

The New Meccano Motor Chassis

Fine Example of the Latest Meccano Construction

(Concluded from Last Month)

THE back axle, which really consists of a fixed hollow casing, is represented in the model by a framework of Strips, etc., that provides suitable bearings for the two axle shafts and also forms a rigid connection between the fixed portions of the rear wheel brakes (see Fig. 8).

The differential is housed in the back axle between two Wheel Flanges 26 and 26a, each of which is bolted against the inner side of a $2\frac{1}{2} \times 1\frac{1}{2}$ " Double Angle Strip. These Angle Strips are secured rigidly together by means of 3" Strips 26b, and their centre holes form the inner bearings for the axle shafts 27 and 28. In addition, shaft 28 passes through the centre hole of a $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip 29 bolted to the Wheel Flange 26a. One Washer should be placed between the Wheel Flange and the Angle Strip 29 on each of the bolts that hold the latter in position. The rear wheel brake mountings consist of two Face Plates 30 bolted rigidly to the back axle casing, one being secured to the ends of two 1" Reversed Angle Brackets and the other to the ends of two $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strips.

The Torque Rods

The rear axle casing (Fig. 7) performs several important functions in addition to that of providing rigid bearings for the shafts secured to the road wheels. Besides carrying the weight of the vehicle, it must absorb the torque or twisting reaction set up by the propeller shaft, and also transmit the thrust of the road wheels to the chassis. The torque set up in the back axle will be understood more clearly by studying the action of the drive transmission between the propeller shaft and the road wheels. Suppose that this is effected by a bevel pinion on the propeller shaft driving a larger bevel gear secured to an unbroken axle carrying the two road wheels: when the engine rotates, the small bevel pinion on the propeller shaft will endeavour to rotate the bevel wheel on the back axle but since this naturally is somewhat difficult to move, the pinion will tend to travel round the bevel wheel while the latter remains stationary. This state of affairs possibly might result in a snapped propeller shaft and even broken springs, owing to the twisting movement imparted to the axle casing.

It is to counteract these stresses and strains that motor vehicles are fitted with what are known as torque rods. Many car manufacturers obtain the required results by enclosing the propeller shaft in a torque tube, which not only forms a torque reaction resistance, but also receives the forward thrust of the back axle. In the Meccano model the torque rods are shown quite separately from the propeller shaft, so that their functions may be understood more readily.

The torque rods consist of two $5\frac{1}{2}$ " Strips 31 secured to the ends of the $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip 29. These $5\frac{1}{2}$ " Strips taper together at their other ends, where they are secured to a Collar 32 by means of an ordinary bolt inserted in place of the grub screw. Two Washers

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to act as a shock absorber when the back axle is forced up and down by irregularities in the road surface.

It will now be seen that the torque rods 31 effectively counteract any twisting tendency in the back axle without interfering with the free vertical movement of the latter as a whole or the independent movement of one or other of the rear wheels.

The back axle casing is secured to the rear cantilever springs by an Angle Bracket 35 secured to each Face Plate 30. These Angle Brackets are bolted to the end holes of the springs, as will be seen in Fig. 2.

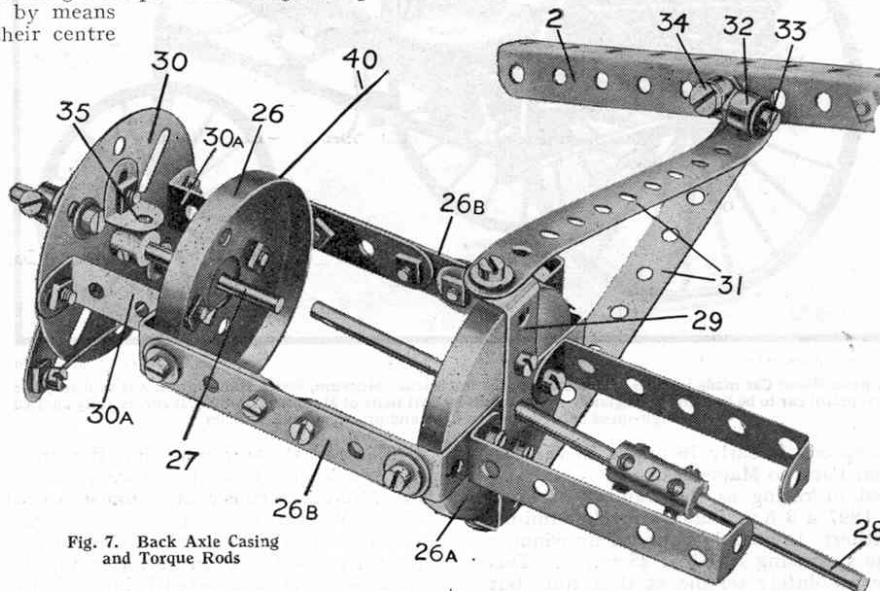


Fig. 7. Back Axle Casing and Torque Rods

Brake Mechanism

One of the rear wheel brakes is shown in detail in Fig. 8, and it will be seen that it is of the internal expanding type. Two $\frac{1}{2}$ " Bolts are passed through opposite slots in the Face Plate 30 and their ends, after passing through $1\frac{1}{2}$ " Strips 36, are secured in Collars 37, which form the brake shoes. Each $\frac{1}{2}$ " Bolt carries a Washer under its head and two on its shank between the Face Plate and the $1\frac{1}{2}$ " Strips 36. The latter Strips are pivoted by means of bolts and lock nuts to a $2\frac{1}{2}$ " Strip 38 that is free to turn about the axle shaft 27. When the $2\frac{1}{2}$ " Strip is moved, the Collars are thrust outward along the slots by means of the links 36 and pressed against the inside periphery of a Wheel Flange 39 bolted to the inside of the road wheel. Three Washers should be placed on the axle 27 between the Strip 38 and the Face Plate. Care should be taken to see that the $\frac{1}{2}$ " Bolts are able to move quite freely to and fro in the slots of the Face Plate.

The grub screws in the Collars 37 have been replaced by $7/32$ " Meccano Bolts, and these are used to secure a short length of Spring Cord. The latter serves to withdraw the brake shoes 37 and return the brake to the "off" position when the Strip 38 is released. The road wheel should be placed on the axle 27 with the Wheel Flange 39 towards the Collars 37, care being taken to see that the latter have plenty of room to move before the road wheel is secured rigidly to the axle.

Each brake rod 40 (see Figs. 2 and 8) consists of two Meccano loom Healds bolted together (a length of cord will serve almost as well in their place if preferred). The Healds are connected pivotally at one end to the Strip 38 by means of a bolt and two nuts (see S.M. 262) and at the other end by a similar method to a

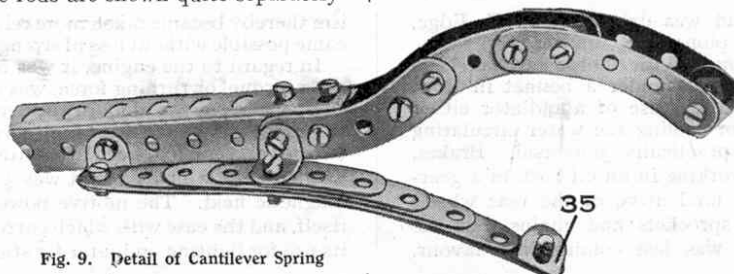


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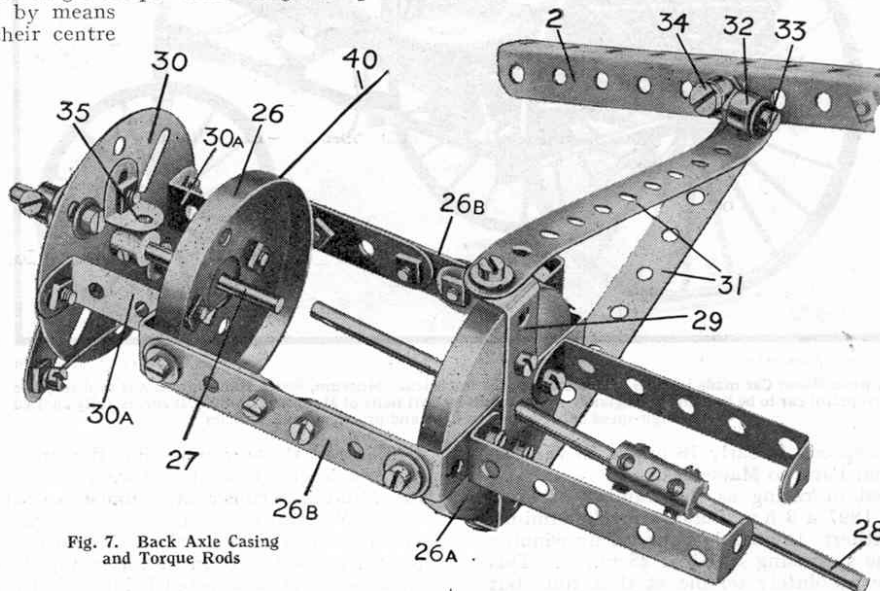


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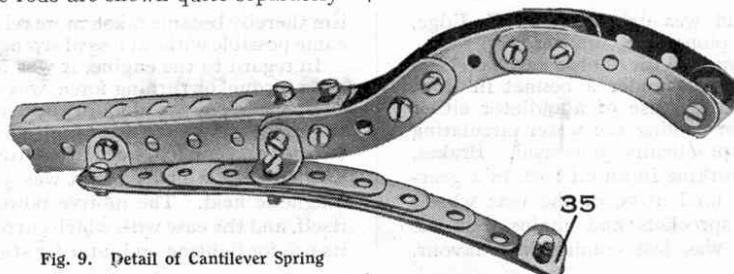


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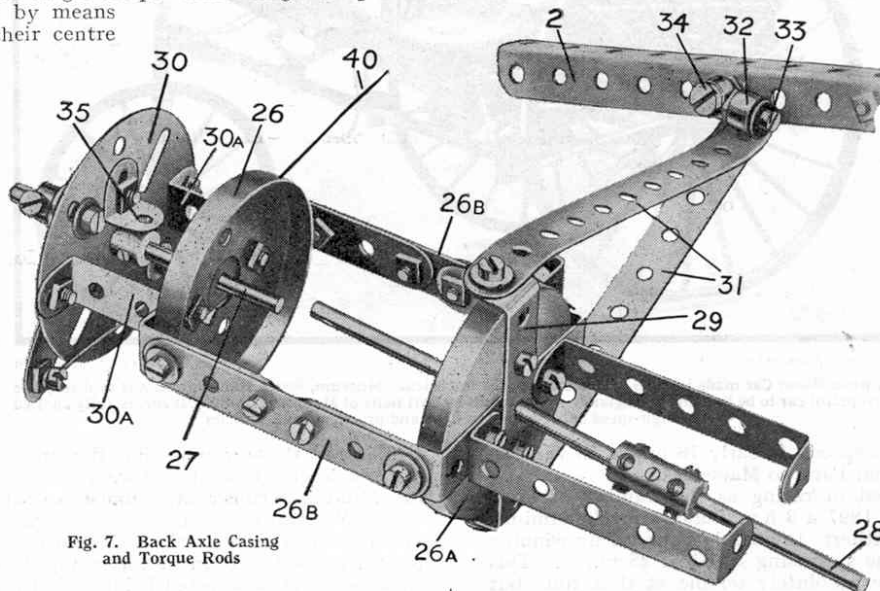


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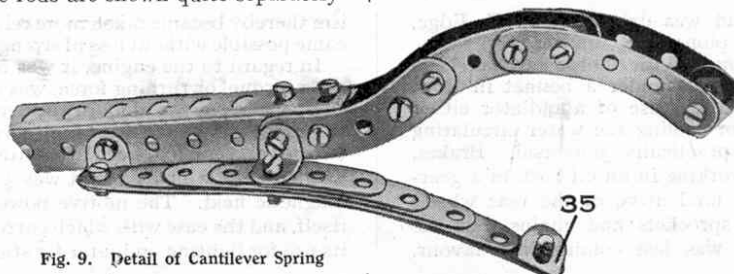


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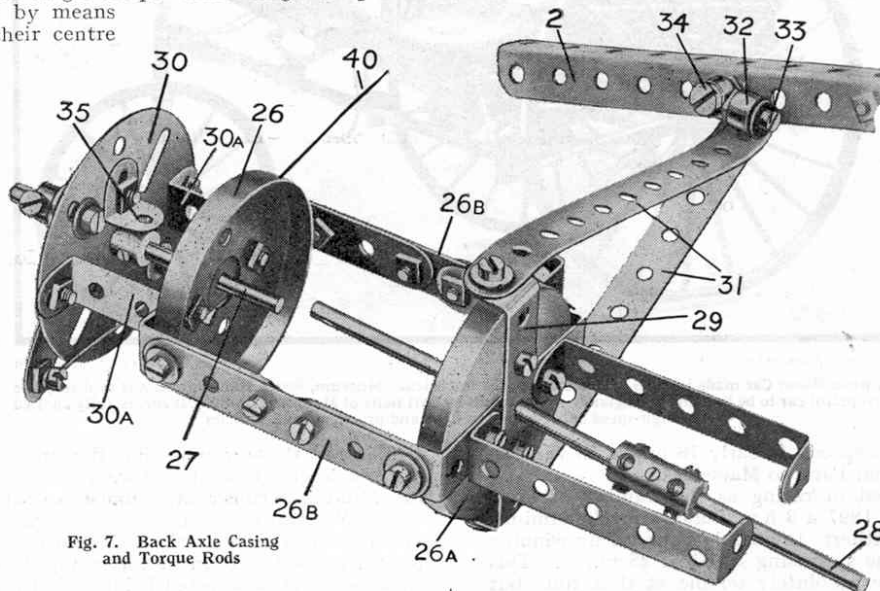


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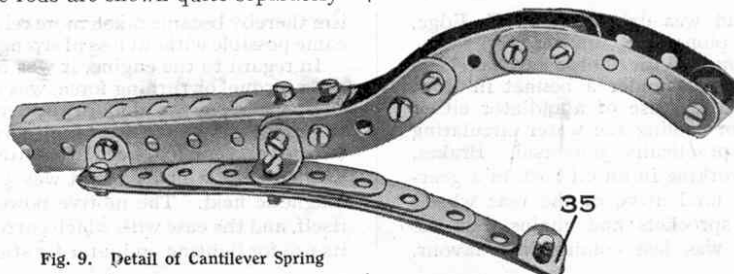


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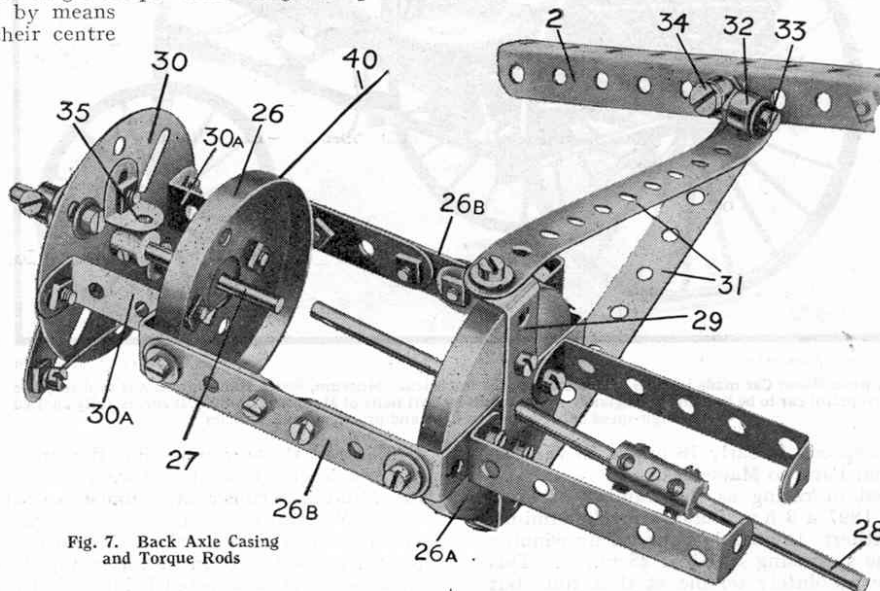


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Brake Mechanism

One of the rear wheel brakes is shown in detail in Fig. 8, and it will be seen that it is of the internal expanding type. Two $\frac{1}{2}$ " Bolts are passed through opposite slots in the Face Plate 30 and their ends, after passing through $1\frac{1}{2}$ " Strips 36, are secured in Collars 37, which form the brake shoes. Each $\frac{1}{2}$ " Bolt carries a Washer under its head and two on its shank between the Face Plate and the $1\frac{1}{2}$ " Strips 36. The latter Strips are pivoted by means of bolts and lock nuts to a $2\frac{1}{2}$ " Strip 38 that is free to turn about the axle shaft 27. When the $2\frac{1}{2}$ " Strip is moved, the Collars are thrust outward along the slots by means of the links 36 and pressed against the inside periphery of a Wheel Flange 39 bolted to the inside of the road wheel. Three Washers should be placed on the axle 27 between the Strip 38 and the Face Plate. Care should be taken to see that the $\frac{1}{2}$ " Bolts are able to move quite freely to and fro in the slots of the Face Plate.

The grub screws in the Collars 37 have been replaced by $7/32$ " Meccano Bolts, and these are used to secure a short length of Spring Cord. The latter serves to withdraw the brake shoes 37 and return the brake to the "off" position when the Strip 38 is released. The road wheel should be placed on the axle 27 with the Wheel Flange 39 towards the Collars 37, care being taken to see that the latter have plenty of room to move before the road wheel is secured rigidly to the axle.

Each brake rod 40 (see Figs. 2 and 8) consists of two Meccano loom Healds bolted together (a length of cord will serve almost as well in their place if preferred). The Healds are connected pivotally at one end to the Strip 38 by means of a bolt and two nuts (see S.M. 262) and at the other end by a similar method to a

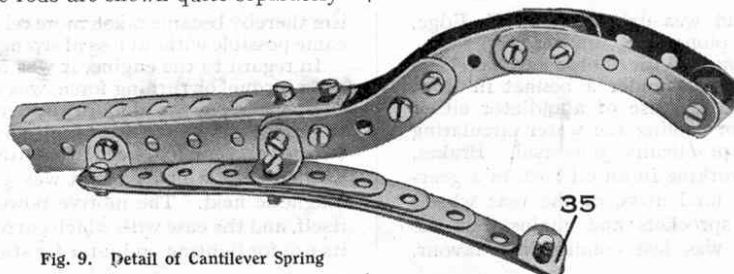
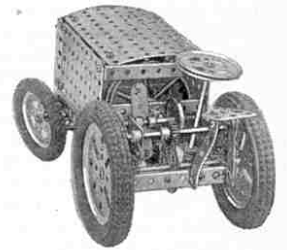


Fig. 9. Detail of Cantilever Spring

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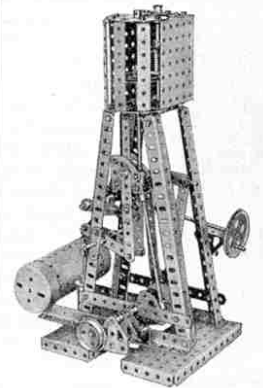
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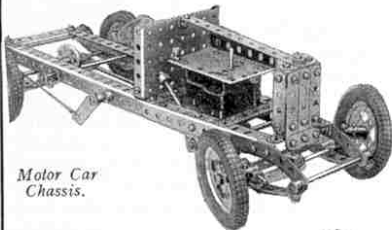
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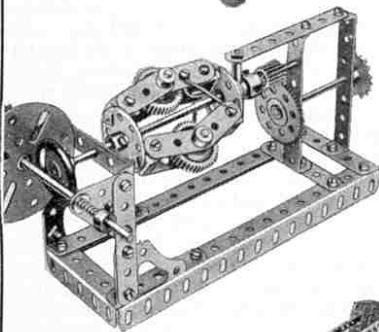
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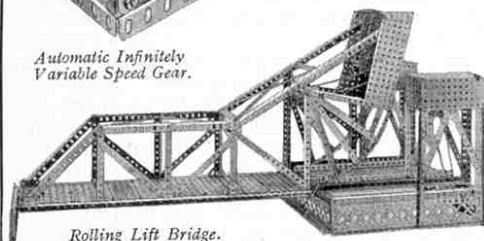
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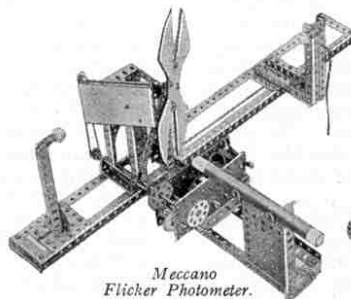
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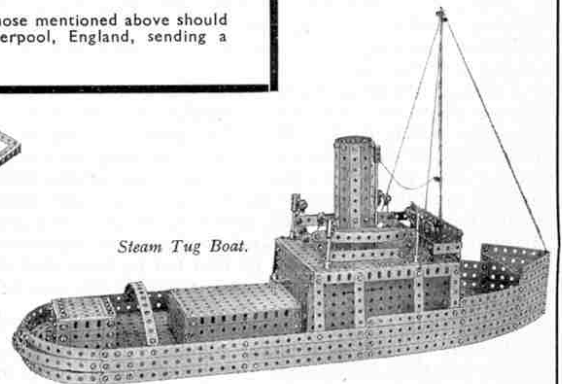
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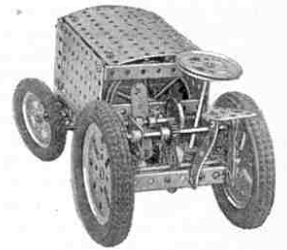
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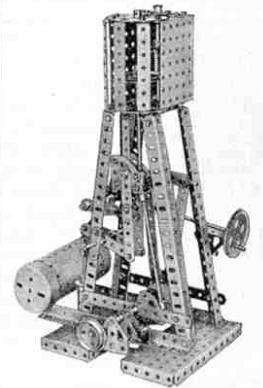
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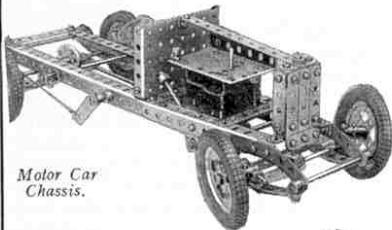
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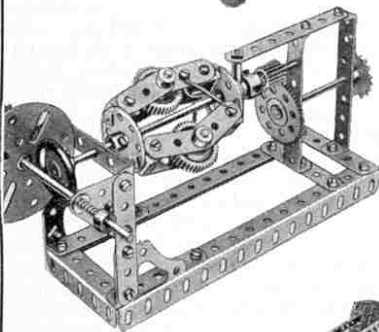
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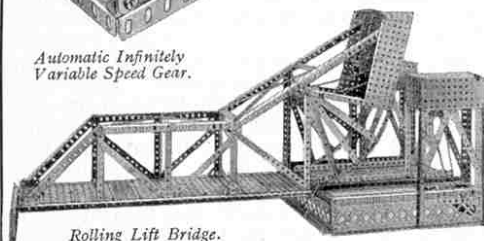
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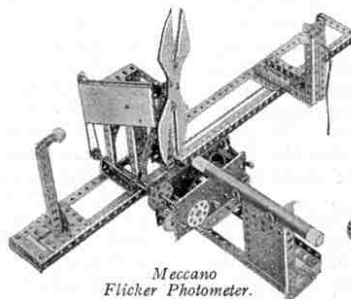
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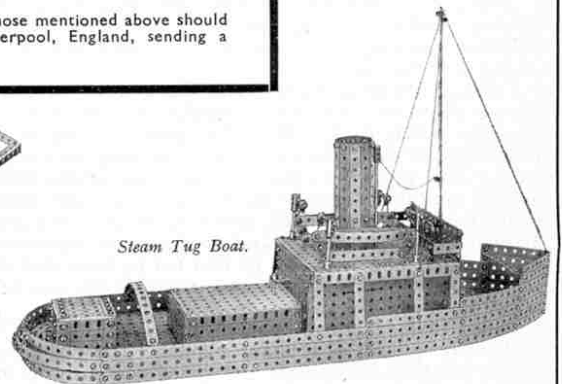
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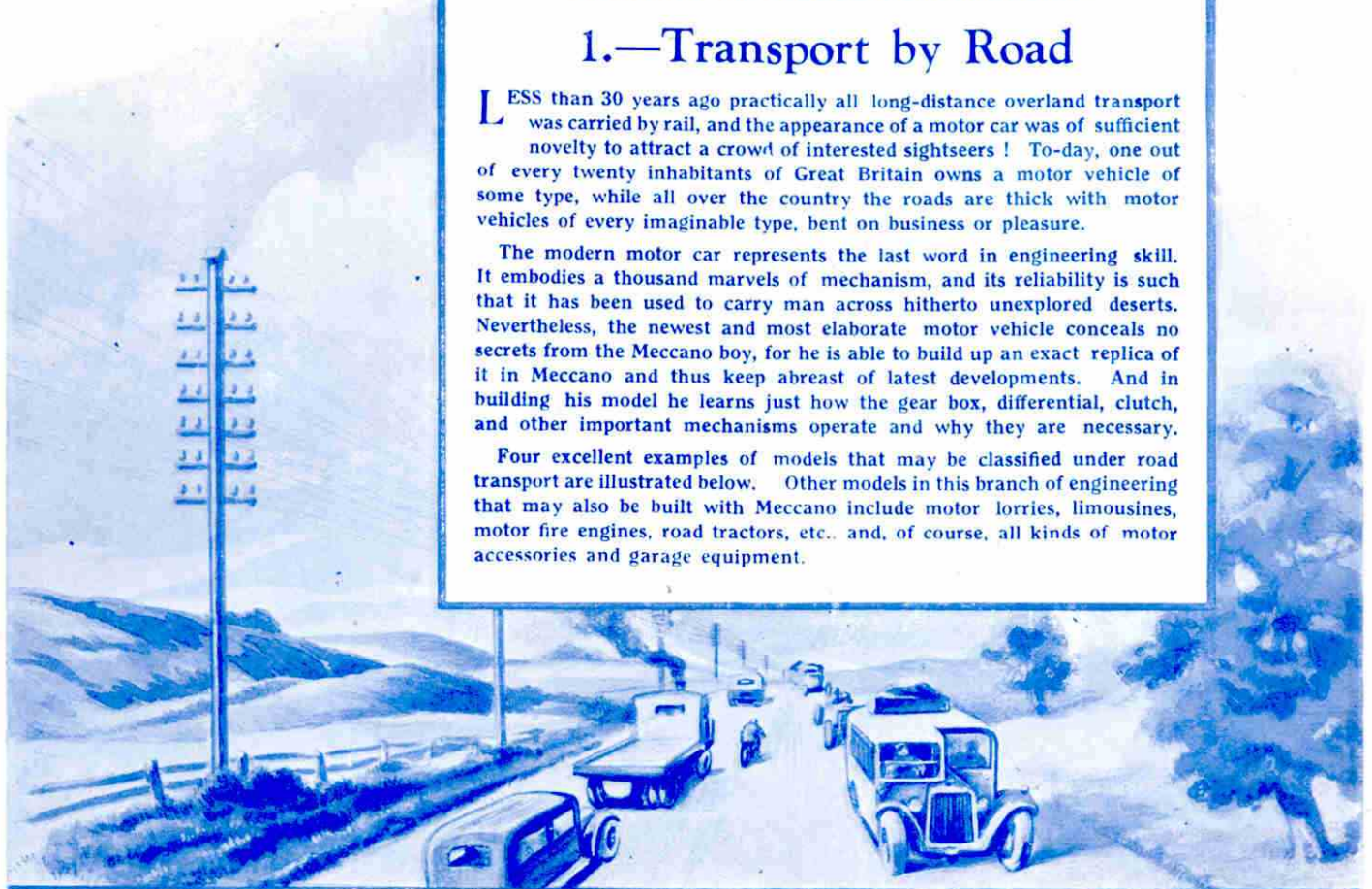
EXAMPLES OF MODEL CONSTRUCTION

1.—Transport by Road

LESS than 30 years ago practically all long-distance overland transport was carried by rail, and the appearance of a motor car was of sufficient novelty to attract a crowd of interested sightseers! To-day, one out of every twenty inhabitants of Great Britain owns a motor vehicle of some type, while all over the country the roads are thick with motor vehicles of every imaginable type, bent on business or pleasure.

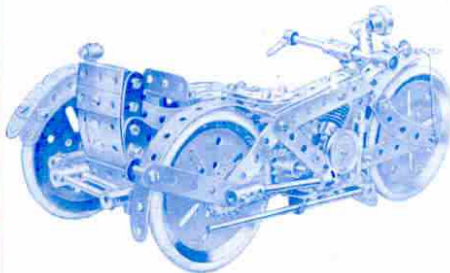
The modern motor car represents the last word in engineering skill. It embodies a thousand marvels of mechanism, and its reliability is such that it has been used to carry man across hitherto unexplored deserts. Nevertheless, the newest and most elaborate motor vehicle conceals no secrets from the Meccano boy, for he is able to build up an exact replica of it in Meccano and thus keep abreast of latest developments. And in building his model he learns just how the gear box, differential, clutch, and other important mechanisms operate and why they are necessary.

Four excellent examples of models that may be classified under road transport are illustrated below. Other models in this branch of engineering that may also be built with Meccano include motor lorries, limousines, motor fire engines, road tractors, etc., and, of course, all kinds of motor accessories and garage equipment.



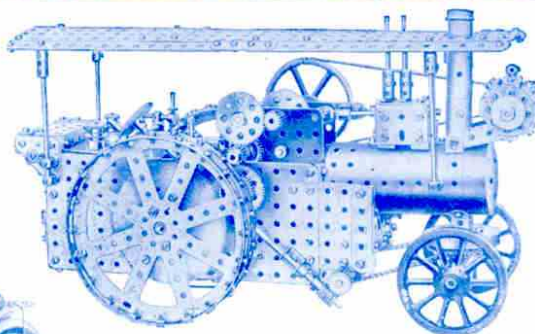
MECCANO MOTOR CYCLE AND SIDECAR

The Meccano Motor Cycle (below) incorporates head and side lamps, sprung saddle, exhaust pipes, chain drive, Klaxon horn, luggage carrier, etc., while the sidecar, which is of graceful streamline design, is mounted on springs. The twin-cylinder engine is composed primarily of two Worms. See Instruction Leaflet No. 3 (Price 2d. post free).



MECCANO MOTOR CHASSIS

This model (right) is driven by a 6-volt Electric Motor and includes a gear box, clutch, differential, laminated springs, Ackermann steering, torque rods, etc. Full instructions for building the model are contained in Special Instruction Leaflet No. 1 (Price 3d. post free).



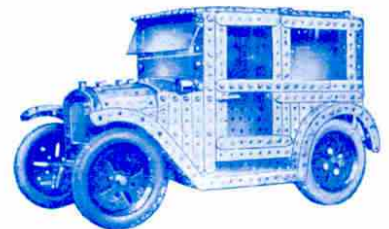
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MECCANO TRACTION ENGINE

Driven by a Meccano 6-volt Motor, which is mounted in the space occupied by the firebox in the prototype, the Traction Engine (left) will easily haul a boy of average weight. It is fitted with two-speeds forward and reverse controls, worm and chain steering gear, and brake. For detailed illustrations and complete instructions for building, see Special Instruction Leaflet No. 22 (Price 2d. post free).



MECCANO MOTOR CAR

The model shown above is of a "baby" car of a well-known make. It is built entirely from standard parts with the exception of the windscreen and windows. The model is complete with steering gear and if desired may be driven by a Meccano Clockwork or Electric Motor.