MECCANO HEAVY VEHICLE CHASSIS

WIRRAL READER'S FINE MODEL

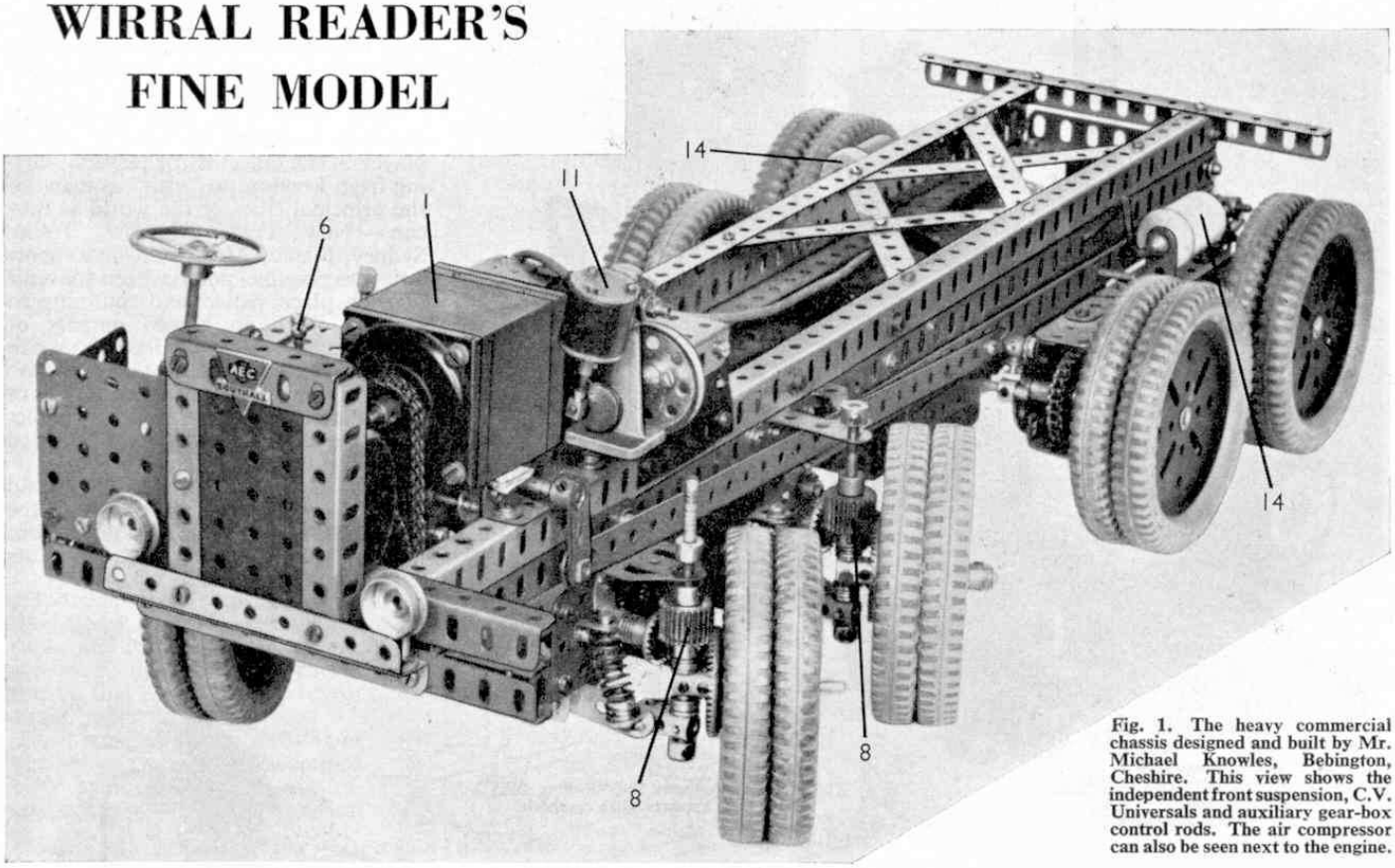

Fig. 1. The heavy commercial chassis designed and built by Mr. Michael Knowles, Bebington, Cheshire. This view shows the independent front suspension, C.V. Universals and auxiliary gear-box control rods. The air compressor can also be seen next to the engine.

TO anyone interested in heavy commercial vehicles, modelling in Meccano, as well as being very enjoyable, can be of great value in assessing the comparative merits of various vehicle designs. These may conveniently be classified in three main categories: the first devoted to orthodox chassis layouts in general use, the second to entirely original ideas, and the third to vehicles basically conventional in arrangement, but incorporating familiar features seldom encountered in the same chassis.

The eight-wheeler illustrated here is a member of this last-mentioned category, and its main features are described here by its builder Mr. Michael Knowles, a skilled Meccano enthusiast who lives in Bebington, Wirral. The chassis should be of considerable interest to advanced model-builders.

The main frame of the vehicle, upon which all the sub-assemblies are mounted, is a 1" × ½" channel section structure built up from four 24½" Angle Girders, and this is flitched with further channels which make it of "E" section for the rear

By "SPANNER"

two-thirds of its length. At the front of this chassis frame, the engine is mounted on a bridge girder, being offset ½" to the nearside. This arrangement allows a little more space in the driving compartment, without materially affecting weight distribution, because the couple created is balanced by that due to the cab base and control gear.

The engine (1) drives through a 2.56:1 chain reduction into the friction clutch which is controlled by a foot pedal (2) mounted in the usual position. The mechanical disengagement linkage provides an 8:1 multiplication in effort between pedal pad and throwout bearing and so ensures light and smooth operation.

The main gear-box, which provides three forward ratios, of 2:1, 3:1 and 4:1, and a reverse of 3.33:1, is mounted behind, and is directly driven by the clutch, and it is operated by a short remote control change-speed lever moving in an "H" gate pattern. In an earlier version of this gear-box installed in a previous model, it was found that keyway rods had only a limited torque capacity, and accordingly their function in this chassis is performed by sliding couplings on the gear-box mainshaft. The main gear-box drives through a ratio 1:1 transposing box (3) and a universally jointed cardan shaft (4), into the two-speed auxiliary gear-box (5), which is controlled by a second lever (6) in the cab. As the ratios of this gear-box are 1:1 and 4:1 a total of 6 usefully spaced forward gears is available, ranging from 2:1 sixth to a 16:1 first gear. The auxiliary gear-box is integral with the rear-wheel drive assembly, which consists essentially of one double-reduction axle, on the ends of which are mounted pivoted chain cases (7) each carrying two Road Wheels. These side-cases also house the final 2:1

reduction and they carry the braking gear. A fully-articulated bogie is thus provided, although naturally its load capacity is somewhat less than that of a genuine compensated two-axle unit.

The front-wheel-drive unit, which is driven by a propeller shaft from the front of the transfer box, can hardly be called a bogie, as it is really a kind of hull, upon which the four front steering wheels are independently suspended by coil springs and Dubonnet linkage.

The driving arrangements are both simple and effective: Only one differential gear is employed, this being in the second axle, and the foremost axle half-shafts are chain driven from it. Intrusion into the F.W.D. unit by the gear-box mainshaft made provision of a front axle differential impossible, while fortunately from the traction point of view, one is definitely undesirable, bearing in mind the limited front wheel movement of $\frac{1}{2}$". To ensure a high tractive effort and to minimise stresses on the differential gear, double reduction gearing is employed at the front axles as at the rear, and the final 2:1 reduction gear is incorporated in the constant-velocity steering universal joints (8).

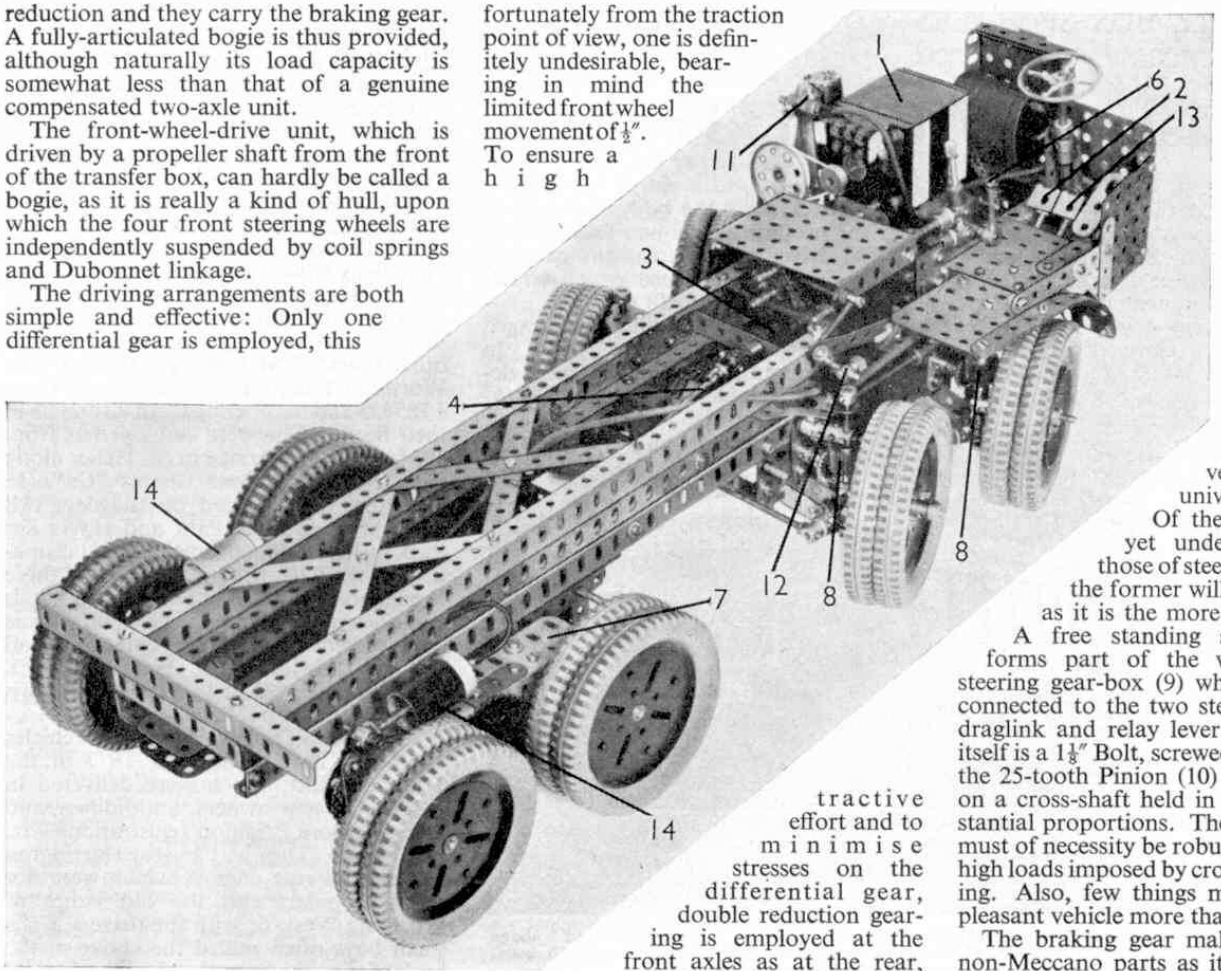

Fig. 2. In this view the driving controls, air pressure braking system and steering and driving arrangements of the front wheels can be seen.

Of the two systems as yet undescribed, namely those of steering and braking, the former will be covered first, as it is the more straightforward.

A free standing steering column forms part of the worm-and-pinion steering gear-box (9) whose drop-arm is connected to the two steering axles by a draglink and relay lever. The drop arm itself is a $1\frac{1}{8}$" Bolt, screwed into the boss of the 25-tooth Pinion (10) which is located on a cross-shaft held in bearings of substantial proportions. The entire assembly must of necessity be robust, because of the high loads imposed by cross-country working. Also, few things mar an otherwise pleasant vehicle more than vague steering.

The braking gear makes use of some non-Meccano parts as it is air operated. It takes the form of a single-line upright

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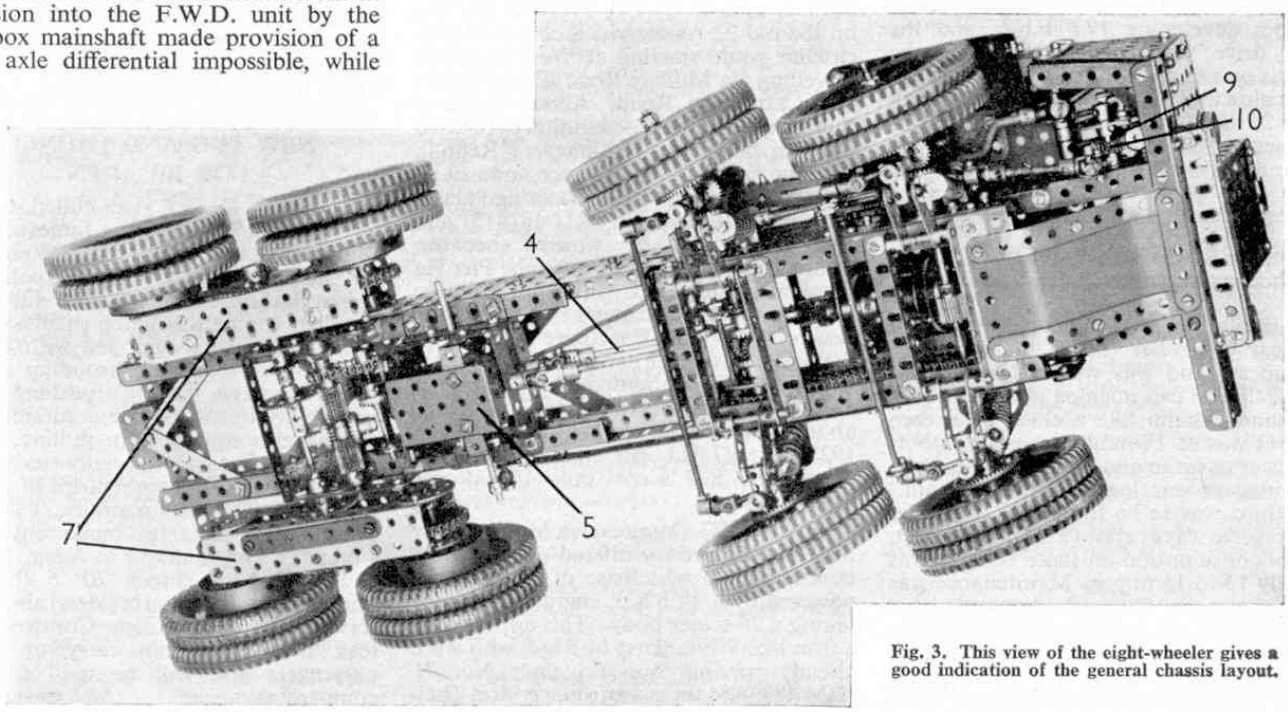
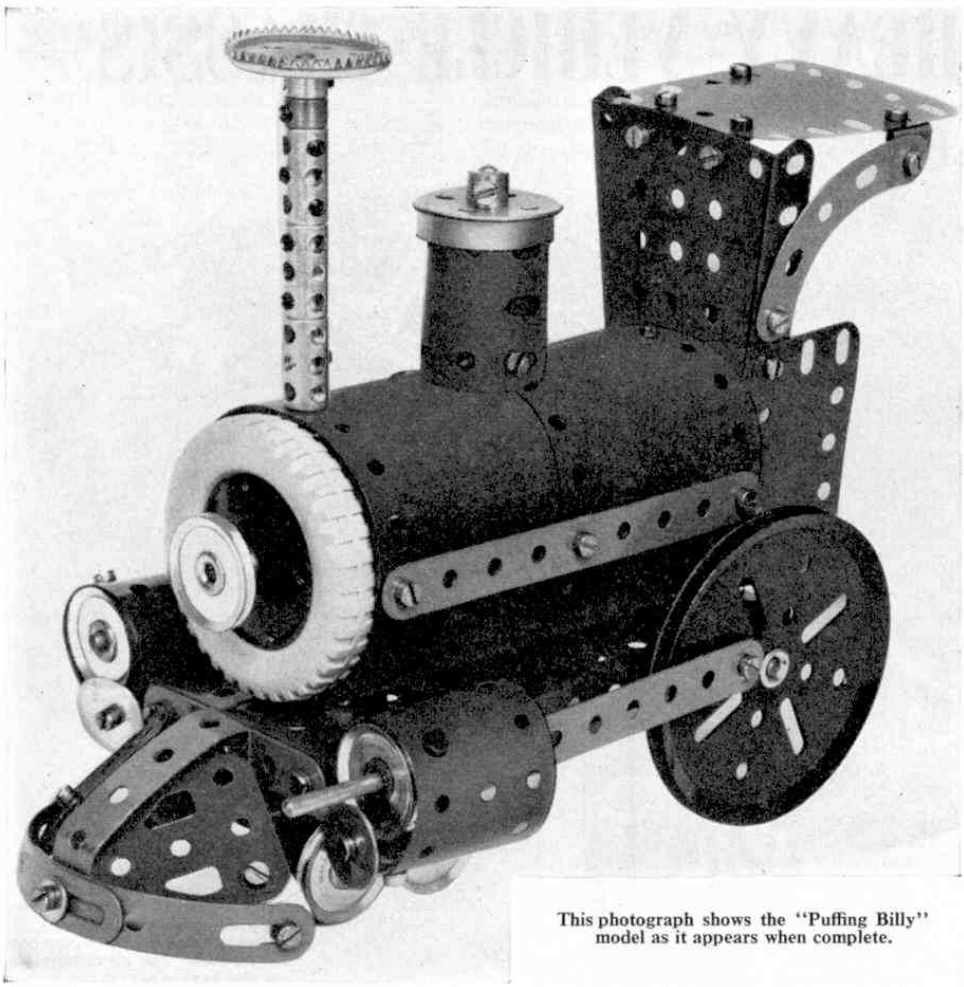


Fig. 3. This view of the eight-wheeler gives a good indication of the general chassis layout.



This photograph shows the "Puffing Billy" model as it appears when complete.

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air-pressure system, and it is powered by a single-cylinder double-acting compressor (11) which feeds air into a small ovoid reservoir located behind the radiator. An air valve (12), operated by the brake pedal (13) admits air to the twin brake chambers (14) which may be seen on the rear bogie side-cases. These chambers operate single-leading shoe cam-expanded brake units operative on the rearmost wheels directly, and on the remaining wheels through the transmission. Contrary to what it might suggest, the system is fairly proportional, and it is powerful enough to stop the vehicle quickly when it is moving down a 1 in 1 slope. On account of the leading-shoe characteristics of the system, the uphill performance is not as good, but cam-expanded leading-and-trailing shoe brakes would have been difficult to fit. Other systems such as transmission or disc brakes were discarded in the interests of realism.

One other criticism concerns the steering, which, although requiring six turns of the wheel from lock to lock, becomes heavy on soft surfaces. This is due mainly to imperfect Ackermann geometry, and permanent front-wheel-drive. Disengagement of this would probably render full-lock cornering impossible, due to the heavy front wheel loading.

However, in spite of its shortcomings, the chassis is most pleasant to drive (it will exceed 1 m.p.h. in 6th gear!) and was well worth the effort of building it, although the choice between a light-handling highway machine and a heavier yet pleasantly invincible cross-country tractor will always be entirely up to the individual model-builder.

Free Holiday Contest

To launch their new international travel game, "GO", Waddington Ltd., of Leeds, in association with *GO!* Magazine, are running a free holiday contest that will interest everyone who dreams of a holiday in the sun. First prize is a week's holiday for two in the Bahamas. The lucky winners will be flown by B.O.A.C. jetliner to Nassau, where they will stay at the fabulous Nassau Beach Hotel. To make their holiday complete, they will also be given £150 in Cook's travellers' cheques. The ten runners-up will each receive a superb Remington 'Lektronic' Shaver and there will be numerous consolation prizes of parcels of Waddington's famous games.

Entry forms for the "GO" competition may be obtained from most toy shops and stores or from the November issue of *GO!* Magazine.

"GO" itself is an ideal family game and may be played by from two to six players. The object is for players, starting from London, to "visit" as many of the principal cities of the world as they can — New York, Moscow, Tokio, Sydney, Buenos Aires, etc.—in as short a time as possible, purchasing a souvenir of each place visited and returning to London when an agreed number of souvenirs have been obtained. You can imagine yourself as a world-wide traveller returning home with a trunk full of mementoes paid for in dollars, roubles and pesos, for your "money" is provided with this fascinating game.

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