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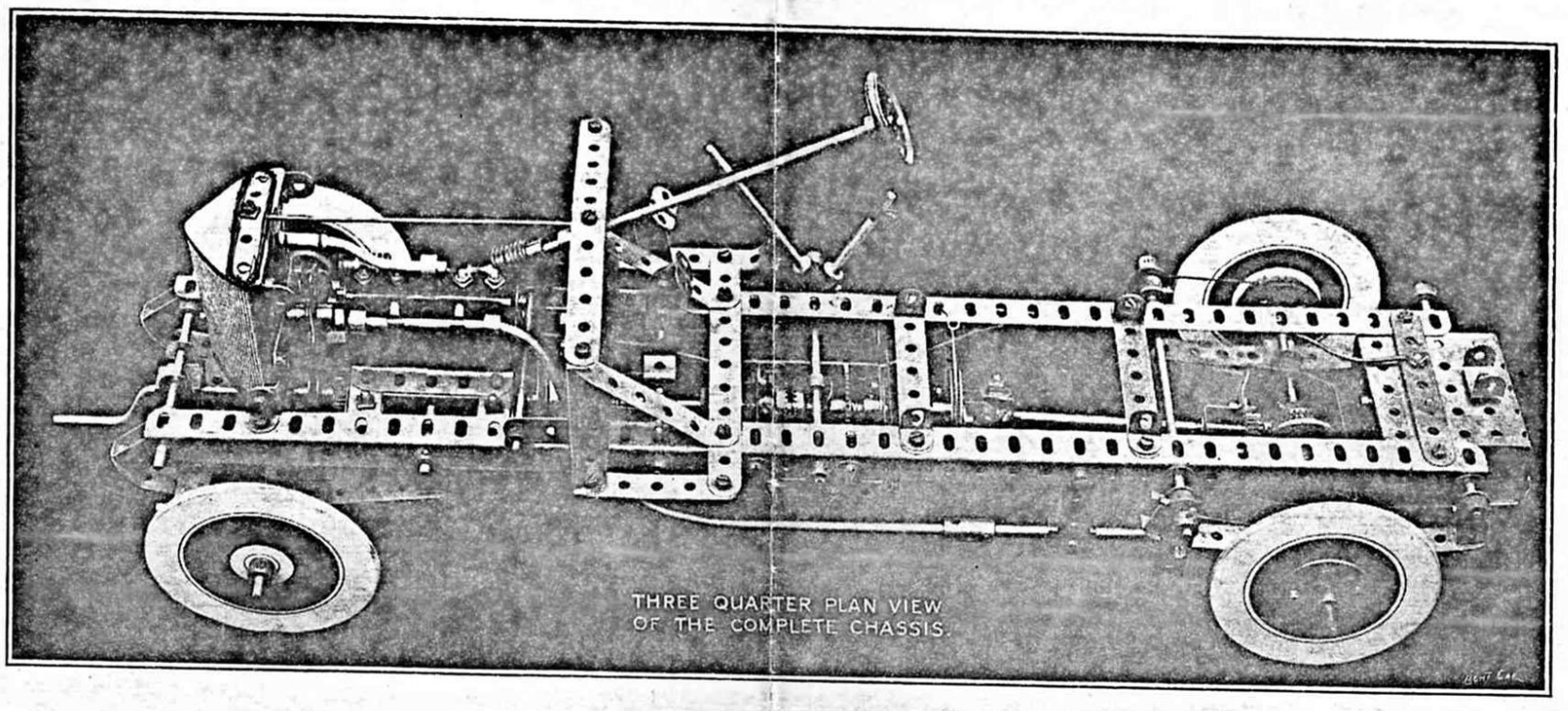
A Chassis built with Meccano

The following consists mainly of extracts which the Editor of "The Light Car" has courteously permitted us to make from an article appearing in the issue of July 7th, 1915

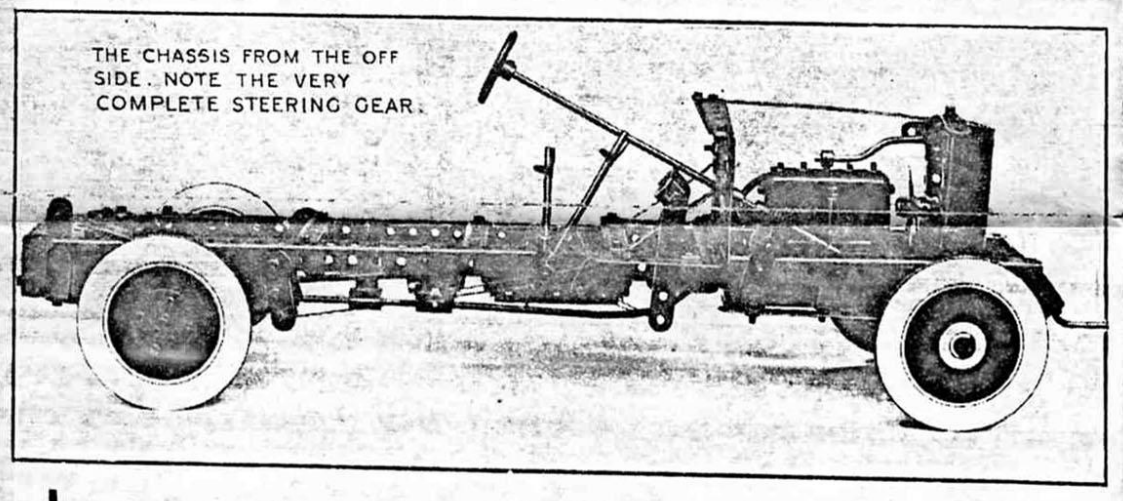


THREE QUARTER PLAN VIEW OF THE COMPLETE CHASSIS.

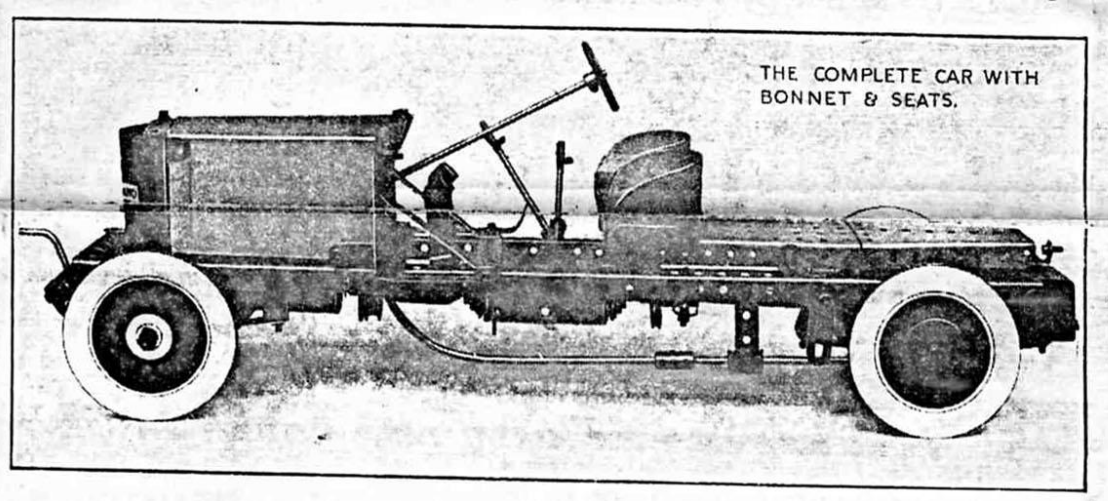
ABOUT six months ago, the makers of that instructive and interesting mechanical toy, Meccano, promoted a competition and offered £200 worth of prizes for the most ingenious mechanism constructed from Meccano parts. The regulations were that any number of these parts could be used in the construction of the mechanism submitted, but no outside assistance in the way of parts or material was to be employed. The lists closed last March, and the results have just been announced.

This interesting and very ingenious motor-car model, which has been awarded a divided second prize in the recent Meccano Competition, was designed and constructed entirely from Meccano parts by Mr. Gordon Crosby, of Leamington Spa. About 10,000 competitors submitted work from all over the world, and it is interesting to note that one of the prize-winners was M. Léon Bollée, the well-known motor-car manufacturer, of Paris, who sent in a model of a motor-car.

For the benefit of those readers who are not acquainted with Meccano parts, it is advisable to point out that each Meccano outfit comprises a number of flat and angular steel strips perforated with $\frac{3}{16}$in. holes at intervals of half an inch, $\frac{3}{16}$in. steel rods of varying lengths, small angle brackets, nuts, bolts,



THE CHASSIS FROM THE OFF SIDE. NOTE THE VERY COMPLETE STEERING GEAR.



THE COMPLETE CAR WITH BONNET & SEATS.

gear wheels, ingenious parts in the form of couplings, drilled and screwed in four different directions, and perforated flanged plates of different shapes. From these various parts, the constructor of the chassis model was enabled, by ingenious combinations, to build up such parts as the steering centres, clutch couplings, brake levers, change-speed lever and connections, &c.

An examination of the photographs will prove the difficulty of evolving such an item as a universal joint, which was not only made outwardly to represent one of these joints, but also provided the same mechanical advantages as an ordinary universal-jointed propeller shaft.

Taking each mechanical part of the chassis in turn, we will now describe how each part was built up, and what Meccano parts were used to arrive at the complete model.

The overall length of the model is about 18 inches, and the frame is built of four angle girders, bolted together in pairs, connected by perforated strips.

The front axle is a 5½in. angle girder. The rear axle is a steel rod bolted above semi-elliptic springs, the latter being made by bending three strips of different lengths to make each spring. The front springs are constructed in the same manner, and each spring is shackled with cranked bent strips.

We now come to the power unit, which presented considerable difficulties at the start as to how to form a four-cylinder engine from mere flanged plates and strips, and a few screws and nuts. Finally, it was decided to represent a *monobloc* cylinder by bending one of the plates into a ∩ section and bolting it to a crank case formed by bending a similar plate in the opposite direction, thus : **U**

The engine is complete with carburetter, magneto, exhaust and water pipes, all of which are represented in a most realistic manner, particularly the carburetter. The engine is provided with fan and radiator, which can be readily seen in the photographs, the radiator being **V**-shaped, and formed, in a similar manner to the engine, from one of the flanged plates. The fan is driven off the crankshaft by a small rubber belt.

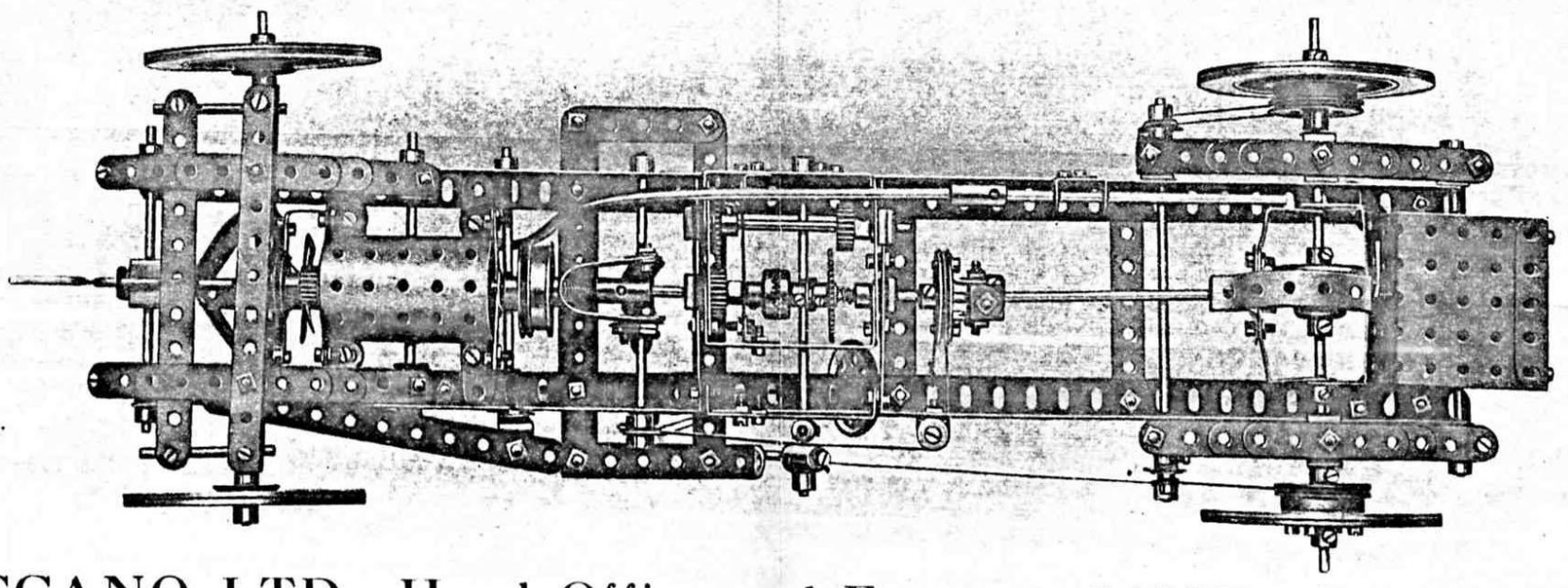
The next item in the transmission is the clutch, which is built up of two disc-wheels—a bush wheel and a flanged-and-grooved wheel—and actuated by a pedal and clutch fork against the pressure of a small coil spring.

The change-speed gear is undoubtedly the most ingenious part of the model. It comprises two speeds of high and low-gear ratios, built into a frame which is bolted to the main frame. The high gear is a direct drive through "dog clutches" arranged by bringing into mesh two small contrate wheels, the teeth of the wheels forming the dogs. The change of speed is actuated by a cross-shaft connected to the change-speed lever, the sliding gear wheel being operated by a striking-fork cleverly constructed from a flat bracket attached to a collar which can be seen in the centre of the cross-shaft. The bracket is slotted, and the slot is made use of to encircle the gearshaft. When the change-speed lever is pushed over, away from the operator, the two dog clutches are thrown out of mesh, and the movement simultaneously brings the sliding gear wheel into mesh with the low-gear pinion carried on the layshaft. The drive is transmitted to the layshaft by means of a pinion on the main shaft with which a gear-wheel on the layshaft is in constant mesh.

The foot brake is behind the gear-box, and is formed of a grooved pulley and cable. The cable goes from the brake pedal, around a guide pulley on the frame, encircles the brake pulley, and is anchored to the frame. The side hand-brake is on similar lines.

The propeller-shaft universal joint is an exceptionally ingenious construction. It operates in exactly the same manner as any universal joint on a real chassis, and is built up from double brackets, mounted behind the propeller-shaft brake drum, and is a combination of the cross pin and sliding types of universal joint. The transmission from the propeller-shaft to the back axle is made by fastening one of the straight-toothed pinions on to the end of the propeller shaft and meshing it with a face teeth crown wheel, on the lines of the old Sizaire rear-axle transmission.

The worm steering is not only correct in design, but follows actual car practice. A worm and pinion are used, and the shaft is connected by levers and rods to the steering swivels. The method of construction is as follows : A large bent strip is bolted to the lowest row of perforations on the dash-board—a flanged plate—and a spindle is passed through the two end holes of the arms of the strip. At one end of this spindle, and within the bent strip, is the pinion which engages the worm on the steering column. At the same end, and outside the bent strip, a crank is bolted, and in the corresponding position at the other end is a collar. The arm of the crank is pivotally connected by an angle bracket to the second hole at one end of the push-and-pull steering rod—a 5½in. strip. To the other end of this strip, and beneath it, a 2in. rod is pivotally connected horizontally by means of a bolt passed through the end perforation but one into the thread of a collar placed on the end of the rod. This rod passes through the centre hole (not the bore) of a coupling placed vertically over the end hole in the 5½in. angle girder which forms the front axle. The coupling is secured to the girder by a bolt, the shank of which is pinched by a grub screw in the coupling, and the rod projects sufficiently beyond the coupling to accommodate the hub of the right front wheel. Another 2in. rod passes through the upper part of the coupling, and at right angles to the first one. It is pivotally connected to the steering tie-rod—a 5½in. strip—by securing to its end a collar bolted through the end hole of the tie-rod. A similar contrivance of coupling, rods, and collar is made at the ends of the axle and steering tie-rod on the near side, and the projecting 2in. rod supports the pulley which is used as a hub for the left front wheel.



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