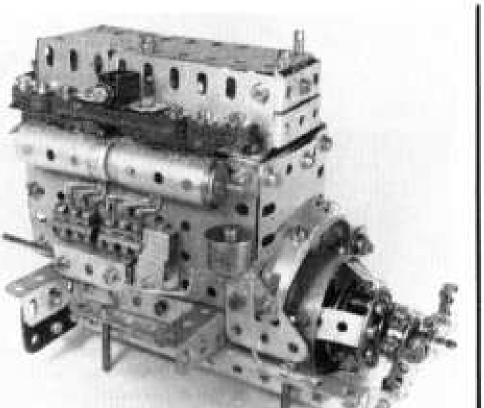


idler Sprockets is maintained in tension against the track by sliding yokes in which they are journalled, the yokes being attached to spring-loaded 'hydraulic' tension cylinders mounted inside the track frames. These cylinders maintain track tension and absorb undue track pressures arising from sharp rocks and similar obstacles. Each track frame is pivoted at its rear end on a strongly-braced axle mounted immediately in front of its respective drive Sprocket.

It is important to arrange for the crawler to ride over uneven ground while keeping the hull as steady as possible. This is done by arranging for each track frame to pivot in such a way that a rise in one track will cause a drop in the other of the same magnitude so that the hull remains upright when travelling over 'average' rough ground. In the prototype, a very heavy axle is journalled through the hull and is fitted at each end with opposing cranks, linked to the track frames. A rise in one track frame will therefore cause a proportionate fall in the other, and vice versa. Eric Taylor produced a solution in his model by fitting a compensating beam, made from Angle Girders, right



A close-up view of the gearbox and differential removed from the model. Note the rubber-tyred brake discs. Above: A general view of the Tractor with the bonnet removed and the driver's seat hinged rearwards.

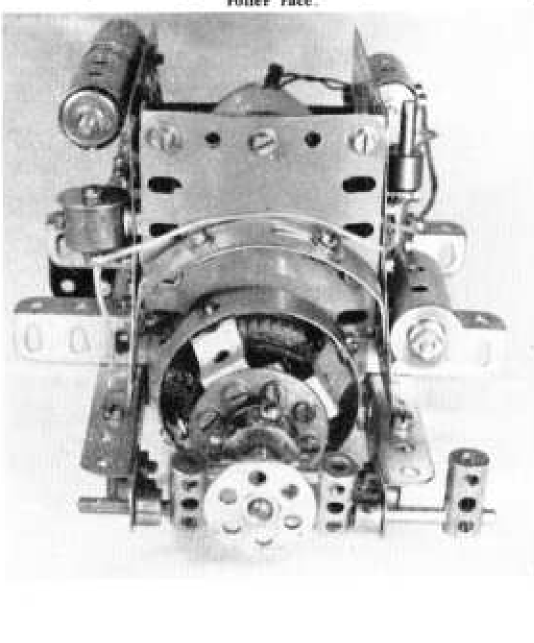


through the hull of the tractor, pivoting it in the centre of the hull, just below the flexible coupling shown in the transmission. At either end of the beam, flexible links connect it to the track frames so that a see-saw effect is produced which provides adequate and realistic compensation in the model.

In order to maintain 'centre point' steering in a crawler tractor which is towing, it is important that the drawbar be pivoted under the tractor at the theoretical centre of weight, thus allowing the tractor to be steered about the centre of 'drag.' In the model, the drawbar pivots just forward of the compensating beam and can either be left in free pivot when towing or locked into any of the holes in the radial frame at the rear of the tractor.

The tracks are made from Flat Girders, with Strips over their elongated holes, each track link being hinged by Fishplates supported against Double Brackets bolted to the Flat Girders. One-inch bolts act as hinge pins and these are locked in place with Collars. The spokes of the driving Sprocket are Narrow Strips spaced and sandwiched between Circular Plates.

The minute detail and proportions of the built-up, imitation engine are evident from picture above. Below: an end view of the engine showing the clutch assembly. Note the built-up roller race.



TWO DOG POWER CARRIAGE

Spanner describes a delightful little model accurately based on a Dog Carriage used in the early 19th century.

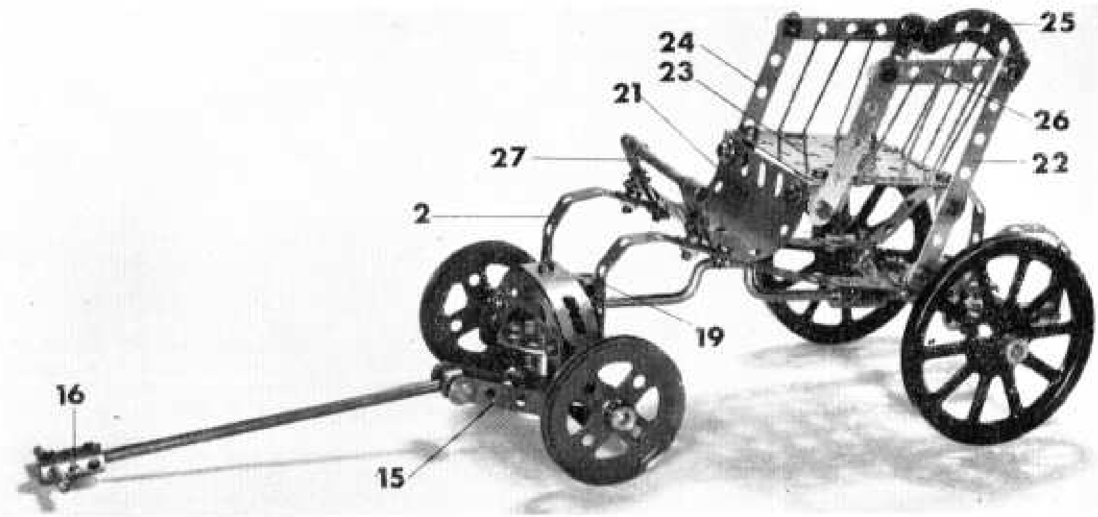
YOU'VE HEARD of horseless carriages—the original name for the motor car—and you'll certainly know something about horse-drawn carriages, but did you know that there used to be such things as dog carriages? These were usually small, light-weight vehicles drawn, as the name suggests, by large dogs. Prior to 1840 they were not uncommon sights in Britain and I understand that even today they can occasionally be seen in out-of-the-way places in some Continental countries such as Belgium and Switzerland.

As far as we are concerned dog carriages are now part of our history, but we at least have the advantage of being able to re-create history in model form, thanks to Meccano. Illustrated on this page is a simple model based on an early dog carriage preserved in Guildford Museum, Surrey.

Construction is quite straightforward. Two combined chassis members and springs are each built up from a 4½ in. Narrow Strip 1 to each end of which another, shaped, 4½ in. Narrow Strip is bolted. Of these, Strip 2 at the front overlaps Strip 1 four holes, while Strip 3 at the rear overlaps Strip 1 only two holes.

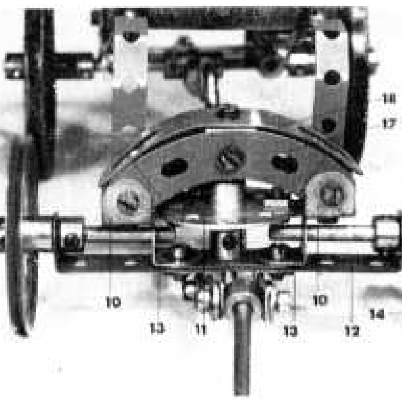
A split rear axle is next built up from two 2 in. Rods, each fixed in one transverse bore of a Short Coupling 4 and joined together by an ordinary Coupling 5. Note that these Rods must not foul the centre transverse bore of the Coupling as, fixed in this, is a 2 in. Rod 6 on each end of which another Coupling 7 is mounted. Two Threaded Couplings 8 are then secured one each on the ends of two 1 in. Rods fixed in the longitudinal bores of Short Couplings 4, the Threaded Couplings being joined by a 2½ in. Rod 9 fixed in rear Coupling 7. Strips 3 are bolted to Threaded Coupling 8 as shown. The rear road wheels are free-running 3 in. Spoked Wheels held on the rear axle by Collars.

In the case of the front axle assembly, two Double Brackets 10 are joined by a 2½ in. Strip to the centre of which an 8-hole Bush Wheel 11, boss uppermost, is bolted. Loose in the boss of this Bush Wheel is a 1½ in. Rod held in place by a Collar above the Bush Wheel and a Double Arm Crank spaced by two Washers below it. Bolted to the underside of this Double Arm



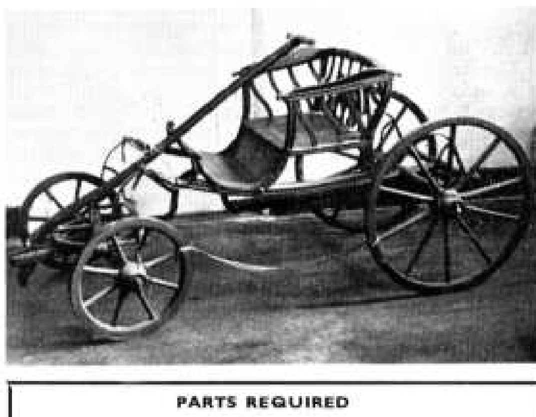
Crank is a $3\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 12, the securing Bolts also holding two Angle Brackets 13 in place at the top of the Crank and a further two in place beneath the Crank

Journalled in the free lugs of the upper Angle Brackets and the lugs of the Double Angle Strip are two 2 in. Rods each carrying a free-running 2 in. Pulley 14 and held in place by Collars. Bolted to the free lugs of the lower Angle Brackets are two 2 in. Narrow Strips 15, the free ends of which are joined by two Bolts screwed into a Collar, at the same time fixing a $5\frac{1}{2}$ in. Rod in the Collar. A Coupling 16 carrying a transversely-mounted $1\frac{1}{2}$ in. Rod is mounted on the end of this $5\frac{1}{2}$ in. Rod, then the lugs of Double Brackets 10 are joined by two $2\frac{1}{2}$ in. Stepped Curved Strips 17, the securing Bolts in one case also fixing the whole unit to the ends of Strips 2. The centres of Strips 17 are connected by a Double Bracket to which a Formed Slotted Strip 18 is bolted. A vertically-mounted Threaded Coupling 19 is then fixed to the upper face of Bush Wheel 11 and a Crank Shaft 20 (Part No. 134), mounted in its centre transverse bore, is secured in the longitudinal bore of front Coupling 7.



Bodywork

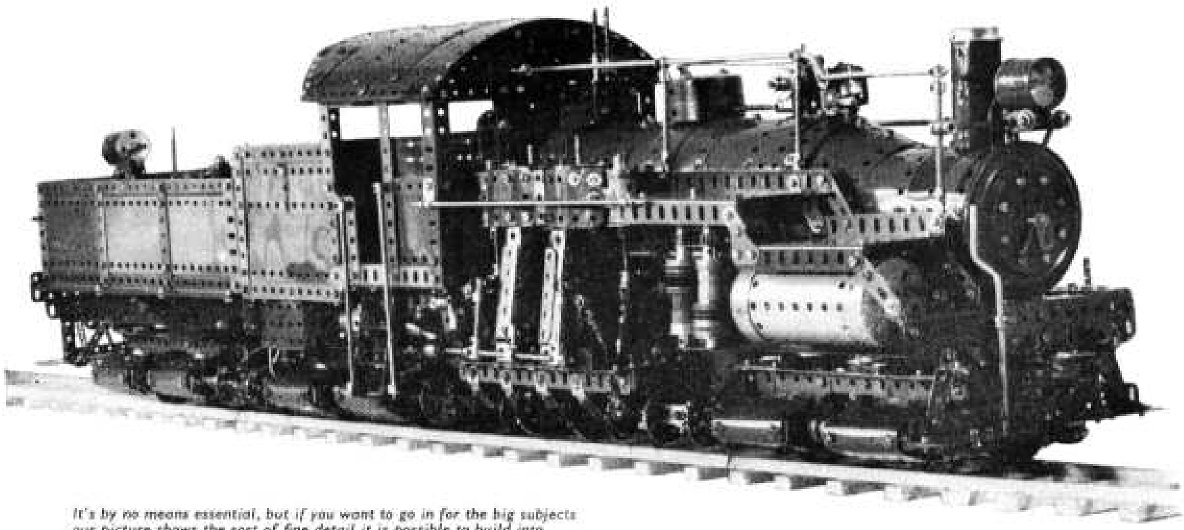
Coming now to the body, this is really highly simple consisting of little more than a seat with a foot-board. A $2\frac{1}{2} \times 2\frac{1}{2}$ in. Curved Plate 21 is bolted to Strips 1 as also are two $3\frac{1}{2}$ in. Narrow Strips 22. The Narrow Strips are connected to the Curved Plate by a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flat Plate 23, attached by Angle Brackets, two $2\frac{1}{2}$ in. Narrow Strips 24 in turn being attached to the Flat Plate also by Angle Brackets. Angle Brackets are again used to fix a $2\frac{1}{2}$ in. Stepped Curved Strip 25 between the upper ends of Narrow Strips 22, the securing Bolts at the same time helping to fix a further two $2\frac{1}{2}$ in. Narrow Strips 26 between Strips 22 and 24. Meccano Cord threaded between Strips 25 and 26 and Flat Plate 23 completes the seat, while the whole model is finished by adding a footrest to Curved Plate 21. This consists of a 2 in. Rod 27 mounted in right-angled Rod and Strip Connectors bolted to the Curved Plate.



Bottom right: The real Dog Carriage as it appears on show in Guildford Museum. It was used by a small girl round about 1825 and was drawn by two large dogs.

PARTS REQUIRED

1—5	2—18b	1—48b	3—90a
2—11	2—19a	10—59	1—134
15—12	2—20a	1—62b	1—200
1—14a	1—24	3—63	2—212a
3—16a	42—37a	3—63c	1—215
4—17	46—37b	2—63d	6—235
2—18a	8—38	1—72	2—235b
			6—235d



It's by no means essential, but if you want to go in for the big subjects our picture shows the sort of fine detail it is possible to build into a model. This particular example was based on an American Shay Locomotive and it gained first prize in Section B of our last competition for R.H. Groen of Amsterdam, Holland.

Meccano Contest 1968-9

CASH PRIZES FOR YOUR MECCANO MODEL!

When the old Meccano Magazine ceased publication last year, Meccano Limited were forced to abandon the model-building competition they were running at the time. This, however, did not mean that the Contests which, over the years, had become part of the Meccano tradition were being abandoned for all time—definitely not! Now that the new Meccano Mag. is well and truly here, in fact, we are delighted to announce the start of yet another contest in which valuable cash prizes are offered to the builders of Meccano models which the judges, taking all things into consideration, feel to be most worthy of success.

ALL COMERS WELCOME

As usual, the competition is open to every owner of a Meccano Set living anywhere in the world and no limit, maximum or minimum, is set either on the number of entries which may be submitted or the quantity of parts which may be used. Any kind of model is eligible for entry unless taken direct from a Meccano manual, and all will be judged on their individual merits. *The only stipulations are that the model or models must be built entirely of standard Meccano Parts and must be your own unaided work.*

Prizes will be awarded for what the judges consider to be the best-built models with particular attention being given to those in which the more unusual parts are put to good use, as well as, of course, to originality of subject. Remember, too, that a small well-built model stands just as much chance of success as a large, unstable example, so don't be put off entering the contest just because you don't own a big stock of Meccano. The competition closes on January 31, 1969, for competitors in the U.K. and Ireland and two weeks later, on February 14, for overseas competitors.

Entries will be divided into two sections, A and B. Section A is for competitors under 14 years of age on the closing date and Section B for competitors aged 14 or over on that date. Prizes in these sections are as follows: Section A, 1st. £5.5.0; 2nd. £3.3.0; 3rd. £2.2.0; 10 prizes of 10s.6d. Section B, 1st. £7.7.0; 2nd. £5.5.0; 3rd. £3.3.0; 10 prizes of £1.1.0.

HOW TO ENTER

Once you have built the model, obtain a good photograph of it, or, failing this, a reasonably detailed sketch. If you are not an artist yourself, it is quite permissible to have a friend prepare the sketch. It is also advisable to include a short description of the main features of the model with your entry, mentioning any points of interest that you would like brought to the attention of the judges. *Under no circumstances, however, must the actual model be sent.*

In entering the Contest, write your name and address on the back of *each* photograph or drawing, together with the letter A. or B. depending on the Section for which you qualify, and forward to **Model-building Contest, Meccano Magazine, Binns Road, Liverpool 13.**

Prize-winning entries become the property of Meccano Limited but unsuccessful attempts will be returned if accompanied by a suitable stamp-addressed envelope or, in the case of overseas entries, a self-addressed envelope and the appropriate International Reply Coupons. Note that entries can be accepted only on the understanding that Meccano Magazine will not be held responsible for any entry damaged or lost and that the judges' decisions are final. No correspondence relating to unsuccessful entries can be considered.