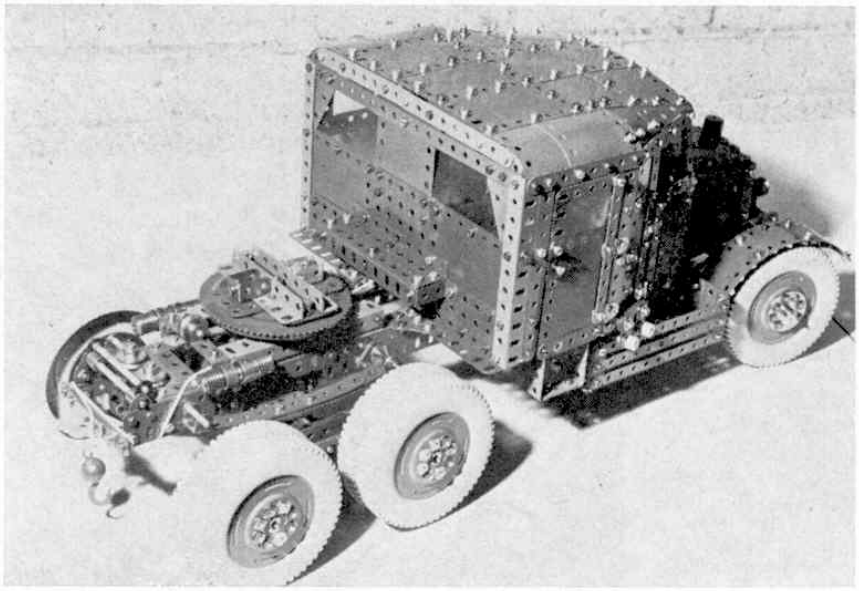


Fig. 1—A Scammell Tank Transporter Tractor Unit of World War II vintage in which the principal mechanisms of the prototype are well reproduced.

HEAVY VEHICLE MODELLING

Some constructional features described and illustrated by Bert Love

HAVING seen what can be done in the way of realistic modelling with the smaller outfits, the junior reader has the challenge of pitting his wits against a limited selection and number of parts. When he is able to move on to the advanced stage or when, as so many youngsters love to do, he pauses to admire the work of experienced constructors, he will be turning his attention to more rugged models, some of which are featured in this article.

A glance at Fig. 1, which illustrates the tractor portion of a famous Scammell Tank Transporter, immediately gives the impression of great strength and power—the essentials of such work horses which carried the Allied tanks of the Second World War across the blazing North African desert and the hilly roads of Italy. This Meccano version of the prototype was originally designed by Phil Bradley, an expert in observing, recording and reproducing heavy-duty vehicle details and mechanisms in Meccano. The model illustrated in this article is a slight modification of Phil's design which was exhibited by Eric Jenkins, its builder, at the March meeting of the Midlands Meccano Guild.

In real life, the basic tractor had to contend with the following requirements. First, it had to be powerful enough to pull its own considerable weight, plus that of a very heavy articulated trailer, carrying thirty tons or more of a fighting tank and its equipment. Secondly it had to be strong enough to stand up to the shocks and stresses imparted to it, both by its load and the almost impossible terrain with

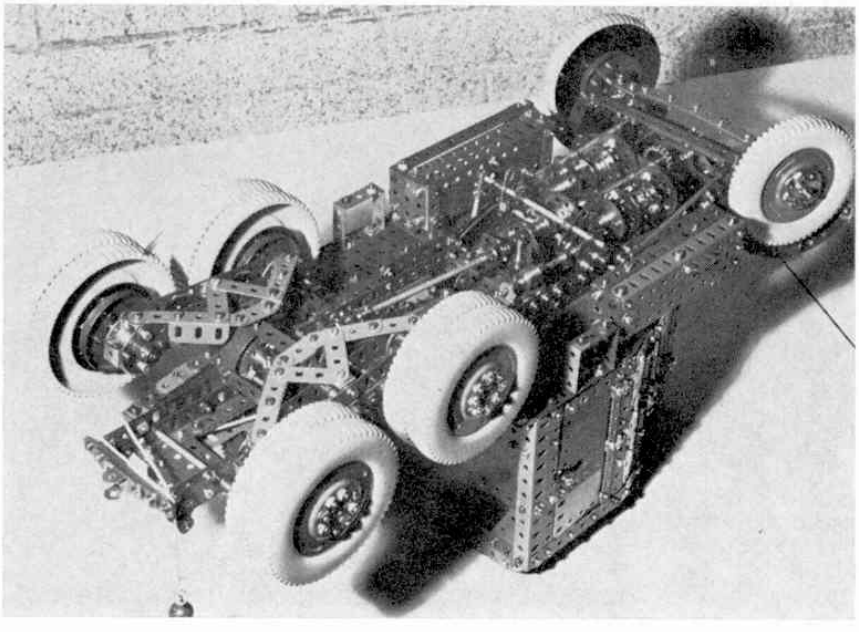


Fig. 2—An underside view of the Scammell Tractor showing the Gearbox, transmission, steering and suspension.

which it was faced on active service. Hence it was fitted with a very powerful engine, a rugged gear-box which could take it up the side of a mountain (by road, of course!) with a full load, and floating rear axle bogies on the tractor fitted with double reduction drives on the eight rear wheels right into the final hubs. Winching gear was also provided, both for hauling on knocked-out or broken down tanks (friend's or foe's) and for general or self-recovery.

All of these basic requirements are skilfully modelled in the Meccano Scammell illustrated in Fig. 1. The dual purpose winch fairleads on the model are clearly shown on the rear of the tractor chassis, two ½ in. Pulleys with boss and a pair of 3 in. Rods providing hawser guides for straight winching to the rear, while a ½ in. loose Pulley just behind the 4 in. Ball Race turntable provides a vertical hawser lead for tank-winching on to the trailer. Semi-elliptical leaf springs are fitted, being anchored at the rear by ½ in. Double Brackets carried on a through Axle Rod, but free to ride on a swinging journal at the front end made from a sandwich of 1 in. Triangular Plates pivoted to the chassis side members and connected to the forward spring Double Bracket by a Long Threaded Pin and Collar.

Further details of the rear axle and bogies can be seen in the view from below illustrated in Fig. 2. The left and right power bogies are quite independent, being pivoted centrally, as shown, from the centre of the rear leaf springs. Axle boxes for each of the four pairs of driven wheels are made from pairs of Bush Wheels attached to 5½ in. Flat Girders and spaced by ½ in. Double Brackets to give adequate strength at several points. A conventional differential drive is fitted to the main back axle from which the half-shafts pass on a first reduction stage via ½ in. Pinions and 57-teeth Gear Wheels, to the final reduction of ½ in. Pinions meshing with 2½ in. Gear Wheels lying inside the back wheels. The 4¼ in. Plastic Road Wheel, Part No. 187b, lends itself very well to this neat and compact construction, allowing the modeller to come close to prototype arrangements.

Note, also from Fig. 2, the unorthodox but efficient gear-box in which the reduction gears from the motor shaft are in constant mesh. They are free to revolve on Keyway Rods, Part No. 230, until such times as they are engaged by compound sliding dogs made from

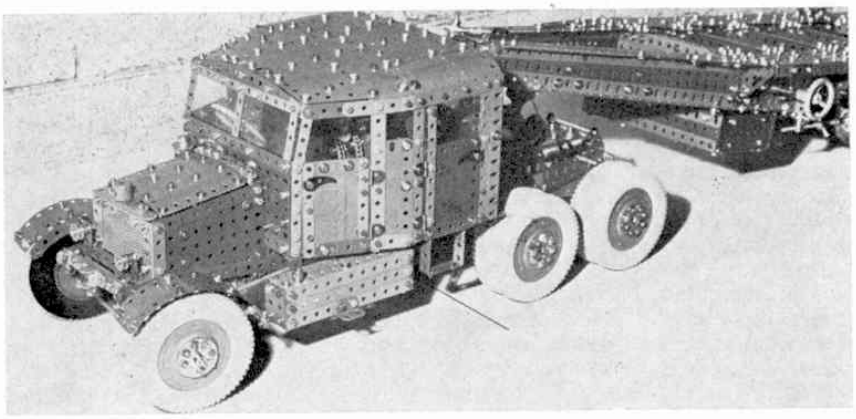
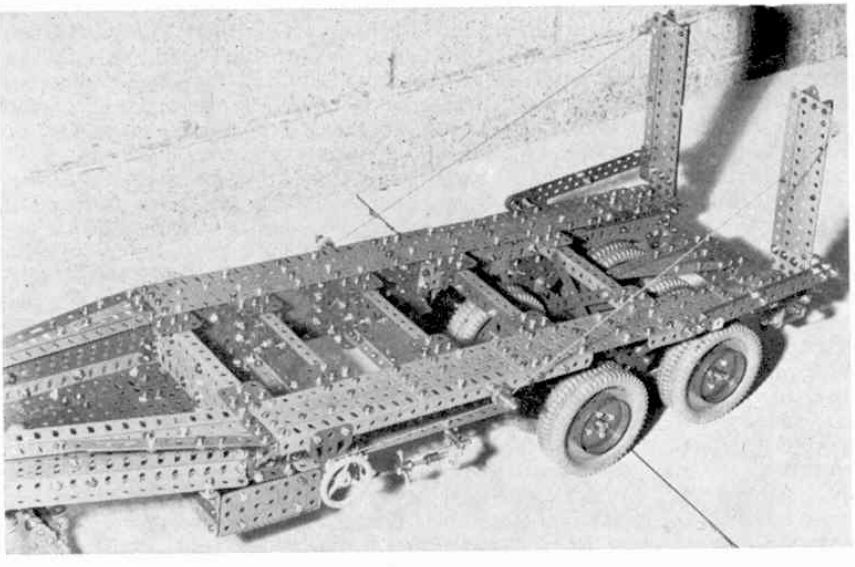
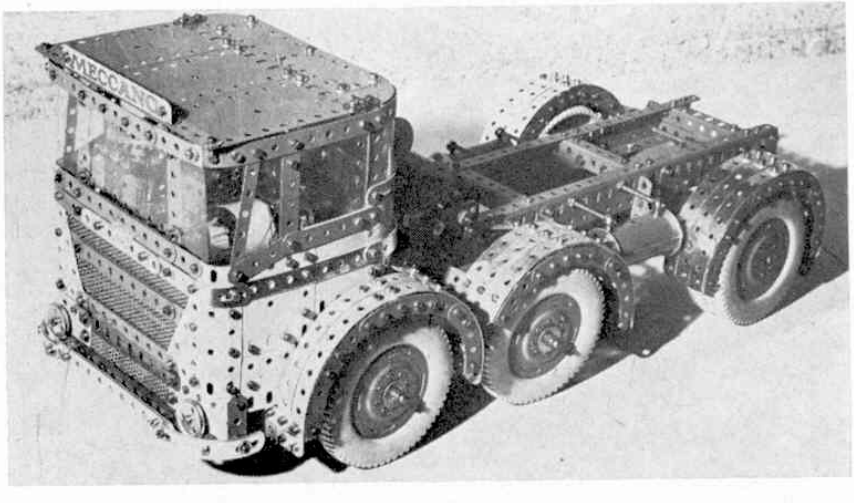


Fig. 3—General view, showing cab details and trailer position. Note the winch pulley and guys on the trailer swan-neck.



Above, Fig. 4—A close-up view of the articulated trailer with tank ramps in the travelling position. Note the rugged construction.

Below, Fig. 5—A short-wheelbase A.E.C. prime mover, designed and built by Phil. Bradley. A fully operational tilt-cab is provided, together with tandem steering and the usual transmission features.



Bush Wheels locked to the ends of Socket Couplings, the Couplings being keyed to their shafts by Keyway Bolts. Bolt shanks, ½ in. or ⅜ in., protrude from the Bush Wheels to engage similar Bolt shanks set in the Gear Wheels. The required gear is engaged by sliding the appropriate Socket Coupling by means of a gear selector rod and lever.

The winching barrel is carried inside the cab and is worm driven from below. The winch can be coupled to the gear-box by a winching hand lever which disengages the transmission clutch at the same time. This can be seen in Fig. 2. The front axle beam is centrally pivoted and comprises a double set of leaf springs to take up forward shocks and to allow a wide margin of rise and fall in negotiating uneven ground. Axle stability is provided by torsion bars made from Axle Rods in Rod and Strip Connectors running back to the chassis side members. Note that the mudguards are supported on the steering arms and hence turn with the steering motion.

The general view of the tractor in Fig. 3 shows further examples of neat modelling in the cab and bonnet details, striking realism of prototype form having been achieved. Driver's and passenger doors hinge authentically and are fitted with working door handles, while Narrow Strips and Transparent Plastic Plates do much to help with neat outlines of the cab framework. Nor does the skill finish here. Fig. 4 shows how the rugged construction principles are carried over into the trailer portion, where Eric Jenkins has produced a first-class working tank trailer complete with heavy-duty compound axle beams in floating journals—again to accommodate wide differences in ground level—stabiliser jacks for on and off-loading, hand winch for loading ramps and swan-neck winch pulleys and guides for tank handling. Rigid cross-bracing with compound girders and similar construction of the trailer sides give all of the rugged appearance of the original transporter.

Fig. 5 shows another thoroughbred from the Bradley stable. This, time, by contrast with the veteran Scammell, a modern A.E.C. short wheelbase prime mover is illustrated. The same careful attention to detail in the cab area is embellished by a little licence in using a small sheet of perforated zinc for radiator grill realism, but this does not detract from the obvious skill in using standard parts for the main features. Incidentally, this cab was modelled in a very careful selection of yellow Plates with silver and green Strips with striking results. The cab top is hinged for easy access to its interior, but Fig. 6 shows that the whole of the cab is capable of being tilted in accordance with current vehicle construction practice. The hinge line can be seen just above the headlamps in the illustrations of Fig. 5. The customary channel girder construction of the chassis is clearly shown and the close-coupled pair of front wheels give the clue to the tandem steering used in this vehicle and reproduced in the model. Note the neatly slung fuel tanks mounted by Screwed Rods and Handrail Supports to the chassis side members.

Of particular interest is the steering column and reduction gearing employed in the model. Two Sleeve Pieces, fitted with Chimney Adaptors, shroud the steering column, simulating the trunk employed in vehicles fitted with power steering. To give something approaching the correct ratio of steering wheel turns for full lock, the double reduction of 3:1 Bevel plus 3 : 1 spur gearing is used at the foot of the steering column to drive the drop arm linked to the steering arm and track rods. The model is fitted with brakes and clutch, operated from the driver's cab, a four-speed gear-box, miniaturised with Pinion gearing, and, by the clever use of an instant disengaging universal joint in the transmission shaft, the entire gear-box, like the cab, can be tilted forward for inspection, adjustment or repair!

In both models so far mentioned, the large Meccano plastic Road Wheels have been employed and they do much to give a proper scale to these heavy-duty vehicles. However, for the purist who prefers rubber tyres on his wheels, Brian Edward's excellent Petrol tanker shown in Fig. 7 will have much appeal. Again, cab details have been excellently moulded and the contour of the mudguards flows smoothly along the model. This model is also fitted with tandem steering, the drop arm from the cab being placed between the two front axles so that a jointed drag link runs fore and aft to the two steering arms. Neat inspection ladders are moulded to the curvature of the main tank while the vehicle's own fuel tank, made from Boiler Ends and a 5½ in. × 2½ in. Flexible Plate, gives it that 'high capacity' look. Nor is the tail end of the vehicle neglected, as Fig. 7a indicates. Number plates are provided by doubling up Flat Trunnions in reverse (a novel way of producing a 1½ in. square plate) and, when fitted with Threaded Bosses to simulate tail, brake and indicator lights, they give the final touch of detail.

Raising the sights to even bigger scale heavy-duty vehicle modelling, Fig. 8 gives a glimpse of what can be done in Meccano even when going up to a wheel size of 6 in. in diameter. The eight coupled wheels shown are not found in the Meccano range of parts and, once again, a little licence is afforded to get the scale right. The illustration shows but a small

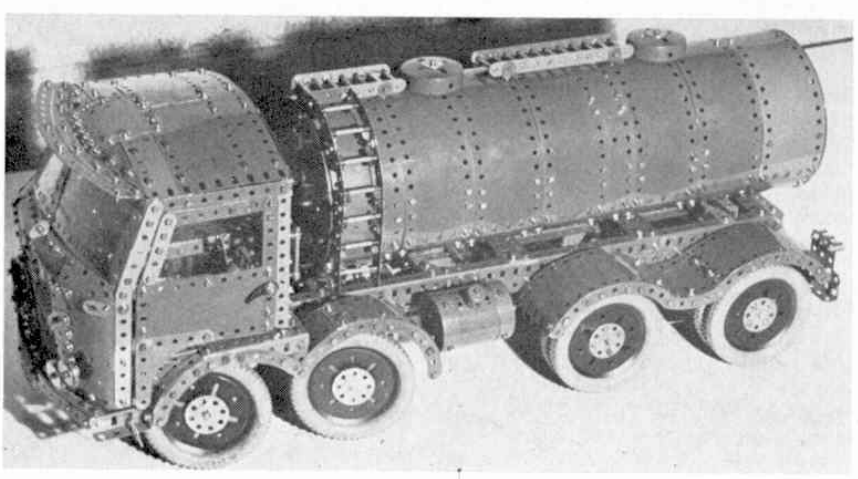


Fig. 7—This Petrol Tanker, designed by Brian Edwards, is fitted with tandem steering, twin differentials, brakes, suspension and four-speed gearbox.

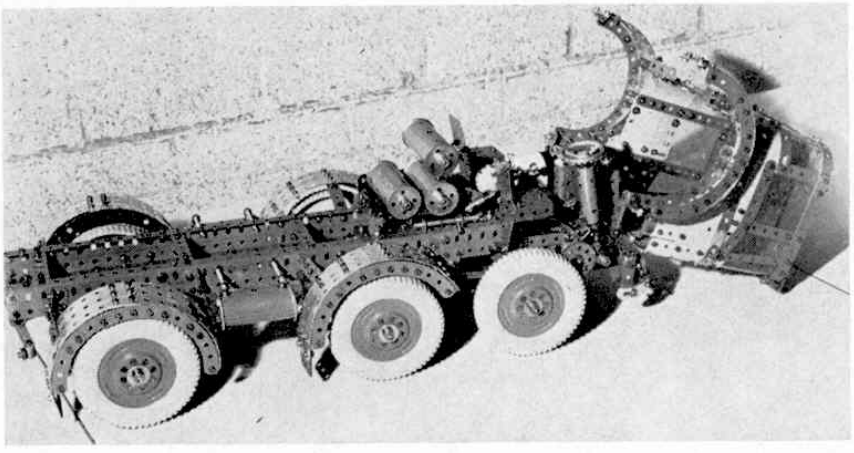


Fig. 6—A rear view of the A.E.C. model, with cab tilted. Note the steering column and auxiliary air and fuel tanks.

fraction of a giant Lorry-mounted Crane, a magnificent large scale model designed by Eric Taylor of Nuneaton. The tyres shown are generally available through motor accessory shops which sell glass ashtrays around which the tyres are mounted. So heavy was the final model that the hollow tyres illustrated had to be fitted with internal wooden discs of substantial proportions, to support the model's weight, previous attempts at stuffing the hollow tyres with rubber hose having proved unsatisfactory for the weight concerned.

This type of vehicle must supply a very stable platform for its crane turntable and hence no springs are fitted at the rear. The wheels, however, must still be able to run over different road surfaces and levels, so swinging bogies are fitted to a beam, halfway between the two differential casings, and the axle tubes themselves, made from double layers and double depths of strips, are pivoted at each end on the swinging bogey arms, but are stabilised to keep the wheels upright by Threaded Rods and yokes running back to the bogey plates at the centre beam. The wheels are built up from Ball Race Flanges and Circular Plates with a $3\frac{1}{2}$ in. Gear Ring mounted inside. This requires a high degree of modelling skill as this Gear Ring, mounted on Bolts, must be absolutely concentric with the half shafts from the differential casings so that a Pinion reduction gearing from the ends of the half shafts can be passed on by idler pinions to the internal teeth of the Gear Ring. Helical Gear differential crown wheels are provided to give 'over the top' drive from the first differential to the second. Thrust bearings made from Chimney Adaptors and miniature ball bearings are used at these points where high torque is required and friction plus smooth Helical drive are important considerations. The built-up universal joint is clearly seen in front of the first differential box, where most of the flexing in the transmission would take place. Bush Wheels, Pivot Bolts, Collars and a 'spider' from a standard Universal Coupling are used for this purpose. Lesser flexing takes place between the two differentials and a simple flexible joint suffices, as shown.

In this article we have tried to give a glimpse, or a taste, of what can be done by the advanced modeller or determined enthusiast who is prepared to break away from traditional leaflet models, take out a sketch pad, dig up some prototype information and then get down to the job. We hope we have succeeded!

Fig. 7a—A neat tail end is one of the attractive modelling features of Brian's Tanker.

Fig. 8—Really heavy-duty stuff! This picture shows the eight coupled wheels on the rear floating bogey of Eric Taylor's giant Lorry-mounted Crane.