MODEL OF THE MONTH:

Floating Crane

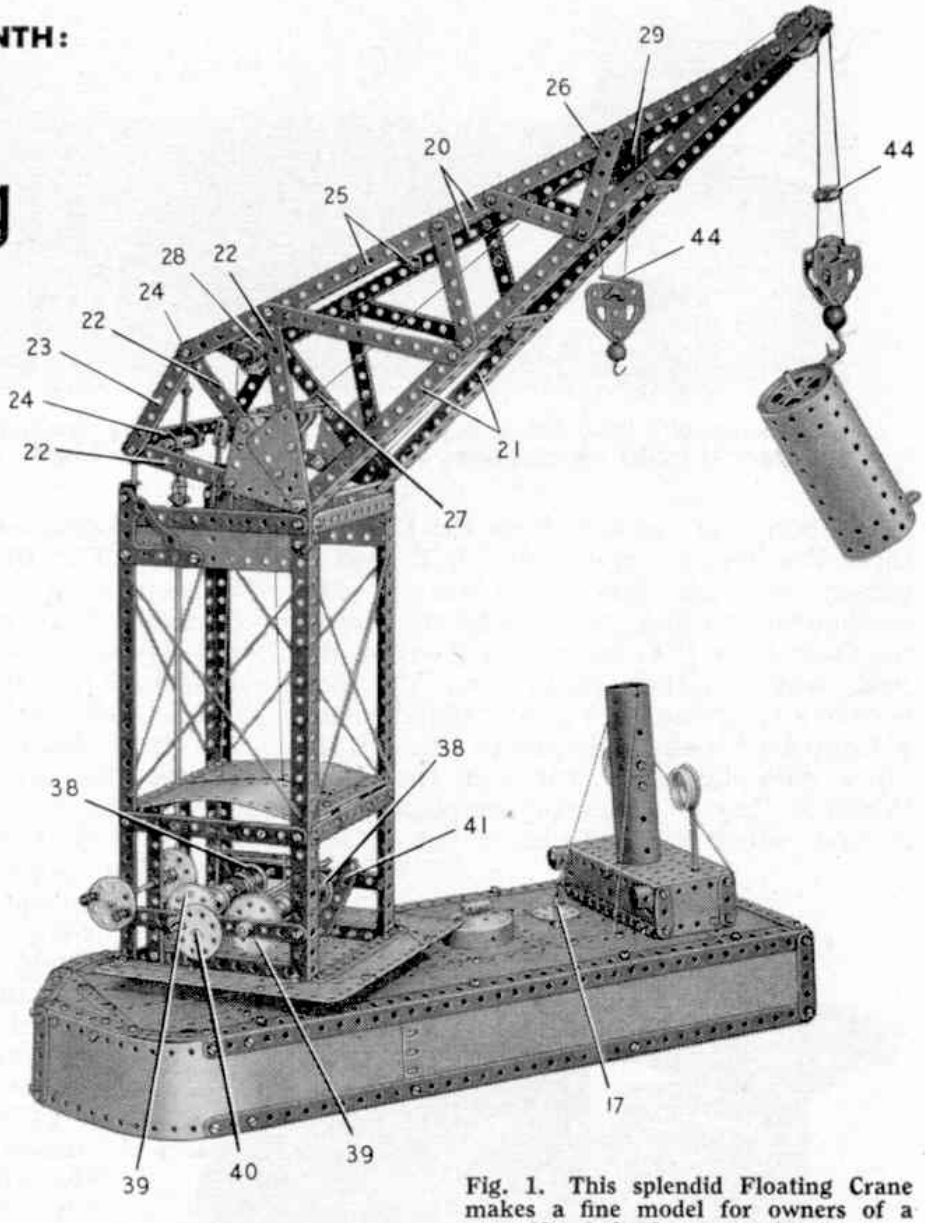

Fig. 1. This splendid Floating Crane makes a fine model for owners of a No. 8 Outfit or one larger.

OUR model this month is based on a type of crane used very frequently in ports and shipyards. Although large land cranes can be used for much of the work in connection with harbours and ships, their range of movement is comparatively limited, and sometimes it is impossible to move them into the best positions for handling certain loads. In these cases a floating crane is invaluable, and indeed essential, for in docks and harbours it can be manœuvred readily into the most suitable position to tackle the work to be carried out. Indeed, sometimes when heavy machinery, or perhaps a funnel, has to be removed from a ship it is possible to carry out the job without docking the vessel.

The efficiency and adaptability of floating cranes has been recognised for many years by dockyards, shipbuilding firms and harbour authorities, and nowadays there are many very fine floating cranes at work in ports and shipyards all over the world. Some of them are capable of handling exceptionally heavy loads, and lifting capacities of 200 tons or more are by no means unusual. In most cases these floating cranes are fitted with propulsion engines and all the auxiliary equipment required to enable them to operate under their own power, while in others the cranes are mounted on unpowered pontoons and must be towed from place to place by tugs. The Meccano model is based on a self-propelled type of floating crane, and the hull or pontoon is provided with a structure representing a deckhouse and control bridge, and is fitted with a funnel and ventilators.

A typical example of a large floating crane is the *Mammoth* owned by the Mersey Docks and Harbour Board. This fine crane can handle loads up to 200 tons, and one spectacular job it carried out was the transport across the River Mersey of part of a lock gate weighing 190 tons. This gate was taken from the Alfred Dock, Birkenhead, and was carried by the crane across the river to the Brunswick Dock, Liverpool, for repairs and strengthening. After the work had

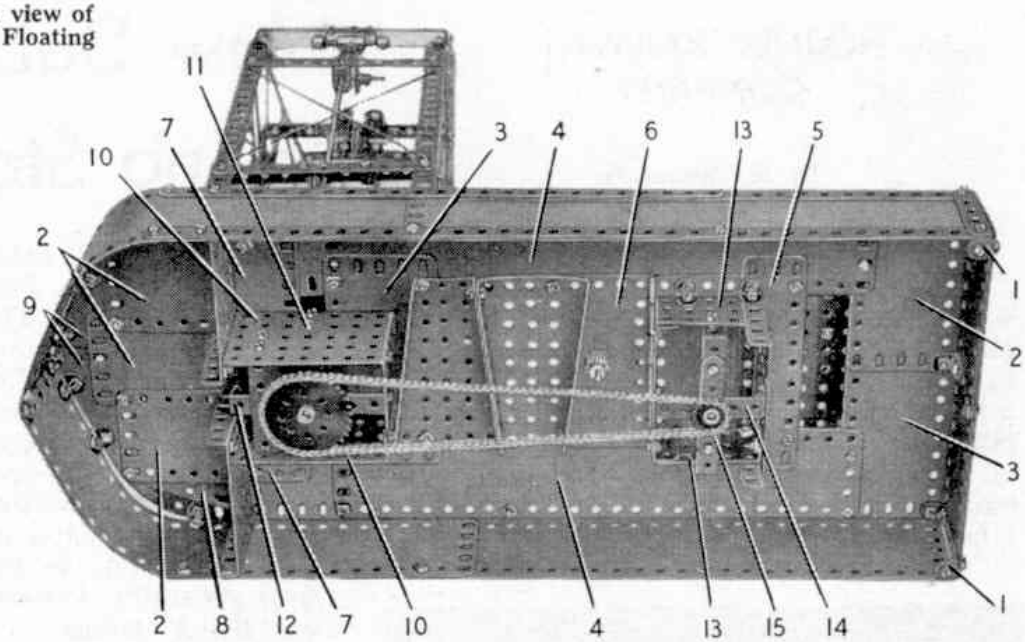

Fig. 2. An underneath view of the pontoon of the Floating Crane, showing the slewing mechanism.

been carried out the *Mammoth* again transported the gate and replaced it without difficulty.

The Meccano model is based on a typical large floating crane of the kind seen in use at many harbour installations. The hull or pontoon is constructed mainly with Strip and Flexible Plates strengthened by Strips and Angle Girders, and the section of the deck that supports the crane is strongly braced. The crane jib is mounted at the top of a tower that is pivotally attached to the deck of the pontoon. The jib can be luffed, or raised and lowered, by turning a handle mounted in the tower. This handle controls a screw mechanism that operates the luffing movement of the jib.

The model has two lifting hooks, and an interesting feature is that the same control handle is used to operate the movements of both of them. The shaft on which the control handle is fixed is free to slide slightly in its bearings, and gear mechanism is used to engage the drive with either of the two winding drums. The slewing or rotating movement of the crane tower and the jib is controlled by a separate handle placed on the pontoon close to the deckhouse.

The Meccano Floating Crane is designed for construction with parts in a No. 8 Outfit. Full constructional details and a list of the parts required to build the Crane can be obtained by writing to the Editor, enclosing a 2d. stamp for postage. Cranes are always popular subjects for Meccano models, and there is sure to be a big demand for details of the Floating Crane.

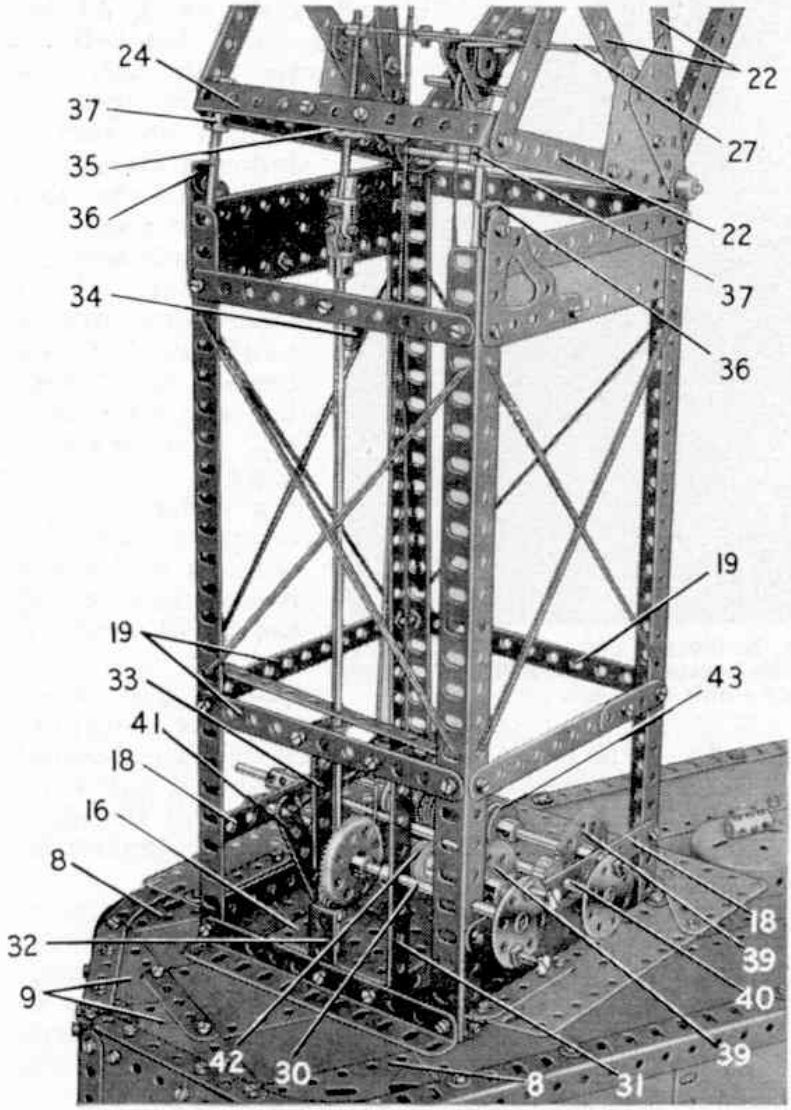

Fig. 3. A close-up picture of the tower revealing details of the control handles and the gearing.

MODEL OF THE MONTH

FLOATING CRANE

Illustrated in the November 1956 issue of the "Meccano Magazine

(This model can be built with Outfit No. 8)

Construction of the Pontoon

Each side of the pontoon consists of two 12½" x 2½" Strip Plates overlapped three holes and edged by two 12½" Angle Girders and two 12½" Strips, each pair of Girders and Strips being overlapped 14 holes. The ends of the front Strip Plates are curved as shown and are connected at the bow by two Obtuse Angle Brackets. The stern is filled in by two 4½" x 2½" Flexible Plates, strengthened along their lower edges by two 4½" Strips and bolted at each end to a 2½" x ½" Double Angle Strip 1. The upper lugs of these Double Angle Strips are fixed to the rear ends of the 12½" Angle Girders, and the lower lugs are attached to the 12½" Strips by Angle Brackets.

The deck is plated by four 4½" x 2½" Flexible Plates 2, two 5½" x 2½" Flexible Plates 3, two 12½" x 2½" Strip Plates 4, a 5½" x 1½" Flexible Plate 5, a Hinged Flat Plate 6, two Flanged Sector Plates, two 2½" x 2½" Flexible Plates 7, two 3½" x 1½" Triangular Flexible Plates 8, and two 3½" x 2" Triangular Flexible Plates 9. These Plates are arranged as shown in Fig. 2 and are bolted to the 12½" Angle Girders and to Angle Brackets at the stern and the bow. At the bow the Triangular Flexible Plates are edged by a 2½" Curved Strip and a 3½" Strip on each side. A 1" Triangular Plate is bolted to the overlapped front corners of the Plates 9. A 3" Pulley is bolted to the deck, with its boss projecting through the gap left between the Plates 7.

Two 3½" x 2½" Flanged Plates are attached to the sides of the pontoon, and to them are fixed further 3½" x 2½" Flanged Plates 10. These Flanged Plates are connected to the 3" Pulley by 1" x ½" Angle Brackets, and a 2½" x ½" Double Angle Strip is bolted between them by a bolt 11 on each side. A 3½" x ½" Double Angle Strip 12 is supported by a 2½" x ½" and a 2½" x 1" Double Angle Strip fixed to the Plates 10.

Two 2½" x 1½" Flanged Plates 13 are attached to the Hinged Flat Plate 6 by Angle Brackets, and are connected at one end by a 3½" x 2½" Flanged Plate and at the other end by a 3½" x ½" Double Angle Strip. A 2½" x 1" Double Angle Strip 14 is bolted to the Flanged Plate and the Double Angle Strip. Two 1" x 1" Angle Brackets connected by a 2½" Strip 15, are attached to the Flanged Plates 13.

The top of the deckhouse is a 5½" x 2½" Flanged Plate and the walls are 5½" x 1½" and 2½" x 1½" Flexible Plates edged by 5½" and 1½" Strips as shown in Fig. 1. The funnel consists of two Cylinders connected by Fishplates and attached to the Flanged Plate by an Angle Bracket. The ventilators are 1⅛" Flanged Wheels locked by nuts on Screwed Rods. The deck house is attached to the pontoon by Angle Brackets.

A Boiler End is fixed to the deck by a Coupling and a ½" Pinion on a 1½" Rod.

Assembly of the Tower

The tower consists of four 12½" Angle Girders connected at their lower ends by four 5½" Angle Girders. A 5½" x 2½" Flanged Plate 16 (Fig. 3) is bolted between two of the 5½" Girders, and a platform

is attached to three of them. This platform is made from three $5\frac{1}{2}$" x $1\frac{1}{2}$" Flexible Plates and two $2\frac{1}{2}$" x $2\frac{1}{2}$" Triangular Flexible Plates. The upper ends of the $12\frac{1}{2}$" Girders are connected by two $5\frac{1}{2}$" x $1\frac{1}{2}$" Flexible Plates and four $5\frac{1}{2}$" Strips.

A 3" Pulley is attached by two $\frac{3}{4}$" Bolts to the Flanged Plate 16 and a 4" Rod is fixed in its boss. The Rod is passed through the 3" Pulley of the pontoon and through the Double Angle Strip 12, and is fitted with a 2" Sprocket. This Sprocket is connected by Chain to a $\frac{3}{4}$" Sprocket on a $3\frac{1}{2}$" Rod 17, Fig. 8, which is mounted in the Hinged Flat Plate 6, the Strip 15 and the Double Angle Strip 14. A handle on the Rod is provided by a Crank bolted to a Wheel Disc and fitted with a Threaded Pin.

Two $5\frac{1}{2}$" Strips 18, and three further $5\frac{1}{2}$" Strips 19 and a built-up $5\frac{1}{2}$" strip, are bolted to the tower as shown in Fig. 3. The built-up strip consists of a $4\frac{1}{2}$" and a 2" Strip.

The Jib

Each side of the jib is formed by a strip 20 made from two $12\frac{1}{2}$" Strips overlapped 15 holes, a $12\frac{1}{2}$" Angle Girder 21 extended 11 clear holes by a $12\frac{1}{2}$" Strip, three $5\frac{1}{2}$" Strips 22 and a $3\frac{1}{2}$" Strip 23. The lower ends of Strips 22 are fitted with a $2\frac{1}{2}$" x 2" and a $2\frac{1}{2}$" x $1\frac{1}{2}$" Triangular Flexible Plate, and the side is braced by Strips as shown in Fig. 1.

The sides are connected by two $5\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strips 24, two $2\frac{1}{2}$" Strips overlapped two holes and fixed to Angle Brackets held by bolts 25, a $2\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strip held by bolts 26, and two 1" x 1" Angle Brackets at the jib head. A built-up $5\frac{1}{2}$" x $\frac{1}{2}$" double angle strip 27 is made from two $2\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strips and a $2\frac{1}{2}$" Strip, and to it are bolted two Trunnions. A 1" loose Pulley is mounted between the Trunnions on a 2" Rod. A 1" fixed Pulley 28 is fixed on a $1\frac{1}{2}$" Rod supported in a Stepped Bent Strip.

A 1" fixed Pulley is mounted on a $1\frac{1}{2}$" Rod supported in a Channel Bearing 29, and a further 1" Pulley is fixed on a 2" Rod held in the jib head by Spring Clips.

The jib pivots on a $6\frac{1}{2}$" Rod held by Collars in $1\frac{1}{2}$" Strips bolted to the tower. It is luffed by turning a Bush Wheel on a $3\frac{1}{2}$" Rod 30 mounted in the tower and in a $4\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strip 31. The Rod carries at its inner end a $1\frac{1}{2}$" Contrate that engages a $\frac{1}{2}$" Pinion on an $11\frac{1}{2}$" Rod. This Rod is supported in the Flanged Plate 16, in a $1\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strip 32, a $2\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strip 33 and a $\frac{1}{2}$" Reversed Angle Bracket 34. The $11\frac{1}{2}$" Rod is fitted at its upper end with a built-up universal coupling, made from a Swivel Bearing and a small Fork Piece connected by two bolts. This coupling joins the $11\frac{1}{2}$" Rod to a 3" Screwed Rod threaded through a Coupling 35. The Coupling 35 pivots on two 1" Rods held by Collars in a $1\frac{1}{2}$" x $\frac{1}{2}$" Double Angle Strip.

The luffing action is guided by 2" Rods sliding through Angle Brackets 36 lock-nutted to Corner Gussets bolted to the tower. Each of the 2" Rods is held in a Coupling 37 screwed on a $\frac{1}{2}$" Bolt passed through the side of the jib.

The Hoisting Mechanism and Cords

Each of the two load hooks is operated by Cord fastened to a winding drum consisting of a Sleeve Piece and two $\frac{3}{4}$" Flanged Wheels. These drums are fixed on $6\frac{1}{2}$" Rods held in the Strips 18 by Collars, and each Rod

is fitted with a 1" Pulley 38 and a 57-tooth Gear 39. The Gears 39 are not placed exactly in line, so that a $\frac{1}{2}$" Pinion on an 8" Rod 40 can be positioned between them without engaging either Gear. The Rod 40 is free to slide about $\frac{1}{4}$" in its bearings, and by sliding it to one side or the other the Pinion is moved into mesh with one of the Gears 39 to engage the drive to the drum on the same Rod as the Gear. The winding drum brakes are 3" Strips 41 lock-nutted to the Flanged Plate 16. The Strips bear against the Pulleys 38 and are connected by a stretched 6" Driving Band tied to each Strip by Cord.

The Cord from drum 42 passes over Pulley 28 and the Pulley that is mounted on the Rod in Channel Bearing 29, round a $\frac{1}{2}$" loose Pulley in the pulley block and is then tied to the Channel Bearing. The pulley block consists of two Flat Trunnions spaced apart by nuts on a $\frac{1}{2}$" Bolt that supports a small Loaded Hook. The $\frac{1}{2}$" Pulley is mounted on a $1\frac{1}{2}$" Rod.

The Cord from drum 43 passes over the Pulley supported by double angle strips 27, over the Pulley at the jib head and round a 1" loose Pulley in the pulley block. The Cord is then tied to the jib head. The pulley block consists of two Flat Trunnions spaced apart by nuts on a $\frac{3}{4}$" Bolt that carries a large Loaded Hook. The 1" loose Pulley, with a $\frac{1}{2}$" loose Pulley on either side of it, is mounted on a $1\frac{1}{2}$" Rod. The Fishplate 44 reduces the tendency for the Cord to twist.

A cover over the operating mechanism is provided by two $5\frac{1}{2}$" x $2\frac{1}{2}$" Flexible Plates connected by $5\frac{1}{2}$" Strips and attached to two of the Strips 19 by Angle Brackets. This cover is removed in Fig. 3 to show the mechanism clearly.

PARTS REQUIRED

10 of No. 1	2 of No. 18b	2 of No. 48c	1 of No. 116a
21 " " 2	2 " " 19b	2 " " 48d	1 " " 125
6 " " 2a	2 " " 20	2 " " 51	2 " " 126
5 " " 3	2 " " 20a	2 " " 52	4 " " 126a
6 " " 4	4 " " 20b	5 " " 53	2 " " 147b
17 " " 5	5 " " 22	2 " " 54	1 " " 160
2 " " 6	2 " " 22a	1 " " 57b	1 " " 162
6 " " 6a	3 " " 23	1 " " 57c	2 " " 163
10 " " 8	2 " " 24	10 " " 59	2 " " 164
4 " " 9	1 " " 24a	1 " " 62	1 " " 165
3 " " 10	3 " " 26	6 " " 63	1 " " 186
26 " " 12	2 " " 27a	1 " " 77	2 " " 188
4 " " 12a	1 " " 28	1 " " 80a	8 " " 189
2 " " 12b	8 " " 35	2 " " 80c	2 " " 190
2 " " 12c	284 " " 37a	2 " " 90	6 " " 191
1 " " 13	253 " " 37b	1 " " 94	4 " " 192
1 " " 13a	22 " " 38	1 " " 95	6 " " 197
3 " " 14	2 " " 40	1 " " 96a	1 " " 198
1 " " 15	1 " " 44	2 " " 108	2 " " 216
1 " " 15b	2 " " 46	3 " " 111	2 " " 221
2 " " 16	2 " " 48	5 " " 111a	2 " " 222
5 " " 17	10 " " 48a	5 " " 111c	2 " " 223
4 " " 18a	2 " " 48b	2 " " 115	2 " " 224
			2 " " 225.