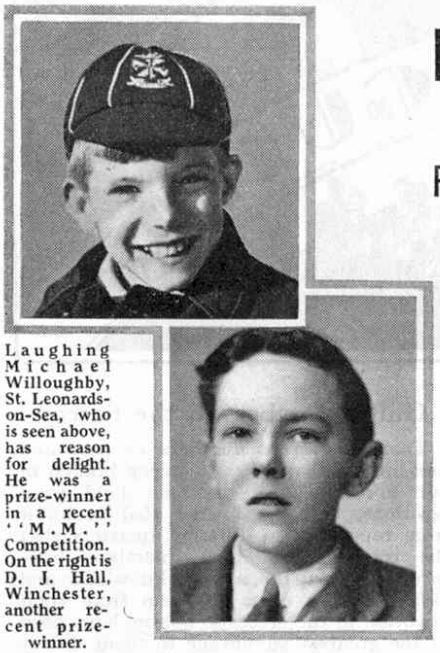


Laughing Michael Willoughby, St. Leonards-on-Sea, who is seen above, has reason for delight. He was a prize-winner in a recent "M.M." Competition. On the right is D. J. Hall, Winchester, another recent prize-winner.

Prize-Winning Meccano Models

By "Spanner"

Further Successful Entries in the "Winter" Contest

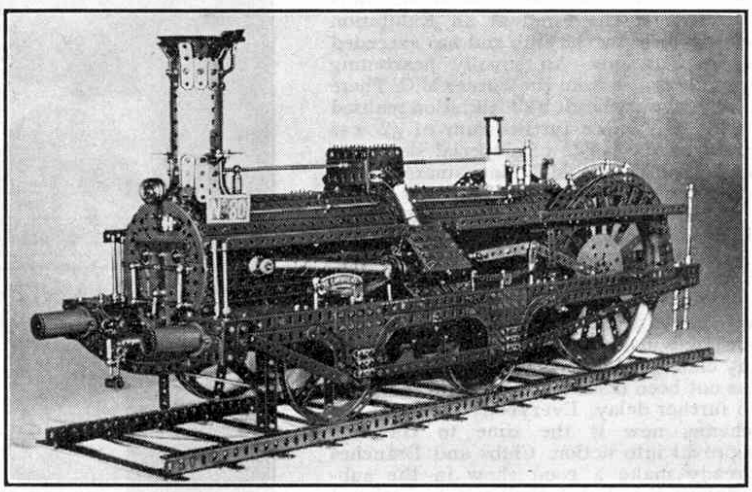
AMONG the chief prize-winning models in Section A of the "Winter" Contest that I was unable to describe last month is a fine swing bridge constructed by L. W. Chitty, Kingston. The model is nearly 7 ft. long, and is an excellent example of the use of Meccano parts in structural model-building. The swivelling centre span is 4 ft. 8 in. long, and is rotated on its axis by an E20B Electric Motor that operates through a two speed gear-box of a simple but efficient type. The lower of the two gear ratios provided allows the span to be manœuvred slowly into correct alignment with the approach spans when the bridge is being closed.

Many model-builders concentrate on subjects such as motor vehicles, locomotives and cranes, which offer scope for novel movements and mechanisms. There is plenty of interest in the building of bridges, however, especially one of an opening type. The construction of such models is not only a good test of a knowledge of girders and their uses, but of ability to carry out neat and careful work.

J. Matthews, Coventry, struck a topical note with a large and well equipped model of a "Pool" petrol tank wagon, which is shown in the illustration below. In addition to particularly neat construction of the tank and chassis, the model is noteworthy on account of the minute detail work incorporated in the cab. Another excellent feature is the realistic appearance of the six wheels. These consist of 3" Pulleys fitted with Road Wheels and Wheel Discs. The formation of the word "Pool" on the tank sides is carried out by means of Curved Strips and Strips.

I always expect neat and careful workmanship from this competitor, and the petrol lorry fully maintains the standard he has achieved in past contests. I recommend model-builders to study the illustration carefully, for there are many constructional details in the model that they will find useful for incorporation in their own work.

A scale model of an early narrow gauge American locomotive was sent by P. R. Wickham, Leicester. It represents one of two 0-4-4 type locomotives that ran in 1877 over the Billerica and Bedford narrow gauge railroad, Massachussetts. The engines were named *"Ariel"* and *"Puck,"* and they always ran bunker foremost as though they were 4-4-0's! Wickham's model is 20 in. long and 9 in. high and runs on 1¾ in. gauge track. It is fitted with working valve gear and full external details, all of which are reproduced as closely as possible to scale. The model was built from the contents of a No. 8 Outfit and a few extra parts.



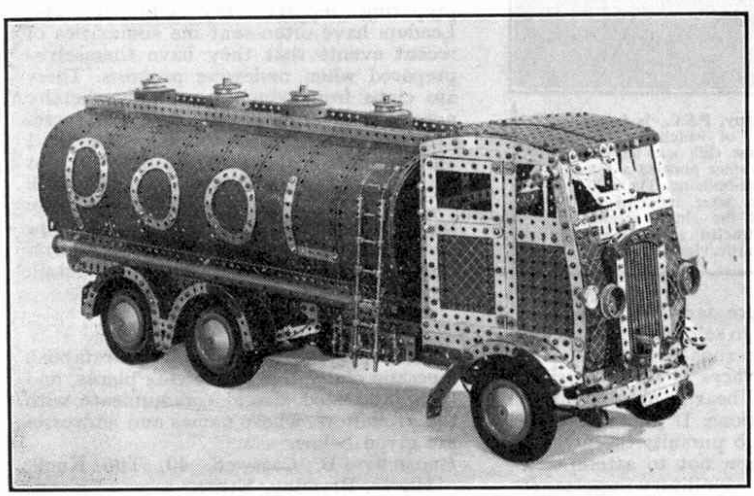
A Meccano version of "Le Continent," an early French locomotive, by E. D. Clements, Orpington.

E. D. Clements, Orpington, also won a prize with a model of an early locomotive. This time it was a model of a French locomotive of the Crampton class, and was based on an illustration of a locomotive of this type that appeared on page 723 of the *"M.M."* for December 1935. Comparison of that illustration with the photograph of the model reproduced on this page will show how closely the features of the actual engine are reproduced.

Military and naval equipment naturally formed the subjects of many models entered in this contest, and I mentioned some of these in my commentary last month. Second Prize in Section B was awarded to Michael Gainsborough-Waring, London, for a model of a "Tribal" class destroyer. This is distinguished for its realistic outline and the care taken to ensure correct proportions in the various items of deck equipment, guns and torpedo tubes. The characteristic outline of the actual vessel is due largely to its funnels, the fore funnel being of a much larger diameter than the aft funnel. In the model the first of these is represented by a Boiler and the second by two Sleeve Pieces placed end to end, and the effect is quite good.

Another excellent model of a military type was a cruiser tank built by K. G. Chettleburgh, Leicester, who won Third Prize in Section B. The model is well designed and constructed, but its realism is spoiled by creeper tracks formed from Sprocket Chain. These are not in scale with the other parts of the model, but due allowance was made for the probability that Chettleburgh lacked sufficient Strips or other suitable parts for building up tracks more in keeping with the size of the model.

Some of those who won the smaller prizes owe their success to the novelty of their models. One of these was S. Whiteside, Clitheroe, who built a switch-back railway. Unfortunately he appears to have attempted too much with the parts at his disposal, for although the model is carefully built it is rather spidery in appearance.



Neat workmanship and carefully modelled details are the prize-winning features of this fine petrol lorry, by J. Matthews, Coventry.

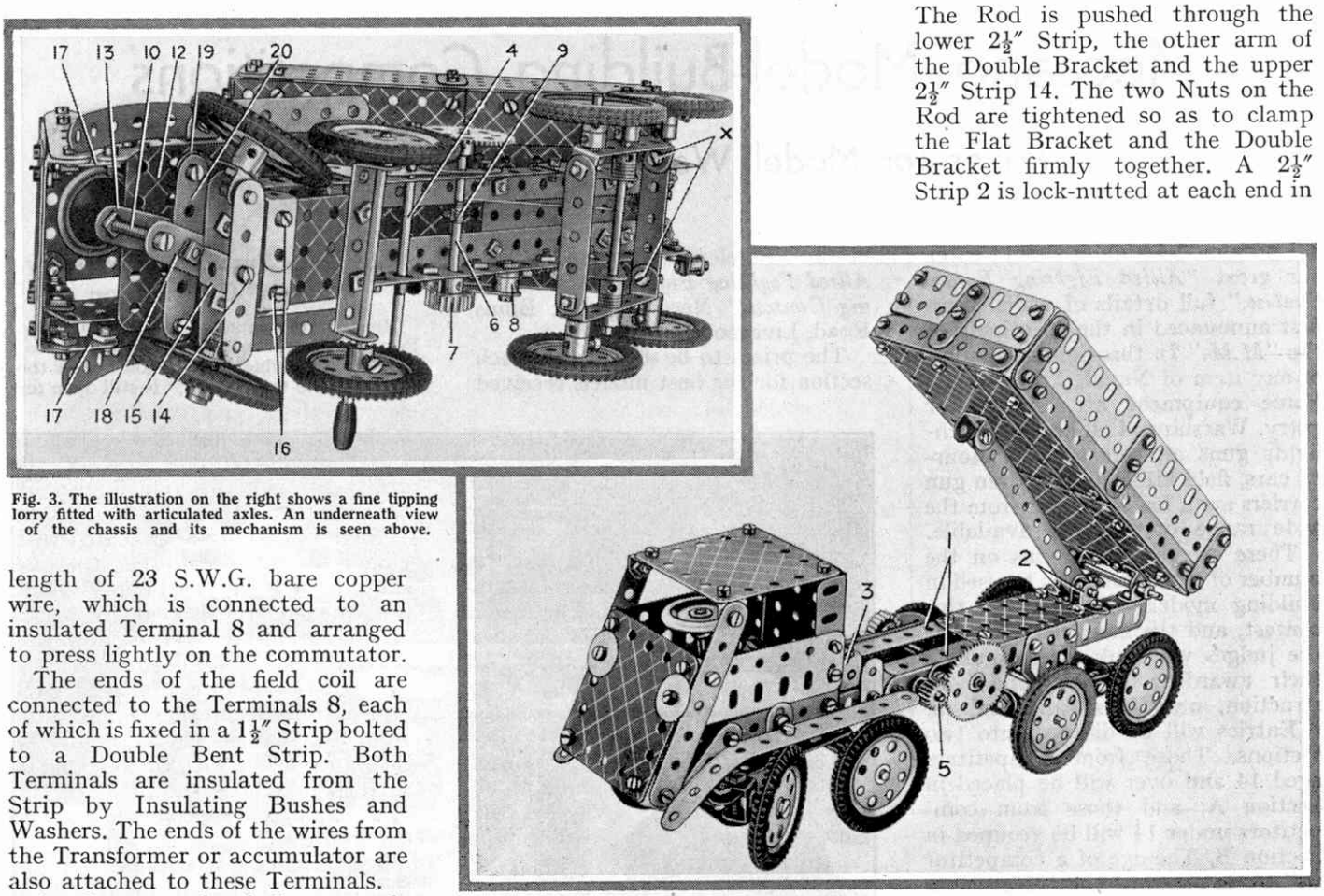


Fig. 3. The illustration on the right shows a fine tipping lorry fitted with articulated axles. An underneath view of the chassis and its mechanism is seen above.

length of 23 S.W.G. bare copper wire, which is connected to an insulated Terminal 8 and arranged to press lightly on the commutator.

The ends of the field coil are connected to the Terminals 8, each of which is fixed in a $1\frac{1}{2}''$ Strip bolted to a Double Bent Strip. Both Terminals are insulated from the Strip by Insulating Bushes and Washers. The ends of the wires from the Transformer or accumulator are also attached to these Terminals.

As the motor is of the two-pole type it will probably be necessary to twist the shaft 5 with the fingers to start it.

Parts required to build electric motor: 7 of No. 2a; 8 of No. 5; 4 of No. 6; 1 of No. 6a; 4 of No. 12; 4 of No. 12b; 1 of No. 15a; 1 of No. 22; 2 of No. 29; 11 of No. 37; 26 of No. 38; 1 of No. 45; 2 of No. 48a; 1 of No. 32; 1 of No. 59; 2 of No. 76; 12 of No. 90; 8 of No. 111; 4 of No. 182; Wire, 2 B.A. Bolts, Nuts and Terminals.

The eight-wheeler tipping lorry of which two views are shown in Fig. 3, is a splendid subject for the great army of model-builders who are specially interested in wheeled vehicles.

The chassis consists of two $9\frac{1}{2}''$ Angle Girders 1, joined by a $3''\times1\frac{1}{2}''$ Perforated Flat Plate, and also by a $2\frac{1}{2}''\times2\frac{1}{2}''$ Perforated Flat Plate. The second of these Plates forms the floor of the cab, and is so arranged that it projects $\frac{1}{2}''$ at each side and $1\frac{1}{2}''$ at the front. Two Flat Trunnions are bolted to the sides of the chassis $2''$ from the rear, and two Angle Brackets 2 and two other Angle Brackets, in which the body pivots, also are bolted in position at the rear of the chassis, as shown in the illustrations.

The four rear wheels are mounted in a pivoted bogie made up as follows. Two $2\frac{1}{2}''\times\frac{1}{2}''$ Double Angle Strips are bolted at their ends to two $2\frac{1}{2}''$ Strips to form a square frame. Two $\frac{1}{2}''\times\frac{1}{2}''$ Angle Brackets are attached to two of the corners of the frame by the Bolts x, and they provide bearings for the rearmost of the rear axles.

The front wheels are mounted in a pivoted frame consisting of a $2\frac{1}{2}''\times1\frac{1}{2}''$ Perforated Flat Plate that pivots on two $1''\times1''$ Angle Brackets 16. A $2''$ Rod is pushed through the front holes of the chassis side girders and through the Angle Brackets, and is held in place by a Collar on each end of it. The rearmost of the two front wheel axles is journalled in a $2\frac{1}{2}''\times\frac{1}{2}''$ Double Angle Strip bolted along the rear end of the Plate, as shown in Fig. 3. A $2\frac{1}{2}''$ Strip is bolted along the front of the $2\frac{1}{2}''\times1\frac{1}{2}''$ Flat Plate. Then a Double Bent Strip 15 is bolted with one of its arms protruding under the Plate, and a $2\frac{1}{2}''$ Strip 14 is bolted to its other arm. Each end of the $2\frac{1}{2}''$ Strip 14 carries a Double Bracket. A $1''$ Screwed Rod is pushed through the lower arm of the Double Bracket and through the slotted hole of the Flat Bracket 19. A Nut is then placed on the lower end of the Rod outside the Double Bracket, and a second Nut above the Flat Bracket. The Rod is pushed through the lower $2\frac{1}{2}''$ Strip, the other arm of the Double Bracket and the upper $2\frac{1}{2}''$ Strip 14. The two Nuts on the Rod are tightened so as to clamp the Flat Bracket and the Double Bracket firmly together. A $2\frac{1}{2}''$ Strip 2 is lock-nutted at each end in the round holes of the two Flat Brackets.

A $1\frac{1}{2}''$ Strip 18 is lock-nutted through its centre hole to the $2\frac{1}{2}''$ Strip 20 and also to the $2\frac{1}{2}''\times1\frac{1}{2}''$ Flat Plate as shown in the illustration. The steering wheel is mounted on a $2''$ Rod and is fitted with a Crank at its lower end. A $1\frac{1}{8}''$ Bolt 10 connects the Crank with Strip 18.

The mechanism by which the body is tipped is simple. A $5\frac{1}{2}''$ Strip is fitted at one end with a $1''$ Corner Bracket, and is pivoted on a $1''$ Rod passed through Angle Brackets 2. The other end of the Strip carries a Double Bracket. A $3\frac{1}{2}''$ Crank Handle is journalled in the middle holes of the $1\frac{1}{2}''$ Strips bolted to the sides of the chassis. It carries a $\frac{1}{2}''$ Pinion 5 meshed with a 57-teeth Gear on a $3''$ Rod 6, a Cord Anchoring Spring and a Ratchet. A length of Cord is tied to the Spring and to the Corner Bracket.

Parts required for eight-wheeled tipping lorry: 2 of No. 1d; 3 of No. 2; 4 of No. 3; 7 of No. 5; 17 of No. 6a; 2 of No. 8a; 2 of No. 9a; 4 of No. 10; 6 of No. 11; 27 of No. 12; 2 of No. 12a; 2 of No. 15b; 2 of No. 16; 2 of No. 16a; 1 of No. 17; 1 of No. 18d; 1 of No. 19g; 8 of No. 21; 1 of No. 22; 1 of No. 26; 1 of No. 27a; 2 of No. 35; 150 of No. 37a; 135 of No. 37b; 11 of No. 38; 1 of No. 40; 42 of No. 48a; 16 of No. 59; 1 of No. 62; 2 of No. 72; 2 of No. 73; 24 of No. 82; 2 of No. 103k; 2 of No. 103d; 2 of No. 103e; 1 of No. 111c; 1 of No. 111a; 1 of No. 120a; 2 of No. 126a; 3 of No. 133a; 8 of No. 142a; 1 of No. 147c; 3 of No. 147b; 1 of No. 148; 1 of No. 155a; 1 of No. 176; 2 of No. 190; 2 of No. 190a; 2 of No. 192; 2 of No. 217b

New Meccano Models

A Fine Variety of Subjects

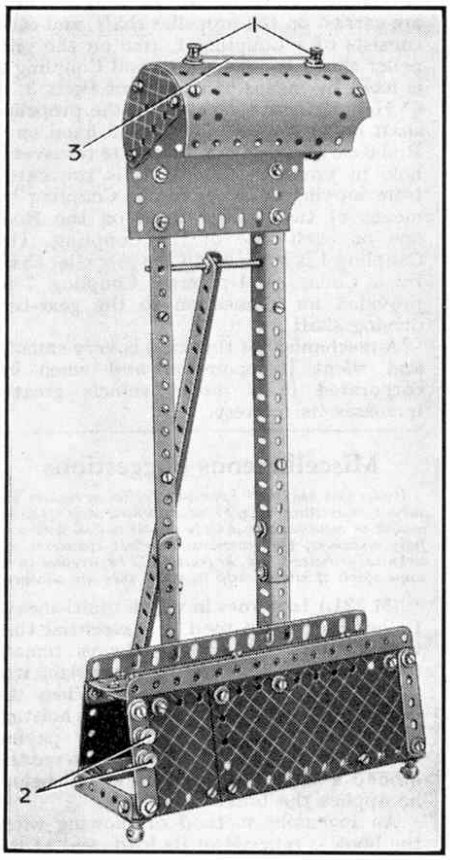


Fig. 1. A useful illuminated book rest.

THE first of three fine models we are describing this month is the illuminated book rest shown in Fig. 1. It is designed to accommodate the *"Meccano Magazine,"* and is fitted with two lamp bulbs that give ample light for reading.

Each of the compound angle girders that support the lamp is composed of a 9½" Angle Girder and a 3" Angle Girder overlapped 1½" and bolted together. They are held to the back of the base by Obtuse Angle Brackets.

At the top the compound Angle Girders are bolted to a Boiler, which is opened out to form the lamp shade. The ends of the Boiler are partly enclosed by 2½" Semi-Circular Plates, each of which is held to the Boiler by three Angle Brackets. Two Lamp Holders are bolted by 6 B.A. Bolts to the Boiler to hold the bulbs, Insulating Bushes and Washers being placed on the shanks of the Bolts to insulate them from the Boiler. A Terminal 1 is screwed on the shank of each Bolt, and each Lamp Holder is fitted with a 3.5-volt Bulb.

Two Terminals 2 are attached to the left-hand side of the front of the base, but are insulated from it by means of Insulating Bushes and Washers. The Terminals 1 are connected by an insulated wire 3, one end of which is then led to one of the Terminals 2. Another wire connects the cases of the Lampholders, and a lead is taken from this wire to the second Terminal 2.

Parts required to build the book rest: 2 of No. 1b; 4 of No. 5; 1 of No. 8; 2 of No. 8a; 2 of No. 9c; 2 of No. 9d; 16 of No. 12; 2 of No. 12c; 66 of No. 37; 4 of No. 37a; 36 of No. 38; 1 of No. 80c; 4 of No. 103k; 1 of No. 126; 2 of No. 136; 1 of No. 162b; 8 of No. 192; 2 of No. 183; 2 of No. 190; 2 of No. 192; 2 of No. 214. 4 B.A. Bolts and Nuts, 4 Terminals.

An electric motor that can be built entirely from standard Meccano parts is shown in Fig. 2. The model will not produce much power, but its construction is extremely interesting and serves to demonstrate the underlying principles of an electric motor.

The construction of each side of the motor field magnet is commenced by bolting together six Curved Strips interleaved with four 2½" Strips and two 2" Strips, using the ¾" Bolt 1. The lower ends of the Curved Strips are spaced apart by Washers placed on the Bolts 2 and 3. The Bolts 2 hold also two 1"×½" Angle Brackets, by means of which the field magnet is fixed to a 5½" ×2½" Flanged Plate.

The core of the field magnet consists of seven 4½" Strips held together by Bolts x, each of which holds also two Angle Brackets and serves to attach the magnet to the uprights. The Strips and Angle Brackets are carefully insulated with a wrapping of stout paper. The winding consists of about 500 turns of 26 S.W.G. Cotton Covered Wire.

The armature consists of two 2½"×1½" Double Angle Strips laid back to back, with the 4½" Rod 5 secured centrally between them. The Strips are bound with adhesive tape to retain them in position and to prevent their edges from damaging the insulation of the winding.

The armature is wound in the following manner. A length of 6 ft. of 23 S.W.G. Cotton Covered Wire is doubled to find the centre, and the wire is then laid diagonally across the centre of the armature so that there is an equal length on each side. One half of the wire is then wound on one arm of the armature and the remaining half on the other arm.

Next a strip of paper coated with gum is wound round the armature shaft until a sleeve about ⅛" thick is formed on the Rod 5. Each end of the armature coil is now uncovered and shaped to form an elongated U. The two shaped ends of the wire form the commutator segments, and should be bound to the paper sleeve with cotton. One of these segments is shown at 6; the other is on the opposite side of the paper sleeve.

The armature is clamped on the Rod 5 by two ¾" Contrate Wheels 9, which press tightly against the Double Angle Strips. The ends of the Double Angle Strips are rounded so that they rotate freely in the armature tunnel.

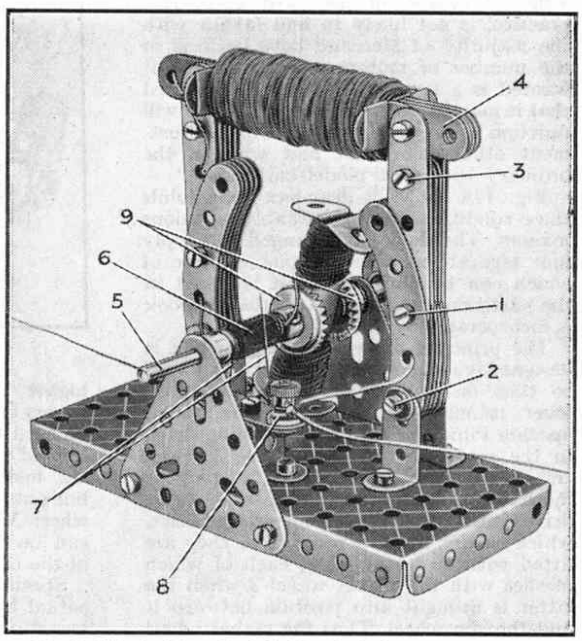


Fig. 2. This electric motor is built entirely from Meccano parts.

Each of the brushes 7 consists of a

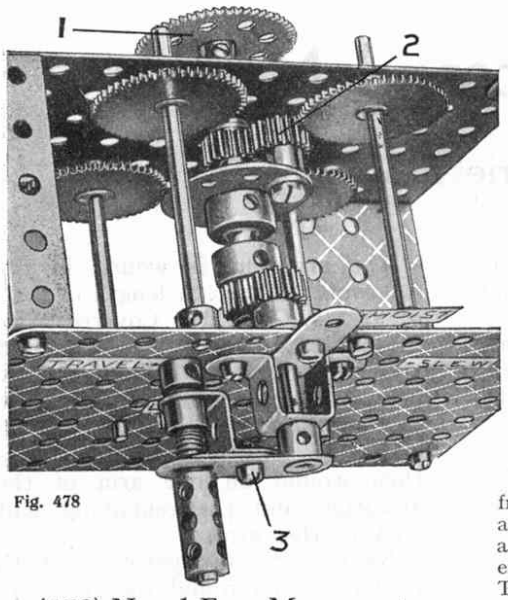


Fig. 478

(478) Novel Four-Movement Gear-Box

(G. Robinson, Leeds)

The usual method of obtaining two or more separate movements from one power unit, such as a Meccano Clockwork or Electric Motor, is to employ some form of gear-box so arranged that the desired movement may be connected up to the Motor by sliding certain gears into or out of mesh. The design of a gear-box for a crane, for example, in which there may be as many as four or even five separate motions to be driven from a single motor, is a task that requires much thought in order to produce a piece of mechanism that is both neat and capable of functioning in a reliable manner.

The alternative is to employ a separate motor for each motion, so as to avoid a complicated gear-box. This arrangement, although typical of the most up-to-date practice, is not likely to find favour with the majority of Meccano boys because of the number of motors required. What is wanted is a type of gear-box so designed that it may be put together easily, and will function efficiently, without any adjustment other than that met with in the ordinary course of model-building.

Fig. 478 shows a gear-box that fulfils these conditions in a remarkably ingenious manner. The device is arranged to supply four separate movements, one or more of which can be omitted if not required in the particular model in which the gear-box is incorporated.

The principle on which the gear-box is designed is as follows. A Pinion 2 is arranged so that on operation of the "selector" lever it may be moved bodily round another Pinion secured to the driving shaft, in the same way as the "planet" wheel travels round the "sun" wheel in epicyclic mechanism. The four separate shafts to be driven are arranged about the driving shaft, which carries the sun wheel, and they are fitted with 50-teeth Gears, each of which meshes with the planet wheel 2 when the latter is brought into position between it and the sun wheel. Thus the planet wheel forms a connecting link by means of which any one of the four driven shafts can be linked up as desired, with the driving shaft.

The sun wheel on the driving shaft is a ½" Pinion that is in constant mesh with a second ½" Pinion 2 forming the planet wheel. Pinion 2 is fixed to a Pivot Bolt carried in a Bush Wheel, and the latter is free to rotate independently of the driving shaft on which it is mounted. On turning the Bush Wheel the Pinion 2 may be brought into mesh at will with the 50-teeth Gears on the driven shaft.

The Bush Wheel is connected by a Socket Coupling to a ½" Pinion that is loose on the driving shaft and is engaged with a similar Pinion secured on the end of a short Rod carrying at its outer extremity a Crank 3. The Rod is journalled in a reinforced bearing comprising a Double Bent Strip bolted to the 5½" × 3½" Flat Plate that forms one side of the gear-box. The end of the Crank is provided with a spring loaded plunger that may be inserted, on rotation of the Crank, in certain holes in the Plate. These holes are marked in the illustration with the desired gear positions. The plunger is a short Rod free to slide in a Reversed Angle Bracket and a Flat Bracket bolted to the Crank, and a Compression Spring serves to keep the end of the plunger in the holes in the Plate. To change gear, it is only necessary to pull out the plunger and rotate the Crank until it is opposite the hole labelled with the movement required. The plunger is then released.

The drive from each of the Rods carrying the 50-teeth Gears may be conveyed by any suitable means to the particular movement it is intended to operate.

(479) Hypoid Drive for Model Motor Vehicles

(H. S. Everett, Wrotham)

Some modern motor cars are equipped with what is known as hypoid drive in the transmission to the wheel axles. In an ordinary bevel drive the crankshaft, gear-box and propeller shaft are in line with the centre of the crown wheel, and in many instances are level with or slightly nigher than the floor of the car. Metal covers known as shaft tunnels then have to be used to cover the revolving parts. In a hypoid drive, which is a form of bevel gear, the teeth engage considerably below the line passing through the centre of the crown wheel. With it the propeller shaft therefore can be carried lower down and the floor of the car can be quite flat.

Specially cut spiral bevels are used in actual hypoid gearing, but a good representation of a hypoid drive can be reproduced in Meccano by using the ½" Helical Gear (Part No. 211a) and the 1½" Contrate Wheel (Part No. 28). Fig. 479 shows an arrangement of this kind suitable for twin axle drive, which was suggested by H. S. Everett, Wrotham, Kent. It comprises two similar units, one for each axle. These are carried on the propeller shaft, and each consists of a Coupling 1, free on the propeller shaft, to which a second Coupling 2 is fixed by means of two Pivot Bolts 3. A ½" Helical Gear 4 secured on the propeller shaft engages a 1½" Contrate 5 fixed on a Rod 6 carried freely in the centre transverse hole in Coupling 2. Rod 6 is prevented from moving endways in the Coupling by means of two Collars fixed on the Rod, one on each side of the Coupling. The Coupling 1 is retained on the propeller shaft by a Collar. A Universal Coupling 7 is provided for connection to the gear-box driving shaft.

A mechanism of this kind is very smooth and silent in operation and when incorporated in a model vehicle greatly increases its interest.

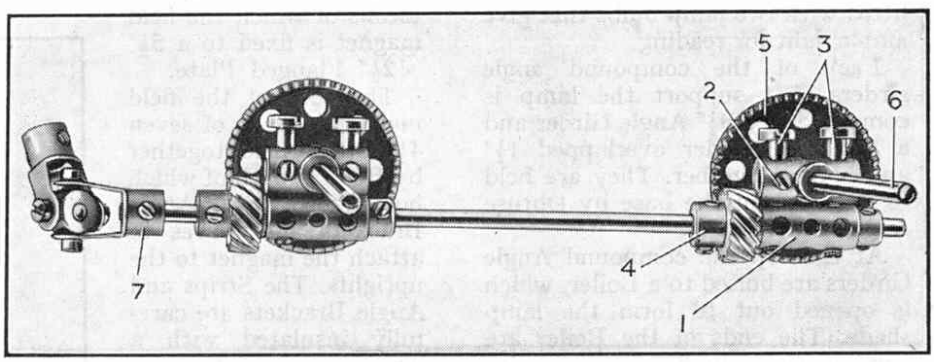


Fig. 479

Miscellaneous Suggestions

Under this heading "Spanner" replies to readers who submit interesting suggestions regarding new Meccano models or movements that he is unable to deal with more fully elsewhere. On occasions he offers comments and technical criticisms that, he trusts, will be accepted in the same spirit of mutual help in which they are advanced.

(M.221.) In cranes in which multi-sheave Pulley Blocks are used it is essential that the hoisting cord should always remain taut, for if it is allowed to become slack it is likely to slip off the pulleys. When the pulley block reaches the ground the hoisting barrel should immediately cease paying out, but if the operator is unable to see the ground a short interval may elapse before he applies the brake.

An ingenious method of showing when the hook is relieved of its load, and at the same time keeping the cord taut if the drum pays out a little too rapidly, consists of an Axle Rod pivoted near the centre to the jib and carrying at its lower end a Worm or other suitable weight. An End Bearing at the upper extremity of the Rod carries a ½" loose Pulley. The hoisting cord passes over the Pulley and the weight of the load hook should be sufficient to hold the lever in a position almost parallel to the jib. As soon as the hoisting cord is relieved of its weight when the Pulley block reaches the ground, the Worm at the end of the lever returns it to the vertical position, thus taking up the slack in the cord and giving the crane operator ample warning to apply the brake.

(M.222.) In the construction of gear mechanism the necessity occasionally arises for a small internally toothed gear, and as such a part is not yet included in the Meccano range readers will be interested in learning how a novel substitute can be devised. A 1½" Bevel Gear is used and a ½" Pinion is placed so that it meshes with the inner edges of the Bevel teeth.