

# A Fine New Meccano Model

## Combined Concrete Carrier and Bulldozer

FOR the subject of this month's new model I have chosen an exceptionally interesting machine designed for use on building sites. The model is seen in Fig. 1. It is a small tracked vehicle fitted at one end with a bulldozing blade, which is used for preparatory work in clearing the site, and at the other end with a large hopper, in which concrete or cement can be transported from the mixing machines to the required position. An important feature is that the controls and the driver's seat are reversible, so that the driver can always face the direction in which the machine is travelling. The model is driven by an E20R Electric Motor and is equipped to carry out all the essential operations performed by the actual machine.

The chassis of the model consists of two  $12\frac{1}{2}$ " Angle Girders connected together by two  $5\frac{1}{2}$ " Angle Girders 1 bolted in the positions shown in Fig. 2. The chassis is extended at the hopper end by two built-up girders 2, each of which is assembled from two  $5\frac{1}{2}$ " Strips that overlap the  $12\frac{1}{2}$ " Angle Girders by five holes. A  $3\frac{1}{2}$ " Angle Girder 3 is bolted on each side to the Girders 1, and  $7\frac{1}{2}$ " Strips fixed to the Girders 3 serve as the outer bearings for the axle shafts. The inner bearings are provided by the  $12\frac{1}{2}$ " Angle Girders of the chassis. A casing consisting of two  $5\frac{1}{2}$ " x  $1\frac{1}{2}$ " Flexible Plates overlapped, and two Semi-Circular Plates, is attached to each of the  $7\frac{1}{2}$ " Strips, and is edged by Strips and Curved Strips as shown.

An E20R Electric Motor is attached to the chassis by two Double Brackets on one side, and on the other by a  $3\frac{1}{2}$ " Angle Girder 4 extended by a Flat Girder. A  $\frac{1}{2}$ " Pinion on the Motor shaft engages a 57-tooth Gear 5 fixed on a Rod mounted in the

Motor side-plates. On the lower end of this Rod is a Worm 6 that engages the 57-tooth Gear of the differential. This Gear is fitted with two  $\frac{1}{4}$ " Bolts held in place by nuts. A  $1\frac{1}{2}$ " Rod is held in a Collar screwed on the end of each Bolt, and a Coupling is fixed on the Rod between the Collars. Two Rods, forming what are known as the half-shafts, are mounted as shown in Fig. 2, and each is free to rotate

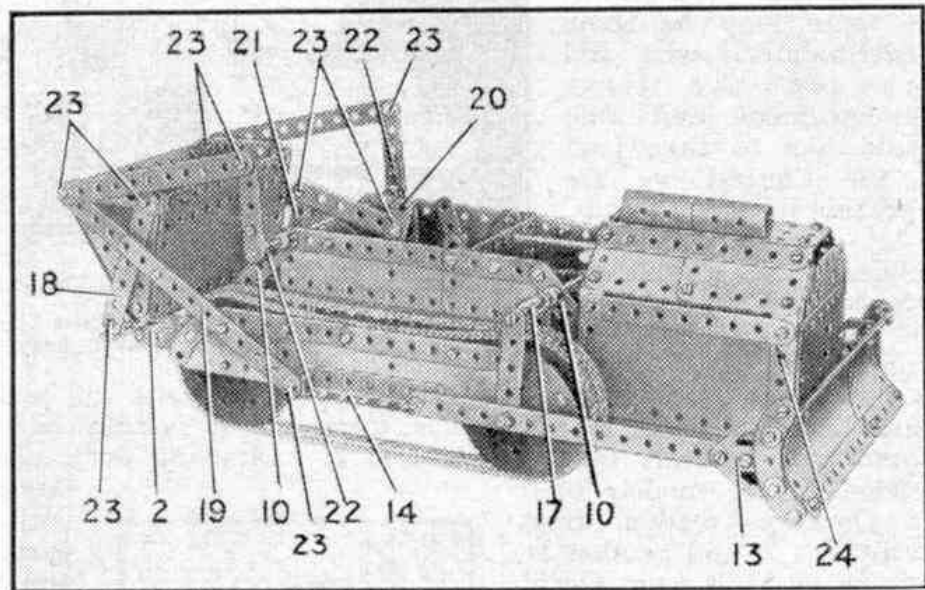


Fig. 1. A combined bulldozer and concrete carrier designed for use on large building operations.

in the longitudinal bore of the Coupling. Two  $\frac{1}{4}$ " Pinions turn freely on Pivot Bolts screwed into the Coupling, and they engage  $\frac{1}{4}$ " Conraxes fixed on the half-shafts.

Two Rods forming idler axles are mounted in the same way as the driving axle, and each is fitted with a  $1\frac{1}{2}$ " Pulley 7. The tracks are represented by lengths of Sprocket Chain passed round 3" Sprockets.

The front and rear divisions of the driving compartment are formed by  $3\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plates bolted to the Girders 1, and the sides are fixed to the flanges of these Plates. Each side is assembled on a  $12\frac{1}{2}$ " Strip bolted to the Flanged Plates immediately above the Girders 1. These Strips support two more  $3\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plates 8 and 9 (Fig. 2), and  $2\frac{1}{2}$ " Strips 10 bolted at a slight angle. The upper ends of Strips 10 are connected by  $5\frac{1}{2}$ " x  $1\frac{1}{2}$ " and  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ " Flexible Plates edged by Strips.

The model can be steered in either direction by applying a brake to one of the tracks. Each brake consists of a length of Cord tied at one end to Girder 1, passed round the Pulley 7 and fastened to a lever 11 in the driving

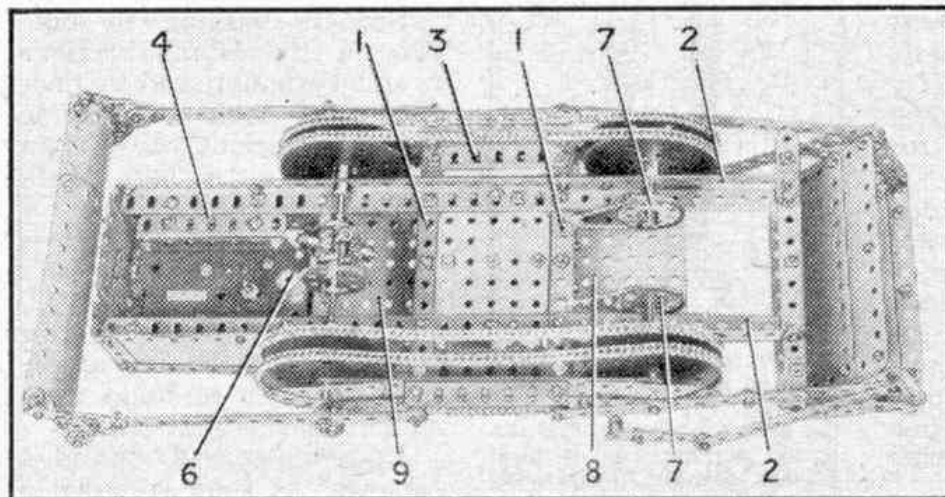


Fig. 2. The bulldozer and concrete carrier seen from underneath.

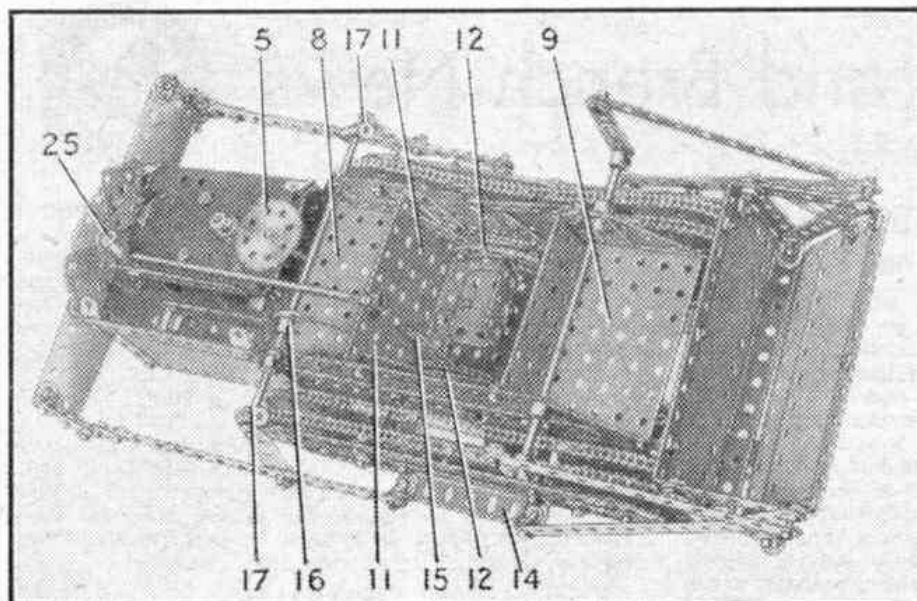


Fig. 3. This plan view of the model shows the arrangement of the driving Motor and details of the cab.

compartment. The lever is a 3" Strip and it is lock-nutted to an Angle Bracket bolted to the chassis. It operates in a quadrant 12 formed by two 2½" Stepped Curved Strips fixed to the side by ¼" Bolts.

The bulldozer blade is made from a 5½" × 2½" Flexible Plate and a 2½" × 2½" Flexible Plate bolted together and edged by Strips. The blade is curved to shape and attached by Angle Brackets to 2½" Stepped Curved Strips. Each of the Curved Strips is fitted with a Flat Trunnion 13, and these are fixed to 7½" Strips pivoted on lock-nutted bolts to Angle Brackets fixed to 3½" Angle Girders 14. These Girders are attached to the Angle Girders 3.

The blade can be raised by operating a lever 15, which is a 3" Strip lock-nutted at its lower end to an Angle Bracket fixed to the chassis. A length of Cord tied to the lever is attached to one arm of a Double Arm Crank 16 that is fixed to a Rod passed through two of the Strips 10. A Coupling 17 is locked on each end of the Rod, and these are connected by 2½" Strips and lock-nutted bolts to the arms supporting the blade.

Each end of the hopper consists of a triangular framework made from a 3", a 3½" and a 2½" Strip, and the ends are linked by 5½" × ½" Double Angle Strips. The sides are 5½" × 2½" Flexible Plates, and the hopper is supported by two pivoted arms on each side. One of these is a 3½" Strip 18, attached to an Angle Bracket fixed to a 7½" Strip bolted across the girders 2, and the other is a built-up strip 19 formed by two 5½" Strips overlapped seven holes. Strip 19 is lock-nutted to an Angle Bracket bolted to the Girder 14.

The hopper can be tipped by moving a lever 20. This consists of a 3" Strip pivoted to the side, and it is linked by a further 3" Strip to a Crank 21. Crank 21 is fixed on a Rod mounted as shown in Fig. 4, and this Rod is fitted with further Cranks 22 extended by 2½" Strips, and the 2½" Strips are connected to the hopper by 5½" Strips. The bolts marked 23 in the hopper linkage are lock-nutted.

The sides of the engine housing are 4½" × 2½" Flexible Plates bolted to the chassis Girders and to a 2½" Angle Girder 24 on each side. The

E20R Electric Motor switch is extended by a 1½" Strip attached to it by a lock-nutted bolt, the other end of the Strip being pivoted on a bolt fixed in a Coupling 25. This Coupling is carried by a Rod passed through an Angle Bracket bolted to the Motor, and through one of the 3½" × 2½" Flanged Plates. An operating lever on the Rod is provided by a Collar fitted with a Bolt.

Each side of the engine housing is completed by two 2½" × 1½" Flexible Plates connected to the sides by Obtuse Angle Brackets. The top is formed by two 3" × 1½" Flat Plates and this is also bolted to Obtuse Angle Brackets. The radiator consists of two 2½" × 2½" Flexible Plates overlapped three holes, a 2½" × 1½" Flexible Plate and two Flat Trunnions. The floor of the driving compartment is a 2½" × 2½" Flat Plate fixed to a 3½" Strip bolted across

the Girders 1. The driver's seat is made from two 1½" Flat Girders connected by an Angle Bracket, and it is pivoted on a 1½" × ½" Double Angle Strip bolted to the floor.

In fitting the track Chains care should be taken to see that each of them has approximately the same tension.

Parts required to build Bulldozer and Concrete Carrier: 2 of No. 1; 8 of No. 1b; 15 of No. 2; 5 of No. 2a; 6 of No. 3; 7 of No. 4; 15 of No. 5; 1 of No. 6a; 2 of No. 8; 2 of No. 9; 5 of No. 9b; 2 of No. 9d; 2 of No. 11; 21 of No. 12; 8 of No. 12c; 3 of No. 14; 1 of No. 16; 4 of No. 16a; 1 of No. 18a; 1 of No. 21; 2 of No. 25; 2 of No. 27a; 2 of No. 29; 1 of No. 32; 183 of No. 37; 38 of No. 37a; 32 of No. 38; 1 of No. 40; 1 of No. 48; 2 of No. 48d; 4 of No. 53; 9 of No. 59; 3 of No. 62; 1 of No. 62b; 4 of No. 63; 1 of No. 72; 2 of No. 73; 12 of No. 90a; 2 of No. 94; 8 of No. 95b; 1 of No. 103f; 2 of No. 103h; 6 of No. 111; 6 of No. 111a; 6 of No. 111c; 4 of No. 126a; 2 of No. 163; 9 of No. 188; 4 of No. 189; 3 of No. 190; 2 of No. 191; 5 of No. 192; 4 of No. 214; 1 E20R Electric Motor.

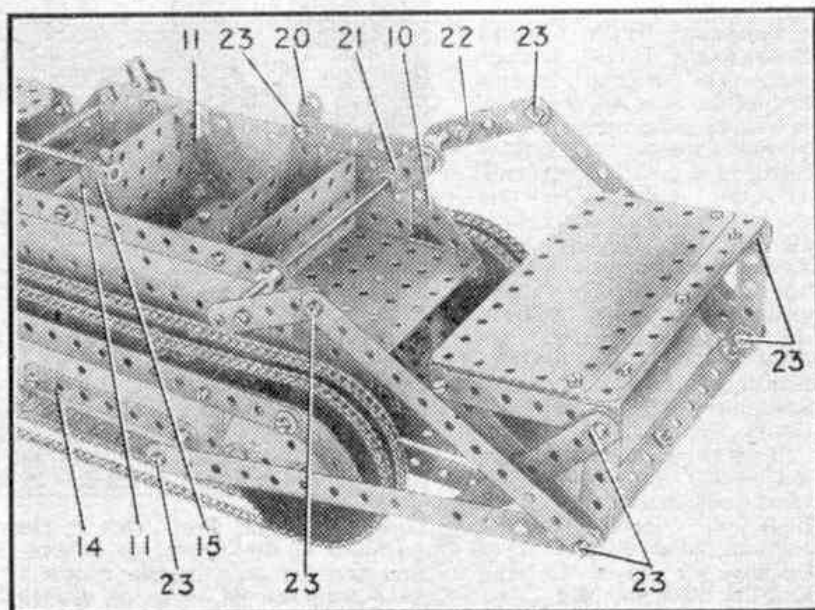


Fig. 4. A rear view of the model showing details of the concrete hopper.