

# A New Meccano Super Model

## Travelling Gantry Crane

THE fine Meccano travelling gantry crane that is shown in Fig. 1 on this page is a very interesting and instructive model, and will provide owners of large Outfits with a splendid subject for their attention. Cranes of this type are in use all over the country and are applicable for all kinds of work. They are of the greatest value in stockyards, foundries and warehouses, as they require little head room and are capable of dealing with either great or small loads, which may be picked up and deposited over a wide area.

The movements of the model include travelling of the entire crane along its rails and traversing of the crab trolley along the gantry, in addition to the hoisting and lowering of the load. All these movements are operated by an E6 or E20B Electric Motor.

Construction of the model should be commenced by building up the tower bases. Each side of each base consists of channel girders built from two  $18\frac{1}{2}$ " Angle Girders and Flat Girders, as shown. The sides are joined at each end by  $3\frac{1}{2}$ " Angle Girders, and the frame so formed is filled in with Flat Plates. Each base

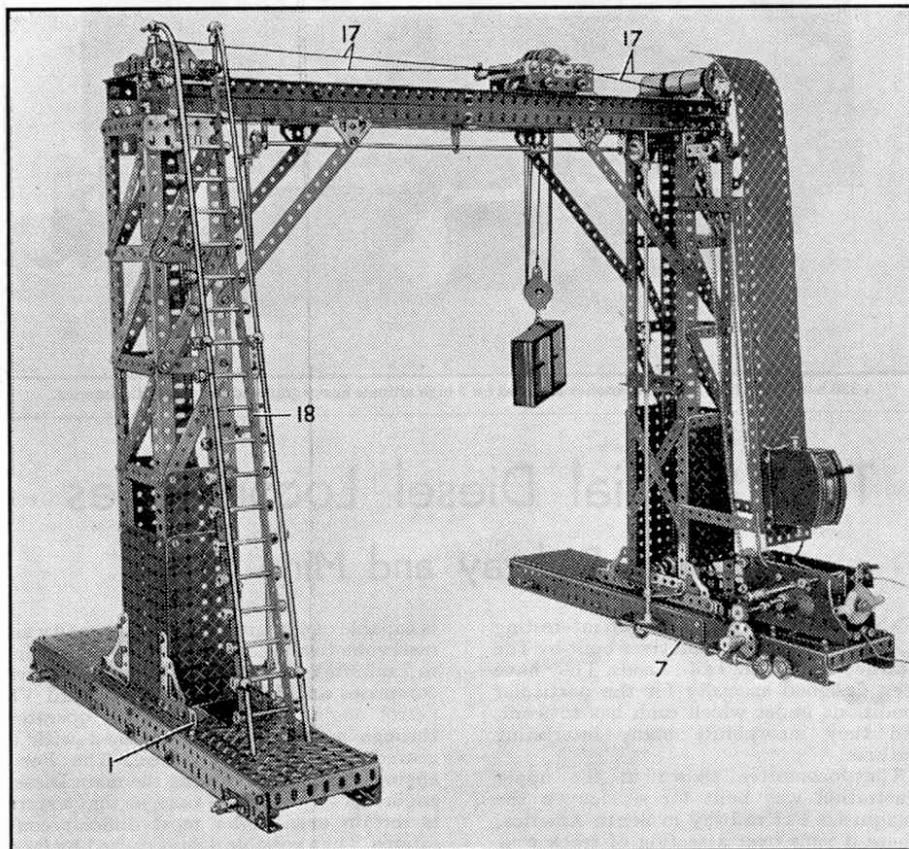


Fig. 1. General view of the new super model Gantry Crane.

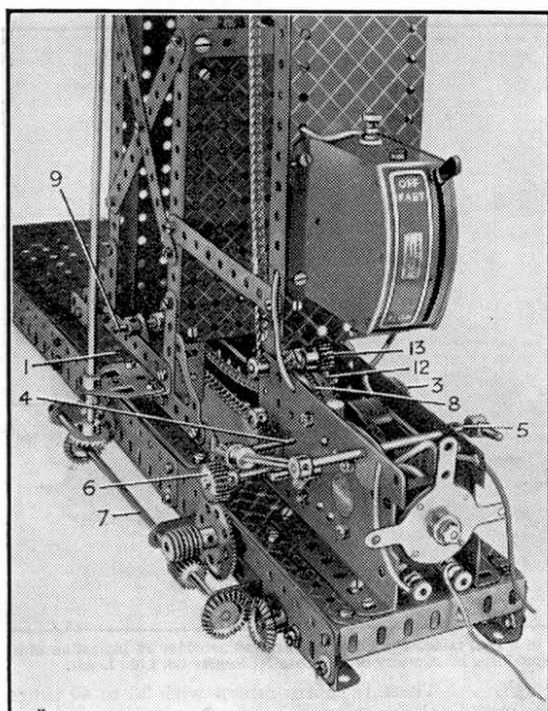


Fig. 2. The base of the right-hand tower, showing the arrangement of the Electric Motor and gear-box.

travels on four  $1\frac{1}{8}$ " diameter Flanged Wheels secured on two 5" Rods, which are journaled in bearings consisting of Double Arm Cranks bolted to the Flat Girders in the positions shown.

Each of the towers that support the main span girder consists of four  $18\frac{1}{2}$ " Angle Girders joined to the base by  $7\frac{1}{2}$ " Angle Girders 1 and held rigid by Architraves. They are braced by  $3\frac{1}{2}$ ",  $4\frac{1}{2}$ " and  $5\frac{1}{2}$ " Strips, and at their lower ends are encased in Flat Plates. Their upper ends are bolted to  $2\frac{1}{2}$ " Flat Girders and  $3\frac{1}{2}$ " Angle Girders. The span consists of two H section girders 2, Fig. 3, each of which is made up of four  $24\frac{1}{2}$ " Angle Girders bolted to Flat Girders. These are secured to the  $3\frac{1}{2}$ " Angle Girders at the tops of the towers.

An E20B Electric Motor is bolted to the base of the right-hand tower as shown in Figs. 1, 2 and 4. The arrangement of the gearing is as follows: A  $\frac{1}{2}$ "  $\times$   $\frac{3}{4}$ " Pinion on the armature shaft of the Motor meshes with a special 57-teeth gear 3, which consists of two 57-teeth Gears fixed back to back on a 4" Rod 4. This Rod forms the layshaft, and it carries a  $\frac{1}{2}$ " Pinion and is slideable in the Motor side plates. Movement of the layshaft is controlled by a selector 5, consisting of a  $3\frac{1}{2}$ " Rod that is also free to slide longitudinally in the Motor side plates, as shown in Fig. 2. When the Rod 4 is moved right over to the left, the drive is transmitted to the travelling wheels. The  $\frac{1}{2}$ " Pinion on the Rod 4 then meshes with a similar Pinion on a  $3\frac{1}{2}$ " Rod that also carries a  $\frac{3}{4}$ " Pinion 6. This Pinion engages a 57-teeth Gear on a 5" Rod. A Worm on the Rod meshes with a  $\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Pinion on an 8" Rod 7 that carries two  $\frac{7}{8}$ " Bevel Gears. These Bevels mesh with

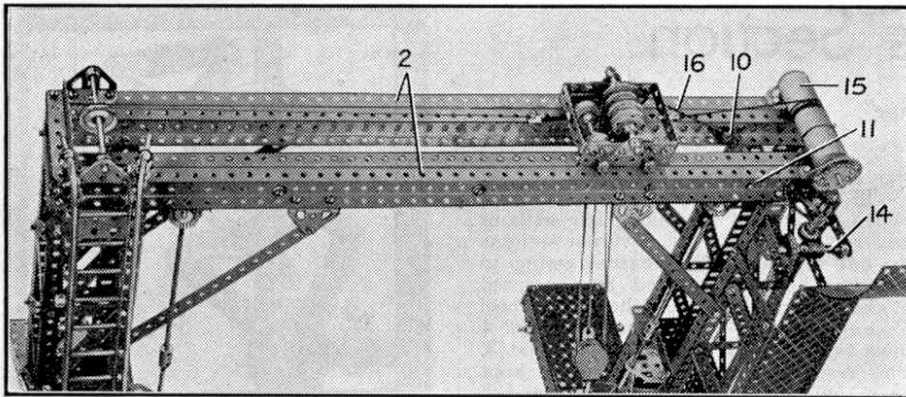


Fig. 3. The gantry seen from above, showing details of the crab trolley.

further  $\frac{7}{8}$ " Bevels on the axles of the travelling wheels.

The gear train that transmits the drive for hoisting and lowering the load is brought into operation by placing the selector rod in a central position. The  $\frac{1}{2}$ " Pinions are then disengaged and the one on the layshaft meshes with a 57-teeth Gear 8 fixed on a 2" Rod that also carries a  $\frac{3}{4}$ " Sprocket. The Sprocket is connected by Sprocket Chain to a similar Sprocket on a 4" Rod 9, which is journalled in two Flat Trunnions at the base of the right-hand tower. A 1" Sprocket on Rod 9 drives a  $\frac{3}{4}$ " Sprocket secured to a 4" Rod journalled at the top of the tower and fitted with a Worm. This Worm meshes with a  $\frac{3}{4}$ " Pinion 10 on a 3" Rod 11.

A third train of gears is provided for transmitting the drive to the travelling crab from which the load hook is suspended. It is brought into operation by sliding the selector rod 5 to the extreme right. A  $\frac{1}{2}$ " Pinion on the layshaft then meshes with a 57-teeth Gear 12 loose on the 2" Rod that carries the Gear 8, and with a  $\frac{1}{2}$ " Pinion 13. The Rod of this Pinion carries a 1" Sprocket that is connected by Chain with a similar Sprocket on a 3" Rod 14. A Worm on Rod 14 transmits the drive to a Wood Roller 15 through a  $\frac{3}{4}$ " Pinion and Bevel Gears as shown in Fig. 3. The speed at which the various operations are carried out is varied as required by means of a Resistance Controller fixed to the right-hand tower and wired in series with the Motor.

The crab, which is seen in Fig. 3, consists of two  $2\frac{1}{2}$ " x 1" Double Angle Strips joined to two 3" Flat Girders. Two 1" Triangular Plates bolted to the Flat Girders provide bearings for a  $3\frac{1}{2}$ " Rod that carries four loose 1" Pulleys spaced from each other by Washers. The crab travels on four  $\frac{3}{4}$ " Flanged Wheels. A Handrail

Support is secured in the centre hole of one of the Double Angle Strips, and a  $1\frac{1}{8}$ " Bolt in that of the other. A Threaded Boss is screwed on the Bolt and a  $\frac{7}{32}$ " Bolt is inserted in one of its tapped bores.

The cord 16 for hoisting and lowering the load is attached by a Cord Anchoring Spring to the 3" Rod carrying the  $\frac{3}{4}$ " Pinion 10, and it is then passed over one of the outer 1" Pulleys on the crab, and around the sheaves of the Pulley Block and the Pulleys of the crab. Finally it is tied to the lug of the Pulley Block.

The Cord 17 for traversing the crab is fastened at one end to the Handrail Support on the crab and then wound several times around the Wood Roller. The other end of the Cord passes through opposite holes in the Double Angle Strips forming the ends of the crab frame, and then is passed over a 1" Pulley mounted on a 4" Rod journalled in two Trunnions at the left-hand end of the span, and tied to the Bolt in the Threaded Boss on the crab. The Threaded Boss provides means of applying the correct tension to the

cord, the degree of tension being regulated by screwing the Threaded Boss along the Bolt as required.

A ladder 18 giving access to the span is constructed by attaching two compound strips, each made up from two  $12\frac{1}{2}$ " Strips overlapped nine holes, to the tower base and to the upper end of the tower. The middle rung consists of a 2" Screwed Rod fixed in place by Nuts, and the others are 2" Rods held by Collars. The handrails are  $11\frac{1}{2}$ " Rods joined by Rod Connectors and supported by Handrail Couplings and Handrail Supports, the latter being secured in the tapped bores of the Collars on the rungs.

A guard for the gearing is fixed to the right-hand tower as shown.

Parts required to make new Super Model Gantry Crane: 4 of No. 1; 4 of No. 1b; 4 of No. 2; 20 of No. 2a; 8 of No. 3; 11 of No. 5; 3 of No. 6a; 8 of No. 7; 16 of No. 7a; 2 of No. 8; 4 of No. 8b; 14 of No. 9b; 1 of No. 9f; 3 of No. 12; 5 of No. 12a; 7 of No. 13; 4 of No. 13a; 6 of No. 15; 1 of No. 15a; 4 of No. 15b; 5 of No. 16; 2 of No. 16b; 22 of No. 17; 2 of No. 18b; 8 of No. 20; 4 of No. 20b; 1 of No. 22; 4 of No. 22a; 3 of No. 25; 3 of No. 26; 1 of No. 26a; 1 of No. 26b; 5 of No. 27a; 12 of No. 30; 1 of No. 30a; 1 of No. 30c; 3 of No. 32; 351 of No. 37af; 344 of No. 37bf; 81 of No. 38; 1 of No. 40; 4 of No. 46; 6 of No. 52a; 80 of No. 59; 9 of No. 62b; 3 of No. 63; 1 of No. 64; 4 of No. 70; 3 of No. 72; 2 of No. 77; 2 of No. 81; 2 of No. 94; 3 of No. 96; 3 of No. 96a; 8 of No. 103b; 2 of No. 103e; 3 of No. 103f; 4 of No. 103k; 1 of No. 106; 8 of No. 108; 1 of No. 111d;

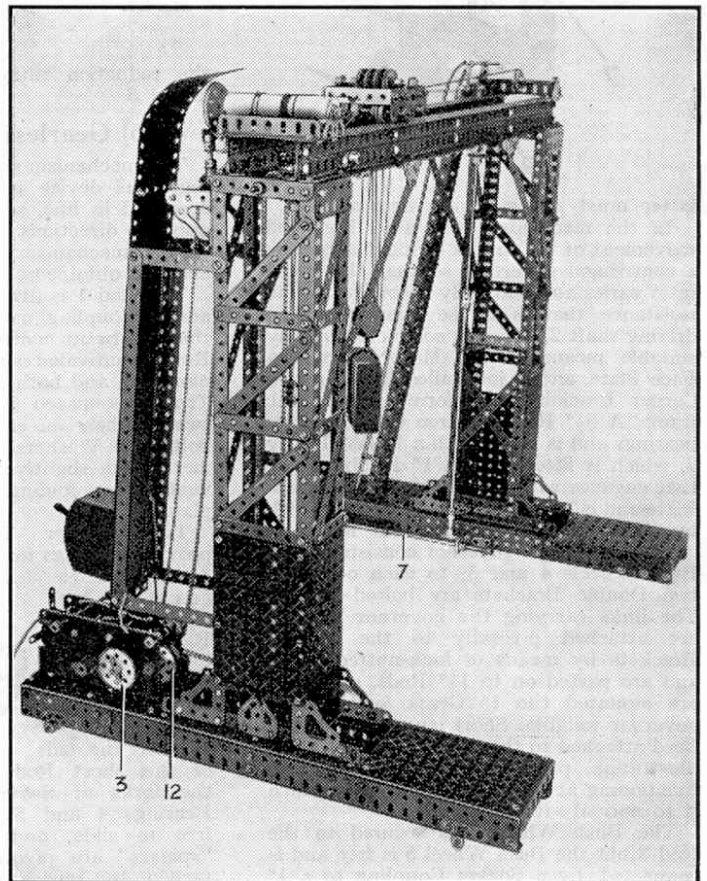


Fig. 4. A rear view of the complete model.

1 of No. 115; 1 of No. 116a; 8 of No. 126; 8 of No. 126a; 7 of No. 136; 2 of No. 136a; 1 of No. 139; 1 of No. 139a; 1 of No. 153; 1 of No. 176; 2 of No. 192; 1 of No. 197; 2 of No. 213. 1—E6 or E20B Electric Motor; 1—6-volt or 20-volt Resistance Controller.