

Fig. 1. Overall view of the complete model.

# A GIANT HAMMERHEAD CRANE

ONE of the models that was extremely popular with the fathers of many present-day Meccanoites was a fine version of a Giant Hammerhead Crane which I described in the *M.M.* some years before the last war. This model held great appeal for model-builders of that time, probably on account

By "SPANNER"

of its realism, sturdy construction and the fact that it was capable of lifting quite considerable loads. I have, therefore, selected this model, as the illustrations of it were fortunately still available to me, for the subject of this latest "Pick of the Pops" article.

I must mention, however, that most of these old models contained

some parts—and in some cases Motors too—of a type now obsolete. Over the years these have been replaced by new and improved parts and Motors. There have, in fact, been many developments in the Meccano system since these models made their appearance, and although they can still be built from the 1962 Meccano, some small modifications will be necessary in details of the design. For example, the Hammerhead Crane shown here was driven by a type of Motor that has been obsolete for many years, but there will be no difficulty in adapting the construction so as to use a modern E15R Electric Motor.

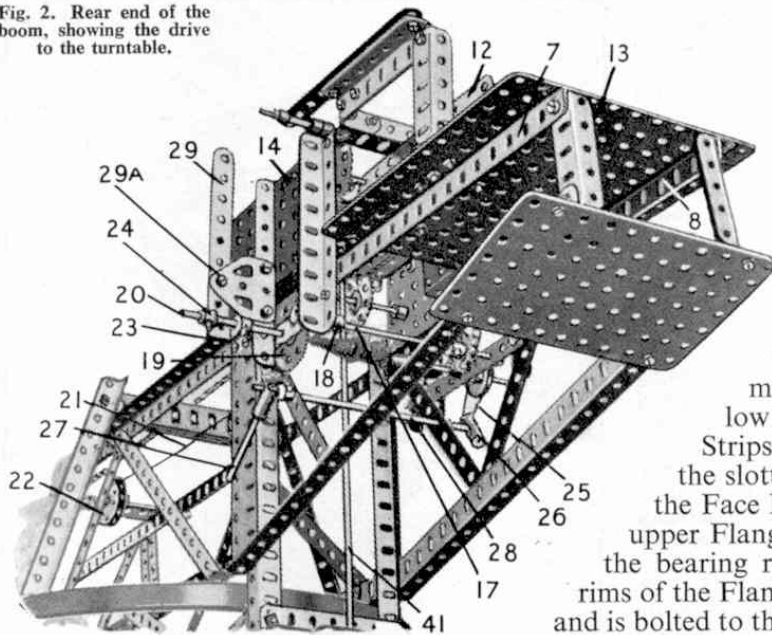
## BUILDING THE MODEL

The main tower is of very massive construction and will withstand tremendous strain. Each corner member 1 is composed of three  $24\frac{1}{2}$ " Angle Girders, connected at top and bottom by  $12\frac{1}{2}$ " Girders 2. The framework is made perfectly rigid by means of a series of ties and struts consisting of  $12\frac{1}{2}$ " Strips 3 and Flat Girders 4. The upper platform is composed of a number of Flat Plates bolted to the projecting flanges of the top Angle Girders 2 and to further  $12\frac{1}{2}$ " Girders secured transversely in the tower.

The rotating boom of the crane swivels upon roller bearings 6 mounted on the upper platform.

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Fig. 2. Rear end of the boom, showing the drive to the turntable.



The construction of the main pivot and roller bearing 6 in the original model made use of the old Channel Segments (Part No. 119) which are now obsolete, and their function in this model can be replaced with advantage by making use of two Flanged Rings (Part No. 167b). One of these is bolted to the platform. A  $9\frac{1}{2}$ " Strip is then bolted across the Flanged Ring and has a Double Arm Crank secured to it.

The Crank carries a Rod that is held in place by two Collars, and passes up through the boss of a Face Plate fixed at the centre of the spider that carries the roller wheels. Eight  $3\frac{1}{2}$ " Strips are bolted radially about the Face Plate and their outer ends are connected by further  $3\frac{1}{2}$ " Strips. The radial  $3\frac{1}{2}$ " Strips are each fitted with a  $1\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip and in each of these a  $2\frac{1}{2}$ " Rod is mounted. The Rods are held in place in the Double Angle Strips by a Collar on their inner ends and a  $1\frac{1}{8}$ " Flanged Wheel on their outer ends.

The Flanged Wheels are spaced from the Double Angle Strips by Washers, eight Washers being used on each of four of the Rods and five being used on each of the other four. The eight Washers are fitted to the Rods

that are mounted below the  $3\frac{1}{2}$ " Strips attached to the slotted holes of the Face Plates. The upper Flanged Ring of the bearing rests on the rims of the Flanged Wheels and is bolted to the underside of the boom. A  $9\frac{1}{2}$ " Angle Girder can be bolted across the centre of the Ring and fitted at its centre with a Double Arm Crank that passes over the pivot Rod fixed in the centre of the lower Flanged Ring.

Each side 7, 8, of the boom is composed of two  $24\frac{1}{2}$ " Angle Girders butted together and secured by a  $5\frac{1}{2}$ " Girder at the centre. The lower portions of the frame consist of  $24\frac{1}{2}$ " Girders 9 and  $12\frac{1}{2}$ " Girders 10, braced by a series of ties and struts 5 and 11.

#### WORKING MOVEMENTS

The three working movements of the model—hoisting, racking and slewing—are driven and controlled from the Electric Motor and gear-box secured upon

the upper side of the boom. The motor (12 Fig. 3) shown in the illustration is an obsolete type, and the current E15R Motor can be used in its place. It is bolted to large Flat Plates 13 carried on the main girders 7, 8, while the sides of the gear-box 14 are bolted directly to the girders 7 and 8. A general view of the driving mechanism and controls is shown in Fig. 3.

The hoisting gear is operated as follows: the Motor, by means of a  $\frac{1}{2}$ " Pinion 15 (Fig. 3) on its armature, drives a 57-teeth Gear Wheel secured to an axle carrying the 1" Sprocket Wheel 16. This Sprocket Wheel is connected by a short Sprocket Chain to a similar wheel mounted on a Rod 17 (Fig. 2), and a Pinion 18 secured to the latter drives a 57-teeth Gear Wheel 19 on the winding shaft 20. The hoisting cord 21 passes from this shaft over a guide pulley 22, and over one of two pulleys 1a in the traveller (Fig. 4); from thence it is led round one of the sheaves of the two-sheaved pulley block 5, back round the other pulley 1a, and over the second sheave in the pulley block 5, and is finally secured to a hole in one of the Bush Wheels 1. The Bush Wheels 1 do not revolve with the sheaves 1a.

The Gear Wheel 19 may be moved in or out of engagement with the Pinion 18 on operation of a lever 29; the latter is pivoted at 29a and engages the Rod 20 by means of a Double Bracket 23 mounted between Collars 24. The movement of the load is controlled by a friction brake consisting of a piece of cord 25 tied to the end of a Coupling 26 and engaging a 1" Pulley secured to the winding shaft. The grip of the cord 25 about the Pulley is relaxed on lifting the lever 27, which consists of a short Rod attached to the shaft 28 carrying the coupling 26.

#### ROTATING AND TRAVERSING

The 57-teeth Gear Wheel (already mentioned) mounted immediately behind the Sprocket Wheel 16 on the shaft 42 (Fig. 3), is driven by the Motor Pinion 15

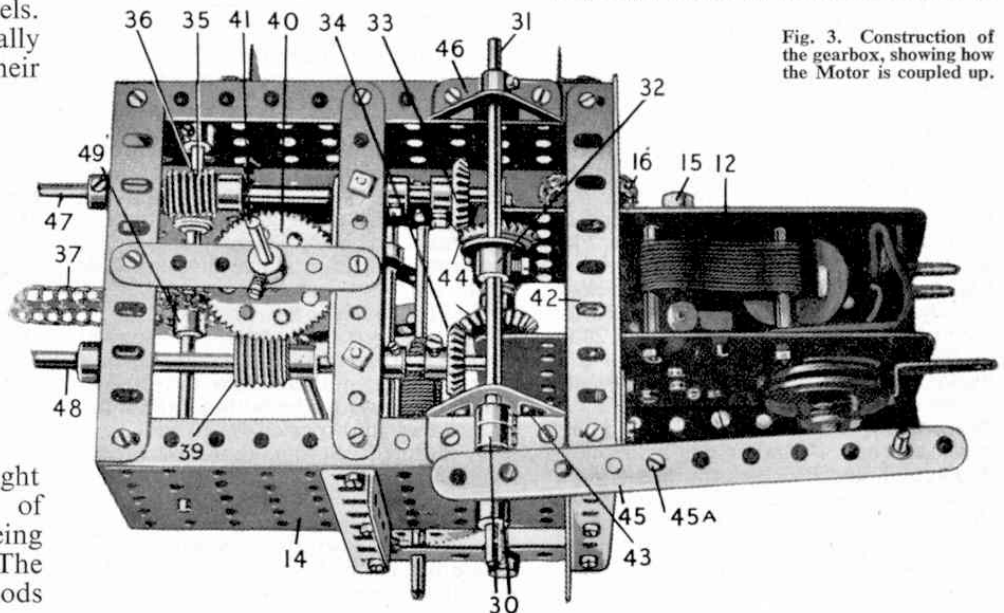


Fig. 3. Construction of the gearbox, showing how the Motor is coupled up.

Fig. 4. Construction of the traveller and arrangement of the hauling chains.

and engages with a further  $\frac{1}{2}$ " Pinion secured to a short Rod journaled in the end of the Motor. The latter Rod carries at its other extremity a further  $\frac{1}{2}$ " Pinion meshing with a 57-teeth Gear Wheel 43 secured to the Axle Rod of two Bevel Wheels 44. This Axle Rod may be moved endways in its bearings on operation of a lever 45. The end hole of a crank 32 is threaded on the axle between the bosses of the Bevel Wheels 44 and is retained in its position by means of two or three Washers placed on either side of the Crank. The latter is secured to a Rod 31 sliding in Trunnions 46, and the lever 45, pivoted at 45a, rests between two Collars 30.

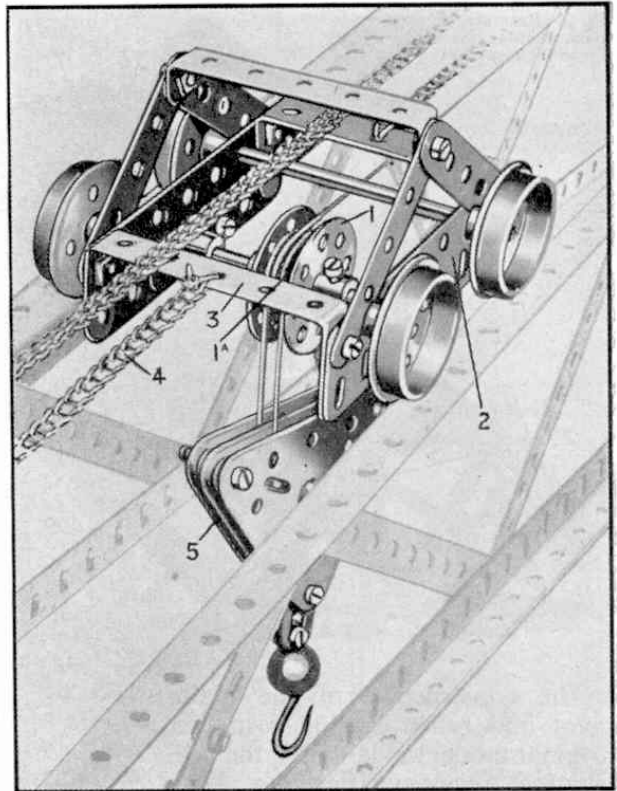
#### SWIVELLING THE CRANE BOOM

The Bevel Wheels 44 are so arranged on their shaft that, on moving the lever 45, one or other may be brought into engagement with one of the two further Bevel Wheels 33, 34, mounted on secondary shafts 47, 48. Shaft 47 carries a Worm 35 driving a 57-teeth Gear Wheel on the Rod 36. A 1" Sprocket Wheel 49 on this Rod engages a length of Sprocket Chain 37, which passes round a similar Sprocket Wheel 38 (Fig. 1) at the outer end of the crane boom. The ends of the Chain are attached to the carriage or "traveller"; hence rotation of the Sprocket 49 moves the traveller to and fro along the boom.

The crane boom is swivelled by means of the secondary shaft 48. This carries a Worm 39 (Fig. 3) engaging the 57-teeth Gear Wheel 40 on vertical shaft 41 (Fig. 3). Shaft 41 carries at its lower end a  $1\frac{1}{2}$ " Sprocket Wheel engaging an endless length of Sprocket Chain which grips the circumference of the lower fixed Flanged Ring of the roller-race.

It will now be seen that a slight movement of the lever 45 will connect the drive from the Motor with either of two operations—swivelling the crane boom or propelling the traveller 12 along the rails 7.

The construction of the traveller is shown in Fig. 4.



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Trunnions 13. Semi-Circular Plates 14 are also bolted in place at the same time.

To construct the sides of the hopper, two  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ " Triangular Flexible Plates 15 and a  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ " Red Plastic Plate 16 are attached by Angle Brackets to the Strip 7 on each side. Two  $4\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plates 17 form the front and rear of the hopper.

Two  $2\frac{1}{2}$ " Strips 18, one on each side of the model, are lock-nutted to the  $12\frac{1}{2}$ " Strips 1. The sifter tray is a  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plate 19 and it is fixed to the Strips 18 and 3 by means of two  $3\frac{1}{2}$ " Rods held in place by Spring Clips. The Spring Clips are spaced from the Strips by means of Washers; this structure should then be able to pivot to and fro with the sifter tray remaining horizontal. A Double Bracket 20 is fixed to the end of the Flanged Plate 19 as shown. Next, Flat Trunnions 21 are bolted to the Strips 6 together with two Reversed Angle Brackets 22. These form bearings for two  $1\frac{1}{2}$ " Rods, each of which carries a Bush Wheel 24 at its inner end. On the outer end of one Rod is a 2" Pulley 23, and on the outer end of the other is a 1" Pulley with Boss. A  $2\frac{1}{2}$ " Strip 25, which forms a crank, pivots at one end on a 1" Rod held in the Double Bracket 20, and its other end pivots on a  $\frac{3}{8}$ " Bolt 26 passed through holes in the two Bush Wheels. When the handwheel formed by Pulley 23 is turned the sifter tray moves backwards and forwards.

Parts required to build the Gravel

Grading Machine: 2 of No. 1; 6 of No. 2; 2 of No. 3; 7 of No. 5; 1 of No. 11; 12 of No. 12; 2 of No. 16; 2 of No. 18a; 1 of No. 18b; 1 of No. 20a; 1 of No. 22; 1 of No. 23; 2 of No. 24; 6 of No. 35; 62 of No. 37a; 48 of No. 37b; 3 of No. 38; 2 of No. 38d; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 5 of No. 111c; 2 of No. 126; 2 of No. 126a; 1 of No. 188; 2 of No. 189; 1 of No. 190; 2 of No. 191; 2 of No. 192; 2 of No. 194; 2 of No. 214.

#### The Conqueror of Gaping Gill—

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his wife told him she heard all he said over the telephone up to the point where the line broke. It was his receiver which had been defective.

Twenty minutes later a storm broke, and rain came down in sheets. Those who had gathered to see the day's events ran for shelter. By evening, the full force of the stream was being felt by Gaping Gill, and spray rose high above the dark hole on the fell.

The following May an Englishman, Edward Calvert, reached the bottom of Gaping Gill, using a windlass and bosun's chair. Today, pothole clubs have found alternative ways to the bottom, and miles of passages unsuspected by Martel have been explored. Several thousand people have stood in the main chamber, which is more than 500 feet long.

But Martel's achievement remains one of the finest in British potholing. It was also among the earliest, for this little Frenchman fired Britons to show enthusi-

asm for the world beneath their feet. Before long, all the open shafts on the fells had been conquered and an exploration begun of the 1,000-odd other water-worn systems in the limestone country.

#### BOOK REVIEW

*Narrow Gauge Railway Modelling*, by D. A. Boreham (Percival Marshall, 21/-), covers the somewhat specialised field of railway modelling indicated in its title. There is a good deal to be said for the type of railway covered in the book, although examples of narrow-gauge lines which were fairly common years ago in these islands are now few and far between. Indeed British Railways operate only one such line carrying passengers, the Vale of Rheidol, but perhaps better known now are the enthusiast-operated Tallylyn and Festiniog systems, as well as the Isle of Man Railway and the unusual Snowdon Mountain Railway.

True modelling of many of the now-vanished prototypes involves a good deal of research, and the actual building of the locomotives and stock calls for a considerable amount of ingenuity and adaptation. A specially useful chapter, therefore, is that covering sources of information on narrow-gauge railways, while constructional features of locomotive and stock are dealt with by the author, and attention is given to typical layouts designed primarily for use at exhibitions. The book concludes with several appendices in which details of various actual locomotives, etc., are given. There are many diagrams, sketches and half-tone illustrations.