Attractive to build, fun to operate

MECCANO GIANT TOWER CRANE

By "SPANNER"

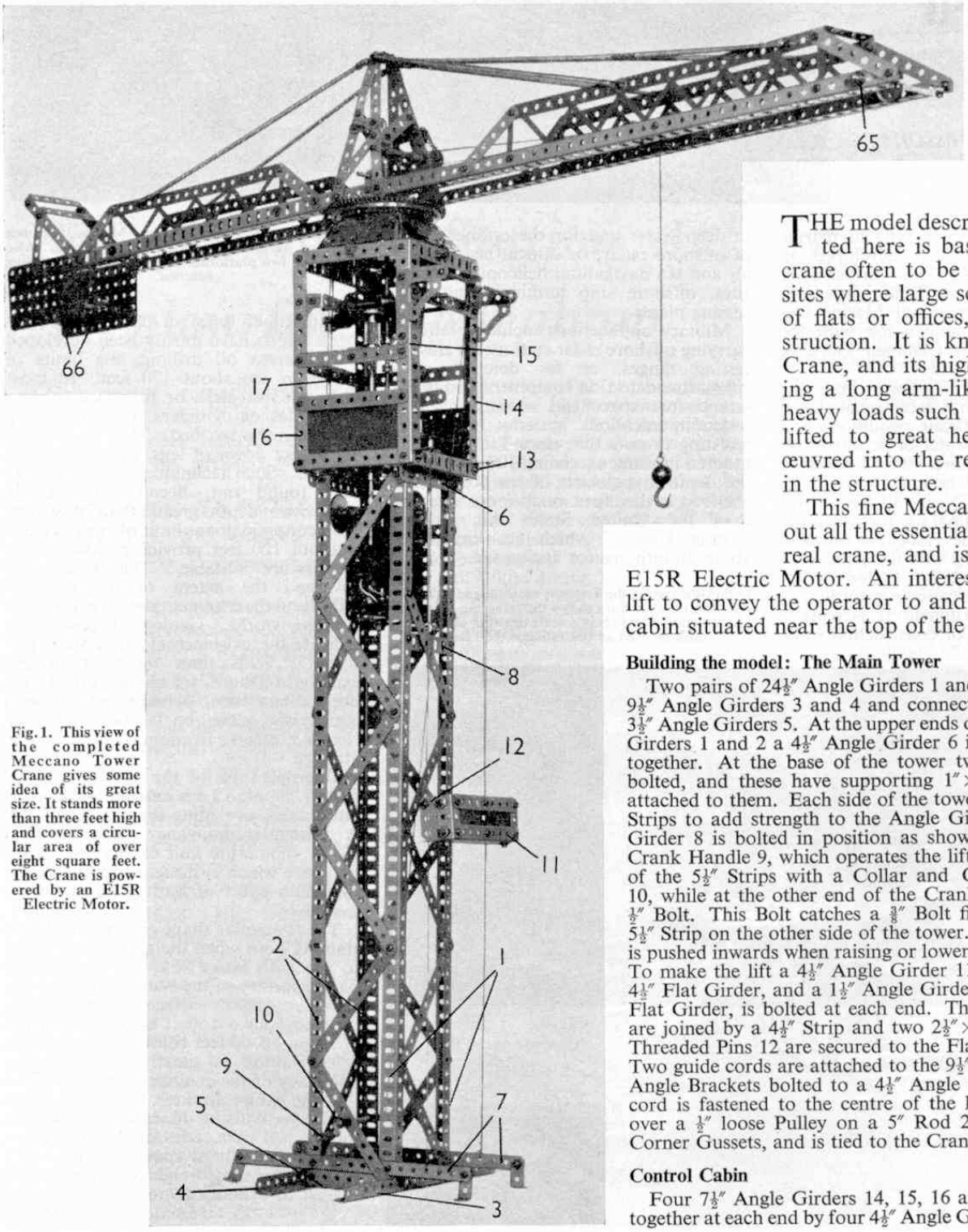

Fig. 1. This view of the completed Meccano Tower Crane gives some idea of its great size. It stands more than three feet high and covers a circular area of over eight square feet. The Crane is powered by an E15R Electric Motor.

THE model described and illustrated here is based on a type of crane often to be seen on building sites where large schools, or blocks of flats or offices, are under construction. It is known as a Tower Crane, and its high tower supporting a long arm-like boom enables heavy loads such as girders to be lifted to great heights and manœuvred into the required positions in the structure.

This fine Meccano model carries out all the essential movements of a real crane, and is powered by an E15R Electric Motor. An interesting feature is a lift to convey the operator to and from his control cabin situated near the top of the tower.

Building the model: The Main Tower

Two pairs of 24½″ Angle Girders 1 and 2 are bolted to the 9½″ Angle Girders 3 and 4 and connected together by two 3½″ Angle Girders 5. At the upper ends of each pair of Angle Girders 1 and 2 a 4½″ Angle Girder 6 is used to join them together. At the base of the tower two 9½″ Strips 7 are bolted, and these have supporting 1″×½″ Angle Brackets attached to them. Each side of the tower is braced with 5½″ Strips to add strength to the Angle Girders. A 3½″ Angle Girder 8 is bolted in position as shown in Fig. 1. A 5½″ Crank Handle 9, which operates the lift, is mounted in two of the 5½″ Strips with a Collar and Compression Spring 10, while at the other end of the Crank is a Collar with a ½″ Bolt. This Bolt catches a ⅜″ Bolt fixed in the opposite 5½″ Strip on the other side of the tower. The Crank Handle is pushed inwards when raising or lowering the lift platform. To make the lift a 4½″ Angle Girder 11 is extended with a 4½″ Flat Girder, and a 1½″ Angle Girder, extended by a 1½″ Flat Girder, is bolted at each end. The 1½″ Angle Girders are joined by a 4½″ Strip and two 2½″×1½″ Flexible Plates. Threaded Pins 12 are secured to the Flat Girders as shown. Two guide cords are attached to the 9½″ Strips 7 and to two Angle Brackets bolted to a 4½″ Angle Girder 13. Another cord is fastened to the centre of the lift platform, passed over a ½″ loose Pulley on a 5″ Rod 25 journalled in two Corner Gussets, and is tied to the Crank Handle 9.

Control Cabin

Four 7½″ Angle Girders 14, 15, 16 and 17 are connected together at each end by four 4½″ Angle Girders to form a box,

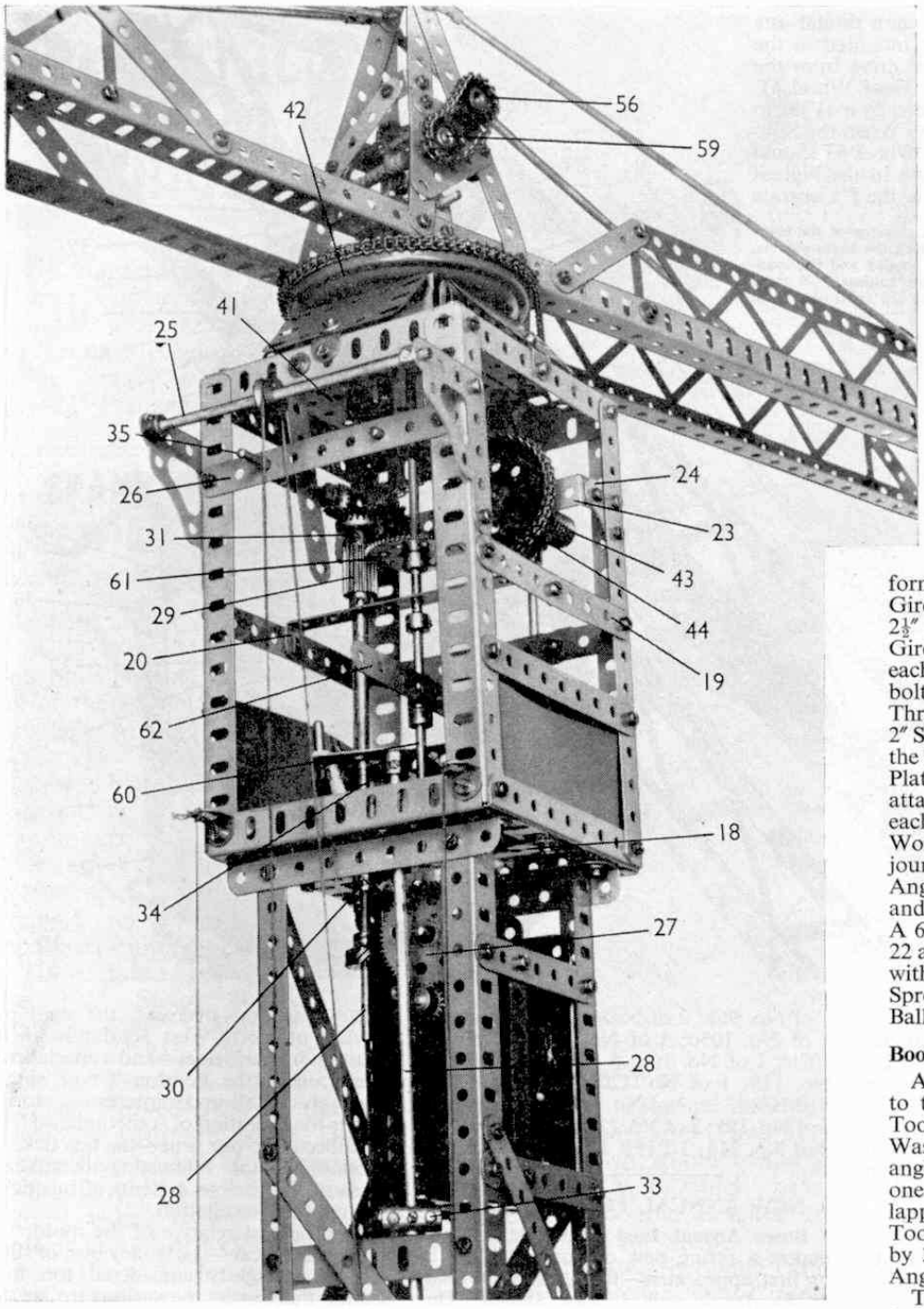

Fig. 2. The cab of the Crane, housing some of the gear assemblies used in the model. Hoisting and slewing are controlled from here.

and three of the sides of this are partly filled in by $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates and $4\frac{1}{2}''$ Strips. The control cabin is now bolted to the $4\frac{1}{2}''$ Angle Girders 6. Across two of the $4\frac{1}{2}''$ Angle Girders a $4\frac{1}{2}''$ Strip 18 is bolted. Two $4\frac{1}{2}''$ Strips 19 support a Double Angle Strip 20, and another $4\frac{1}{2}''$ Strip 21 supports the Trunnion 22. A $4\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip 23 is attached to the $7\frac{1}{2}''$ Angle Girders by 1″ Corner Brackets 24, and a $4\frac{1}{2}''$ Strip 26 is bolted in place through the fourth hole down of the Angle Girder. A $4\frac{1}{2}''$ Strip 26 (Fig. 2) is bolted in the position shown.

Motor Drive

An E15R Motor is attached to the main tower girders by two $3\frac{1}{2}''$ Strips. A $\frac{1}{2}''$ Pinion on its armature shaft drives a 57-teeth Gear Wheel 27 on a 3″ Rod that carries at its other end a $\frac{3}{4}''$ Pinion, which in turn, engages on a 3″ Rod. In the centre of this Rod is secured a $\frac{1}{2}''$ Helical Gear that engages with another $\frac{1}{2}''$ Helical Gear on an 8″ Rod 28. This Rod is journalled in the Strip 18 and the Double Angle Strip 20, and is held in position by the $\frac{1}{2}'' \times \frac{3}{4}''$ Pinion 29 and a Collar 30. A $\frac{3}{4}''$ Contrate Wheel 31 is secured to the end of the Rod 28. On the Rod 32 is fastened a Coupling 33 with two $1\frac{1}{2}''$ Rods in its outer holes and a Threaded Pin on the Motor starting lever is placed between these $1\frac{1}{2}''$ Rods. A Crank 34 with Threaded Pin is secured to the upper end of Rod 32 and operates the Motor starting lever. On a 5″ Rod 35 a $\frac{1}{2}''$ Pinion 36 and a $\frac{3}{4}''$ Sprocket Wheel 37 are secured. A loose Collar 38, placed between two fixed Collars, is attached to a $3\frac{1}{2}''$ Strip 39 by a nut and bolt through its centre hole, the nut being locked against the Collar 38. The end of the Strip is lock-nutted to an Angle Bracket bolted to the $4\frac{1}{2}''$ Angle Girder 40.

Ball Bearing Mounting

Two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates 41, bolted at 90 degrees to each other to form a cross, are fixed to the $4\frac{1}{2}''$ Angle Girders, the centre bolts also securing four $2\frac{1}{2}''$ Angle Girders extended by $2\frac{1}{2}''$ Flat Girders. To two of the Flat Girders facing each other two $2\frac{1}{2}''$ Angle Girders are bolted, and on to these is fixed the Ball Thrust Race Flanged Disc 42, with two 2″ Screwed Rods and Nuts passed through the $\frac{1}{2}''$ Angle Girders and the $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates 41. A $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate is attached by an Obtuse Angle Bracket to each side. A 2″ Sprocket Wheel 44 and a Worm 43 are now fixed to a 5″ Rod journalled in the Strip 26 and the Double Angle Strip 23. The Sprocket Wheels 37 and 44 are connected by Sprocket Chain. A $6\frac{1}{2}''$ Rod 45, mounted in the Trunnions 22 and 46, carries a $\frac{1}{2}''$ Pinion that engages with the Worm Wheel 43, and a $\frac{3}{4}''$ Sprocket Wheel, which later will drive the Ball Thrust Race Toothed Disc.

Boom and Travelling Carriage

A Bush Wheel without set-screw is bolted to the underside of a Ball Thrust Race Toothed Disc and spaced away by one Washer on each Bolt. Two compound angle girders, each built from one $24\frac{1}{2}''$ and one $18\frac{1}{2}''$ Angle Girder (47 and 48) overlapped four holes, are bolted to the Toothed Disc. Braced Girders, supported by 3″ and $3\frac{1}{2}''$ Strips, are attached to the Angle Girders as shown.

The centre triangular structure is built from four $5\frac{1}{2}''$ Strips 49, joined at the top by a Double Bracket. Each of the $\frac{3}{8}''$ Bolts securing the Double Bracket also holds three Rod and Strip Connectors to which the compound tie rods are held. Further Rod and Strip Connectors fastened to the Braced Girders support the other ends of the tie rods. The $5\frac{1}{2}''$ Strips 49 are braced by $2\frac{1}{2}''$, 2″ and $1\frac{1}{2}''$ Strips, the last mentioned numbered 50. A $3\frac{1}{2}''$ Rod 51 journalled in the 1″ Corner Brackets 52 carries a $\frac{1}{2}''$ Pinion 53, a 1″ Pulley 54 and two Collars. A 3″ Rod 55, mounted in the $1\frac{1}{2}''$ Strips 50, carries a $\frac{3}{4}''$ Sprocket Wheel 56, a $\frac{3}{4}''$ Contrate Wheel 57 and two

Collars. The Sprocket Wheel 56 drives a similar one on a 3″ Rod 59. An 11½″ Rod 60, mounted in the centre of the control cabin takes the drive from the ½″ × ¾″ Pinion 29 via the 57-toothed Gear Wheel 61. The movement of the Rod is controlled by a 4½″ Strip 62 operating similarly to the Strip 39. When the Strip is in its lowest position, the Worm Wheel 63 should engage with the Pinion 53, and when in the highest position the ½″ Pinion 64 should engage the ¾″ Contrate Wheel 57. Neutral is about the central position.

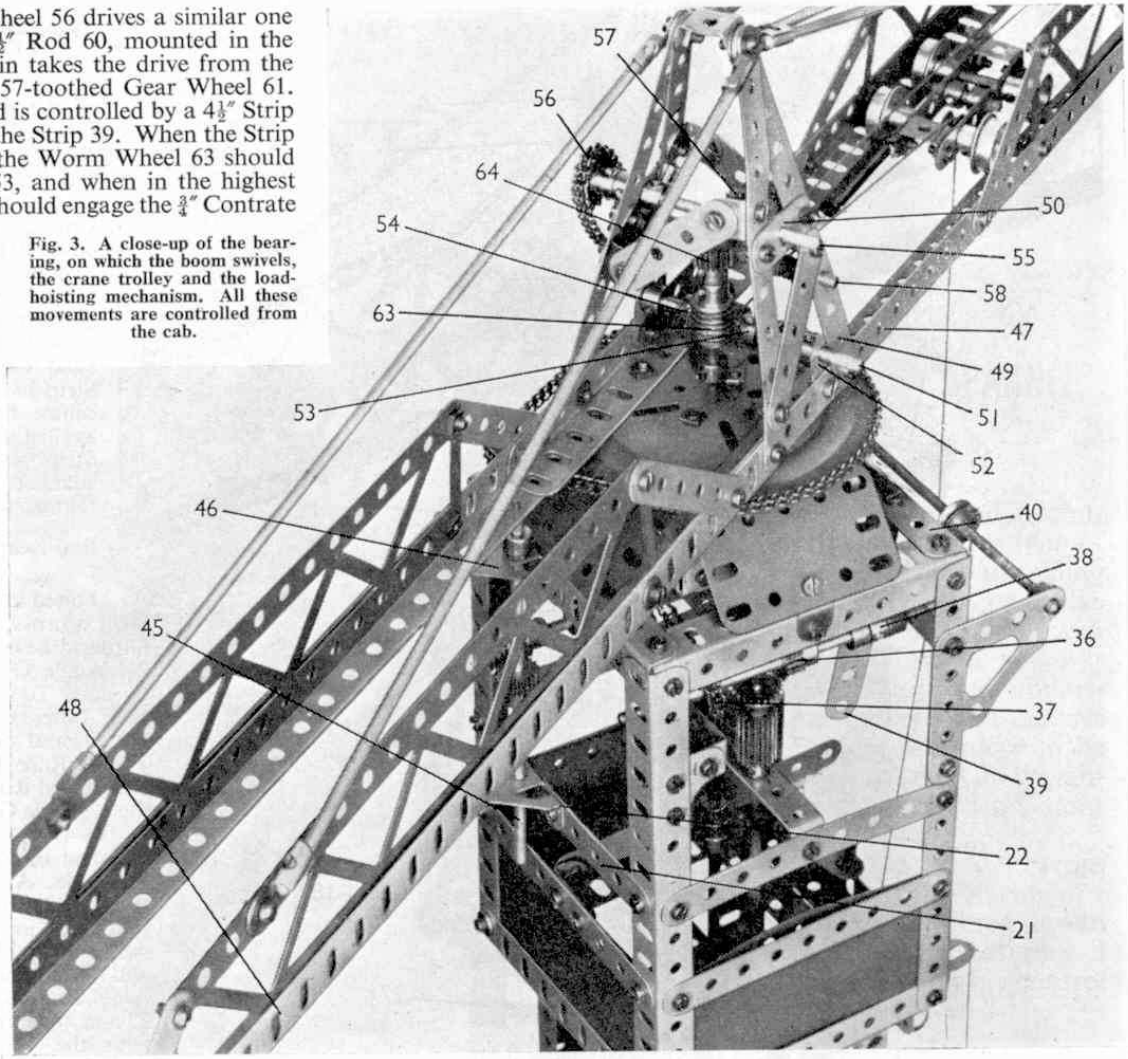

Fig. 3. A close-up of the bearing, on which the boom swivels, the crane trolley and the load-hoisting mechanism. All these movements are controlled from the cab.

The Travelling Carriage on the Boom

Two 3″ Strips are connected together by two Double Brackets. The ¾″ Flanged Wheels are secured to 2″ Rods, one Rod having a ½″ loose Pulley on it. A 1″ loose Pulley is placed on a 3½″ Rod 65 mounted at the front end of the boom. A length of Cord is tied to the Double Bracket at the front of the carriage, taken around the 1″ loose Pulley, around 1″ Pulley 54 and then fastened to a Spring attached to the carriage, with enough tension on the cord to avoid slip. Another length of Cord is wound around the Rod 58, taken over the ½″ Pulley in the carriage and fastened to a large Loaded Hook. A length of Chain is placed around the ¾″ Sprocket Wheel on Rod 45 and the Toothed Disc.

A counterbalance weight at the rear end of the boom is made up from five 4½″ × 2½″ Flat Plates bolted to two 2½″ × ½″ Double Angle Strips that are attached to the 4½″ × 2½″ Flat Plates 66.

Before setting the model in motion make sure that all the rods rotate freely in their bearings.

Parts required to build the Meccano Tower Crane: 2 of No. 1a; 25 of No. 2; 12 of No. 2a; 5 of No. 3; 8 of No. 4; 6 of No. 5; 2 of No. 6; 2 of No. 6a; 6 of No. 7; 2 of No. 7a; 2 of No. 8a; 4 of No. 8b; 11 of No. 9a; 3 of No. 9b; 6 of No. 9d; 2 of No. 9f; 3 of No. 11; 7 of No. 12; 4 of No. 12a; 5 of No. 12b; 7 of No. 13; 2 of No. 13a; 3 of No. 14; 3 of No. 15; 2 of No. 16; 4 of No. 16b; 2 of No. 17; 2 of No. 18a; 1 of No. 18b; 1 of No. 19h; 4 of No. 20b; 1 of No. 22; 1 of No. 22a; 2 of No. 23; 1 of No. 24; 1 of No. 25; 5 of No. 26; 1 of No. 26b; 1 of No. 27; 2 of No. 27a; 2 of No. 29; 2 of No. 32; 236 of No. 37a; 224 of No. 37b; 38 of No. 38; 1 of No. 43; 5 of No. 48a; 2 of No. 48c; 9 of No. 53a; 1 of No. 57b; 28 of No. 59; 1 of No. 62; 1 of No. 63; 2 of No. 81; 1 of No. 94; 1 of No. 95; 4 of No. 96a; 2 of No. 99; 2 of No. 99a; 1 of No. 103c; 4 of No. 103f; 2 of No. 103h; 2 of No. 108; 5 of No. 111c; 4 of No. 115; 1 of No. 120b; 2 of No. 126; 4 of No. 133a; 1 of No. 168; 6 of No. 188; 3 of No. 191; 2 of No. 211a; 12 of No. 212; 2 of No. 213; 1 E15R Electric Motor.

NEW ANNUAL FOR BUS FANS

Buses Annual 1964 (Ian Allan, 12/6) makes a fitting new companion—this is its first appearance—to the now familiar *Trains Annual* and *Aircraft Annual*. The bus in its various forms seems likely to play an increasing part in public transport in view of the thinning-out of railway services now imminent, so the present time is particularly apposite for the publication of this new annual. In it, widely-varied aspects of bus operation are considered, starting appropriately with a section entitled "Birth of a Bus", which explains the why and how of bus design, development and building. Successive sections deal with the problems involved in keeping the wheels turning, and explain how the maintenance and overhaul programmes are arranged.

Bus transport overseas, the mail bus services of North-West Scotland—an institution in themselves—and a special consideration of the London T-type single-deck vehicles all make interesting stories. Nor is the evolution of something we have all collected in our time—the bus ticket—overlooked, for interesting details are given of the various systems of bus ticket issuing and cancellation.

That nearest relative of the motor bus and the tram car—the trolley bus, of silent service—is rightly considered too in a section that covers the various trolley systems, now so few in number. Economic and other features have combined to restrict the life of the trolley system to little more than fifty years. The book concludes with interesting details of the development of the coach rally, a type of event that has come into being and attained increased popularity during the past decade.

There are plenty of illustrations in the 96 pages, and these show how the basic bus has been, or can be, developed into a surprising number of varieties. The book is sure to have a strong appeal for bus and coach enthusiasts.