

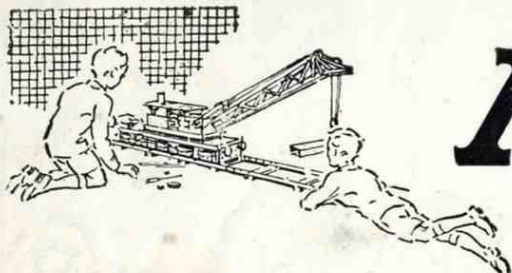
# MECCANO

INSTRUCTIONS  
FOR  
No. 4a ACCESSORY OUTFIT

No.  
41.4a



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# MECCANO

*Real Engineering in Miniature*



## MODEL-BUILDING WITH MECCANO

There is no limit to the number of models that can be built with Meccano—Cranes, Clocks, Motor Cars, Ship Coalers, Machine Tools, Locomotives—in fact everything that interests boys. A screwdriver and a spanner, both of which are provided in each Outfit, are the only tools necessary.

When you have built all the models illustrated in the Manuals of Instruction the fun is not over, but is just beginning. Now comes the chance to make use of your own ideas. First of all, re-build some of the models with small changes in construction that may occur to you; then try building models entirely of your own design. In doing this you will feel the real thrill of the engineer and the inventor.

## HOW TO BUILD UP YOUR OUTFIT

Meccano is sold in eleven different Outfits, ranging from No. 0 to No. 10. Each Outfit from No. 1 upwards can be converted into the next one larger by the purchase of an Accessory Outfit. Thus, Meccano No. 1 Outfit can be converted into No. 2 Outfit by adding to it a No. 1a Accessory Outfit. No. 2a Outfit would then convert it into a No. 3 and so on. In this way, no matter with which Outfit you commence, you can build it up by degrees until you possess a No. 10 Outfit.

All Meccano parts are of the same high quality and finish, but the larger Outfits contain a greater quantity and variety, making possible the construction of more elaborate models.

As shown in the illustrations, the realism of many models can be increased by the inclusion of the figures, motor vehicles and other items from the Dinky Toys Series; pilots and drivers from the Aeroplane and Motor Car Constructor Outfits; trees and hedges from the Hornby Railway Series; Meccano sacks, cable drums, etc. These items are not included in any of the Outfits. A Clockwork Motor is included in Outfits 7a, 8, 9 and 10 only, and an Electric Motor in Outfits 9a and 10 only.

## ELECTRIC LIGHTING OF MECCANO MODELS

It is great fun to illuminate your Meccano models by electric light, and a special Meccano Lighting Set can be obtained from your dealer for this purpose. This consists of two spot lights with plain and coloured imitation glass discs, one stand lamp, two special brackets, and two pea lamps, operated from a 4-volt flash-lamp battery (not included in the Set). The stand lamp is used for decorative purposes, and the spot lights can be used as headlamps, floodlights on cranes, and in countless other ways.

## THE "MECCANO MAGAZINE"

The "Meccano Magazine" is published specially for Meccano boys. Every month it describes and illustrates new Meccano models for Outfits of all sizes, and deals with suggestions from readers for new Meccano parts and for new methods of using the existing parts. There are model-building competitions specially planned to give an equal chance to the owners of small and large Outfits. In addition, there are splendid articles on such subjects as Railways, Famous Engineers and Inventors, Electricity, Chemistry, Bridges, Cranes and Aeroplanes, and special sections dealing with the latest Engineering, Aviation, Shipping and Road and Track News. Other pages deal with Stamp Collecting, and Books of interest to boys; and a feature of outstanding interest is the section devoted to short articles from readers.

The "Meccano Magazine" is the finest of all papers for boys who are interested in the wonderful things going on in the world around them. It is published on the first of each month. If you are not already a reader write to the Editor for full particulars, or order a copy from your Meccano dealer, or from any news-agent.

## THE MECCANO GUILD

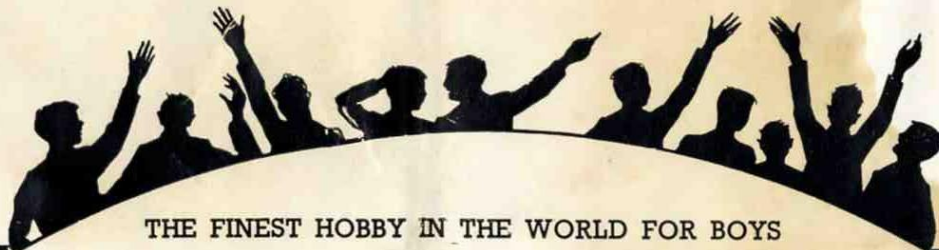
Every owner of a Meccano Outfit should join the Meccano Guild. This is a world-wide organisation, started at the request of Meccano boys. Its primary object is to bring boys together and to make them feel that they are all members of a great brotherhood, each trying to help others to get the very best out of life. Its members are in constant touch with Headquarters, giving news of their activities and being guided in their hobbies and interests. Write for full particulars and an application form to the Secretary, Meccano Guild, Binns Road, Liverpool 13.

Clubs founded and established under the guidance of the Guild Secretary provide Meccano boys with opportunities of enjoying to the utmost the fun of model-building. There are nearly 200 active clubs in Great Britain, and nearly 100 in countries overseas, each with its Leader, Secretary, Treasurer and other officials. With the exception of the Leader, all the officials are boys, and as far as possible the proceedings of the clubs are conducted by boys.

Recruiting Medallions are awarded to members who are successful in securing recruits for the Guild, and good work on behalf of Meccano clubs, or of the Guild generally, is recognised by the presentation of special Merit Medallions. Full particulars of both these awards will be sent post free on request.

## MECCANO SERVICE

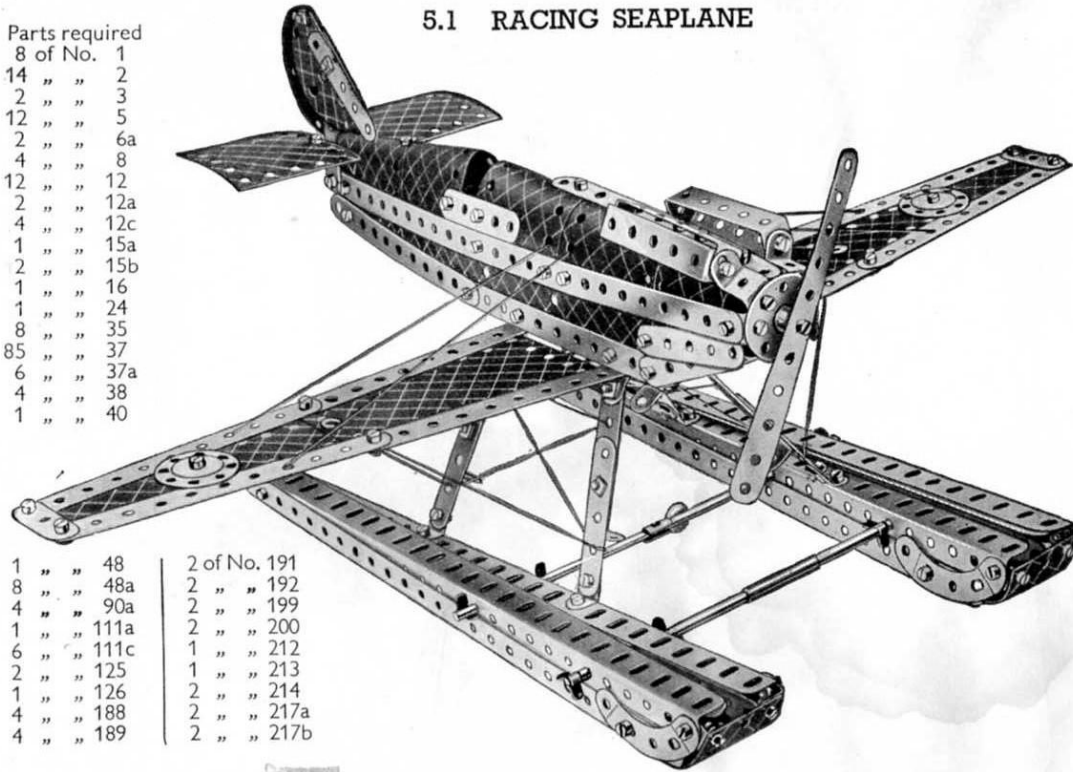
The service of Meccano does not end with selling an Outfit and an Instruction Manual. If ever you are in any difficulty with your models, or if you want advice on anything connected with this great hobby, write to us. We receive every day hundreds of letters from boys in all parts of the world, and each of these is answered personally by one of our staff of experts. Whatever your problem may be, write to us about it.



THE FINEST HOBBY IN THE WORLD FOR BOYS

## 5.1 RACING SEAPLANE

Parts required	
8 of No. 1	
14 " " 2	
2 " " 3	
12 " " 5	
2 " " 6a	
4 " " 8	
12 " " 12	
2 " " 12a	
4 " " 12c	
1 " " 15a	
2 " " 15b	
1 " " 16	
1 " " 24	
8 " " 35	
85 " " 37	
6 " " 37a	
4 " " 38	
1 " " 40	



1 " " 48	2 of No. 191
8 " " 48a	2 " " 192
4 " " 90a	2 " " 199
1 " " 111a	2 " " 200
6 " " 111c	1 " " 212
2 " " 125	1 " " 213
1 " " 126	2 " " 214
4 " " 188	2 " " 217a
4 " " 189	2 " " 217b

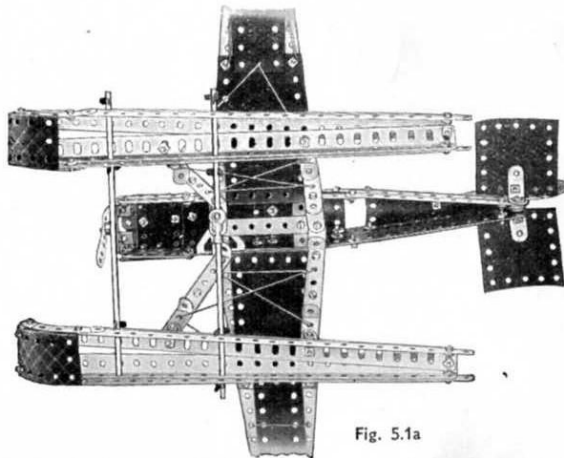
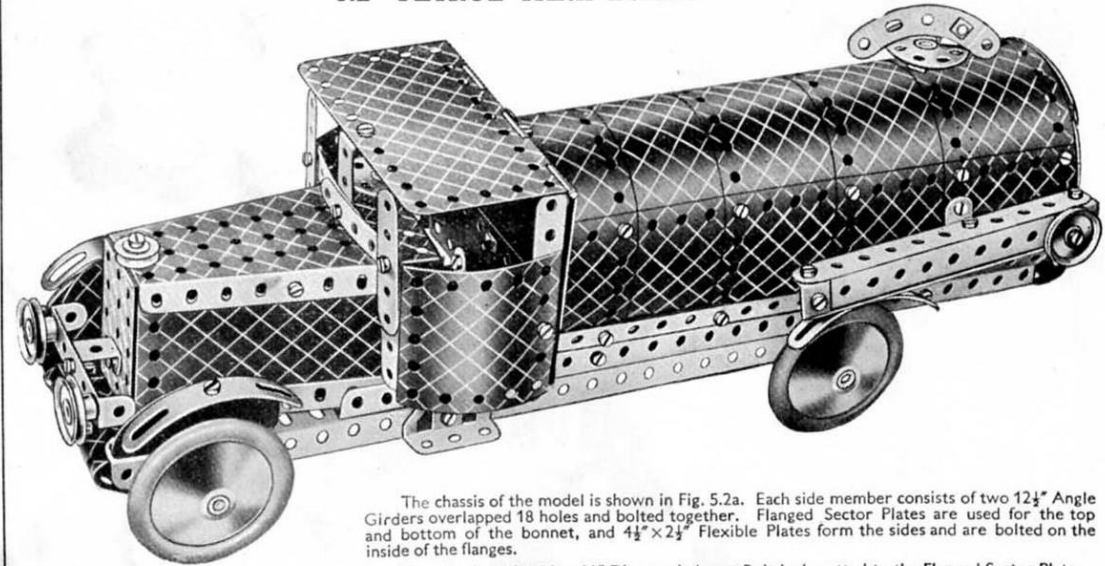


Fig. 5.1a

A  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plate is bolted to Angle Brackets underneath the nose, but it is removed in Fig. 5.1a to show the construction of the fuselage. The rudder is bolted to a  $3\frac{1}{2}"$  Strip, which is held upright between four spacing Washers (two on each side) on the  $\frac{1}{2}"$  Bolt that holds the  $12\frac{1}{2}"$  Strips together at the tail.

The leading edge of the wing is fastened to the fuselage by a Trunnion, and the trailing edge is fixed to a  $1\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strip that spaces the underside of the fuselage. The floats are attached by Obtuse Angle Brackets bolted to the wings. The front tie rod of the floats is made up of two 4" Rods joined by a Rod Connector, and the rear tie rod consists of a  $4\frac{1}{2}"$  Rod and a  $3\frac{1}{2}"$  Rod joined by a Rod and Strip Connector. A  $12\frac{1}{2}"$  Strip is bolted between the two  $12\frac{1}{2}"$  Angle Girders that form the top of each float.

## 5.2 PETROL TANK LORRY



The chassis of the model is shown in Fig. 5.2a. Each side member consists of two  $12\frac{1}{2}"$  Angle Girders overlapped 18 holes and bolted together. Flanged Sector Plates are used for the top and bottom of the bonnet, and  $4\frac{1}{2}" \times 2\frac{1}{2}"$  Flexible Plates form the sides and are bolted on the inside of the flanges.

The steering wheel is a  $1\frac{1}{2}"$  Disc carried on a Bolt lock-nutted to the Flanged Sector Plate.

The roof and back of the cab consist of a Hinged Flat Plate and two  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plates overlapped one hole. The cab is fastened to the chassis by Angle Brackets, and to the bonnet by the  $1\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strip that forms the central division of the windscreen.

In Fig. 5.2a the tank is opened out to show its construction. The top of the tank consists of four  $5\frac{1}{2}" \times 2\frac{1}{2}"$  Flexible Plates and a  $5\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plate. It is extended on the rear side by two  $5\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plates, and  $12\frac{1}{2}"$  Strips are bolted to each longitudinal edge. The complete tank is attached to the Angle Girders by four Obtuse Angle Brackets. The tank filler cap is a Bush Wheel fitted with a  $2\frac{1}{2}"$  small radius Curved Strip, and is fastened to the shank of the  $\frac{1}{2}"$  Bolt at the top of the tank.

## Parts required

7 of No. 2	1 of No. 52
1 " " 3	2 " " 54a
8 " " 5	4 " " 90a
4 " " 8	2 " " 111a
3 " " 11	5 " " 111c
10 " " 12	2 " " 125
2 " " 12a	2 " " 126
4 " " 12c	2 " " 126a
2 " " 15	4 " " 187
3 " " 22	4 " " 188
1 " " 22a	3 " " 189
1 " " 23	4 " " 190
1 " " 24	2 " " 191
4 " " 35	4 " " 192
80 " " 37	1 " " 198
5 " " 37a	2 " " 199
9 " " 38	2 " " 200
1 " " 48	2 " " 214
1 " " 48a	4 " " 215
1 " " 51	1 " " 217a

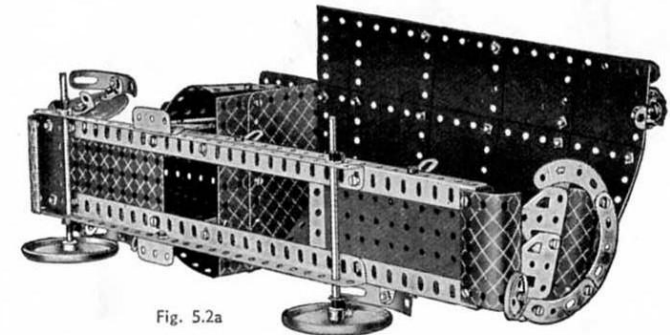
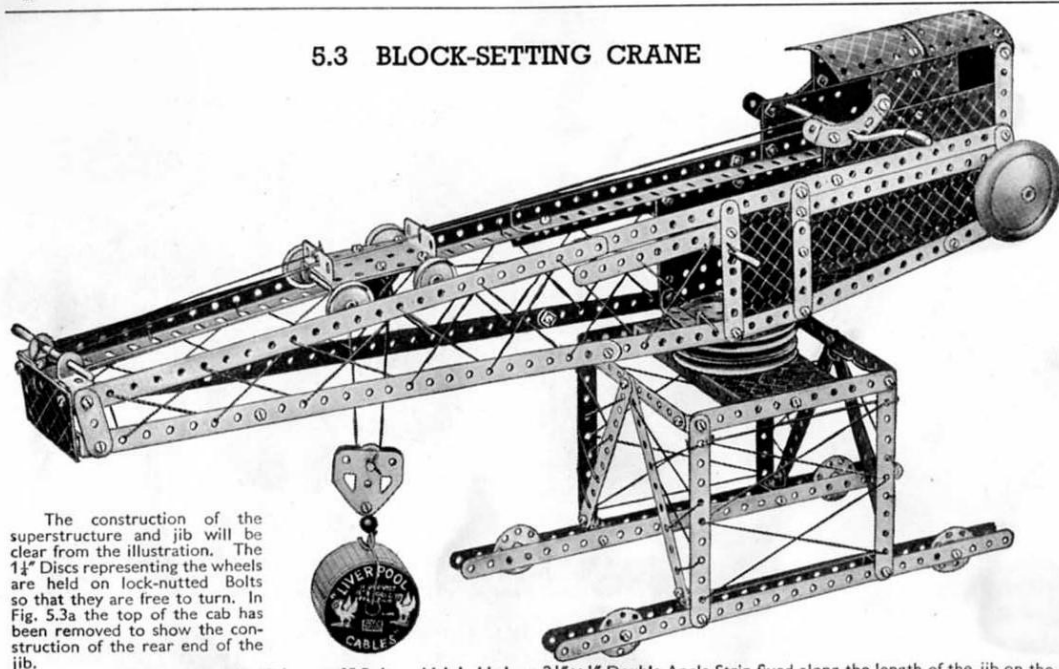


Fig. 5.2a

## 5.3 BLOCK-SETTING CRANE



The construction of the superstructure and jib will be clear from the illustration. The  $1\frac{1}{4}$ " Discs representing the wheels are held on lock-nutted Bolts so that they are free to turn. In Fig. 5.3a the top of the cab has been removed to show the construction of the rear end of the jib.

A 3" Pulley is bolted to the jib by two  $\frac{3}{8}$ " Bolts, which hold also a  $2\frac{1}{2}$ "  $\times$   $\frac{1}{4}$ " Double Angle Strip fixed along the length of the jib on the underside of the 3" Pulley, so that its ends form a bearing between the two Pulleys. A  $3\frac{1}{2}$ " Rod fastened in the boss of the upper 3" Pulley passes through the boss of the lower 3" Pulley, which is bolted to a  $5\frac{1}{2}$ "  $\times$   $2\frac{1}{2}$ " Flanged Plate forming part of the superstructure. The Rod is retained in position below the Flanged Plate as shown in Fig. 5.3b.

The hoisting carriage is shown in Fig. 5.3c; it runs on rails formed by Angle Girders at the top of the jib. A Cord is tied to the front end of the carriage, and is taken over a  $3\frac{1}{2}$ " Rod at the jib head and wound six times around the Crank Handle. It is then tied to the rear of the carriage.

A second Cord is tied to a Cord Anchoring Spring on the  $3\frac{1}{2}$ " Rod carrying the Bush Wheel and the Road Wheel. The Cord is then led around one of the 1" loose Pulleys in the carriage around the  $\frac{1}{2}$ " loose Pulley in the pulley block, and back over the second 1" loose Pulley. Finally it is tied to the  $2\frac{1}{2}$ "  $\times$   $1\frac{1}{2}$ " Flexible Plate at the jib head.

Fig. 5.3a

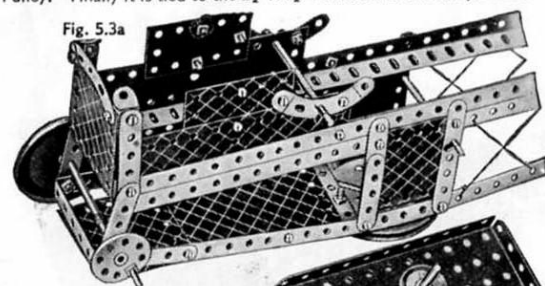


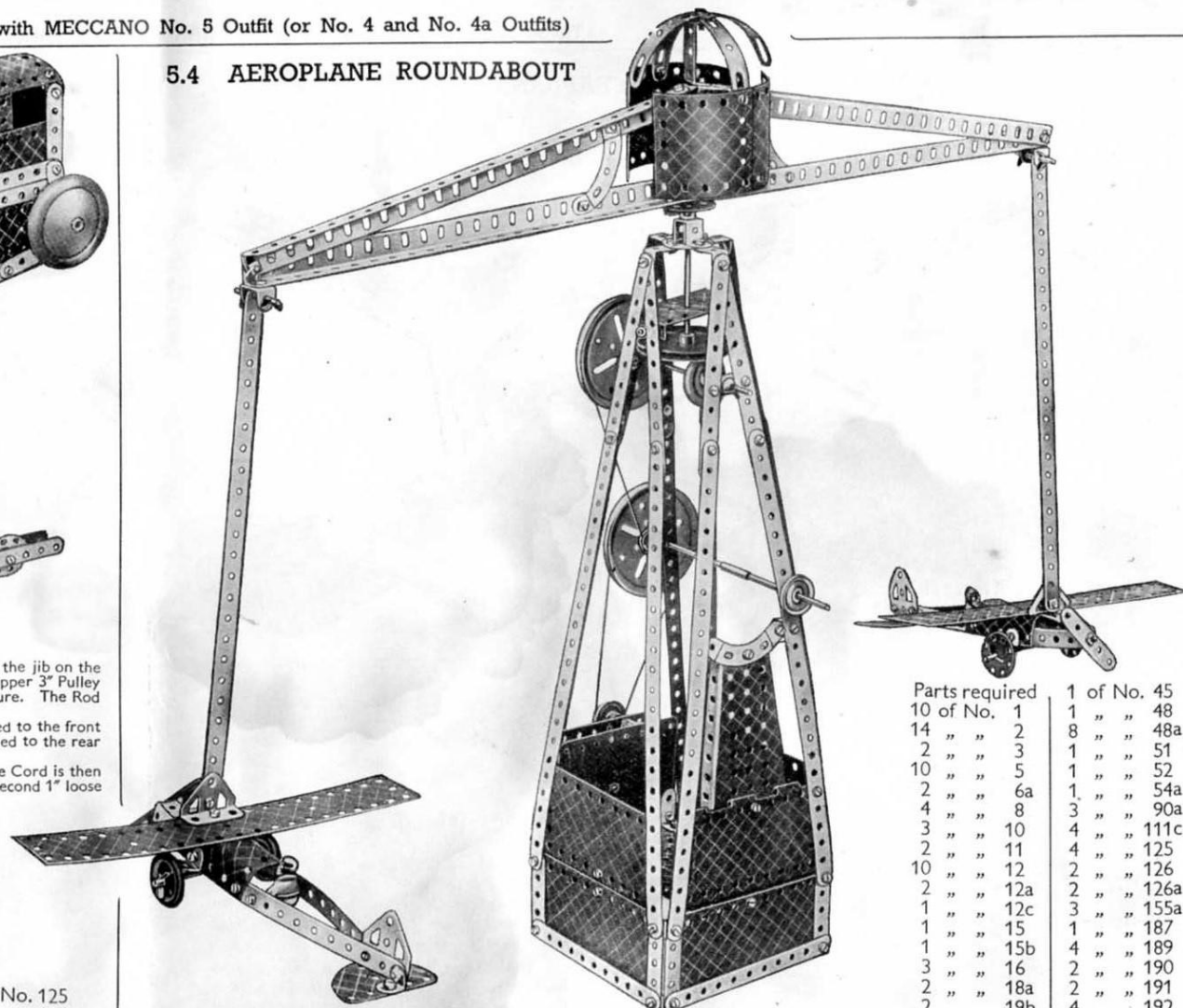
Fig. 5.3c

Fig. 5.3b

## Parts required

10 of No. 1	2 of No. 22a	
14 " " 2	1 " " 23	
2 " " 3	1 " " 24	
12 " " 5	10 " " 35	
2 " " 6a	85 " " 37	
4 " " 8	6 " " 37a	
4 " " 11	11 " " 38	
4 " " 12	1 " " 40	
12 " " 12a	1 " " 45	
4 " " 12c	1 " " 48	
1 " " 15b	7 " " 48a	
3 " " 16	1 " " 51	
2 " " 17	1 " " 52	
1 " " 18a	1 " " 57c	
1 " " 18b	3 " " 90a	
2 " " 19b	1 " " 111a	
1 " " 19g	6 " " 111c	
5 " " 22	1 " " 115	
	2 of No. 125	
	2 " " 126	
	2 " " 126a	
	1 " " 176	
	1 " " 187	
	3 " " 188	
	4 " " 189	
	4 " " 190	
	1 " " 191	
	2 " " 200	
	4 " " 217a	

## 5.4 AEROPLANE ROUNDABOUT



The centre pin is withdrawn from a Hinged Flat Plate and the halves are used as flat plates in the construction of the base.

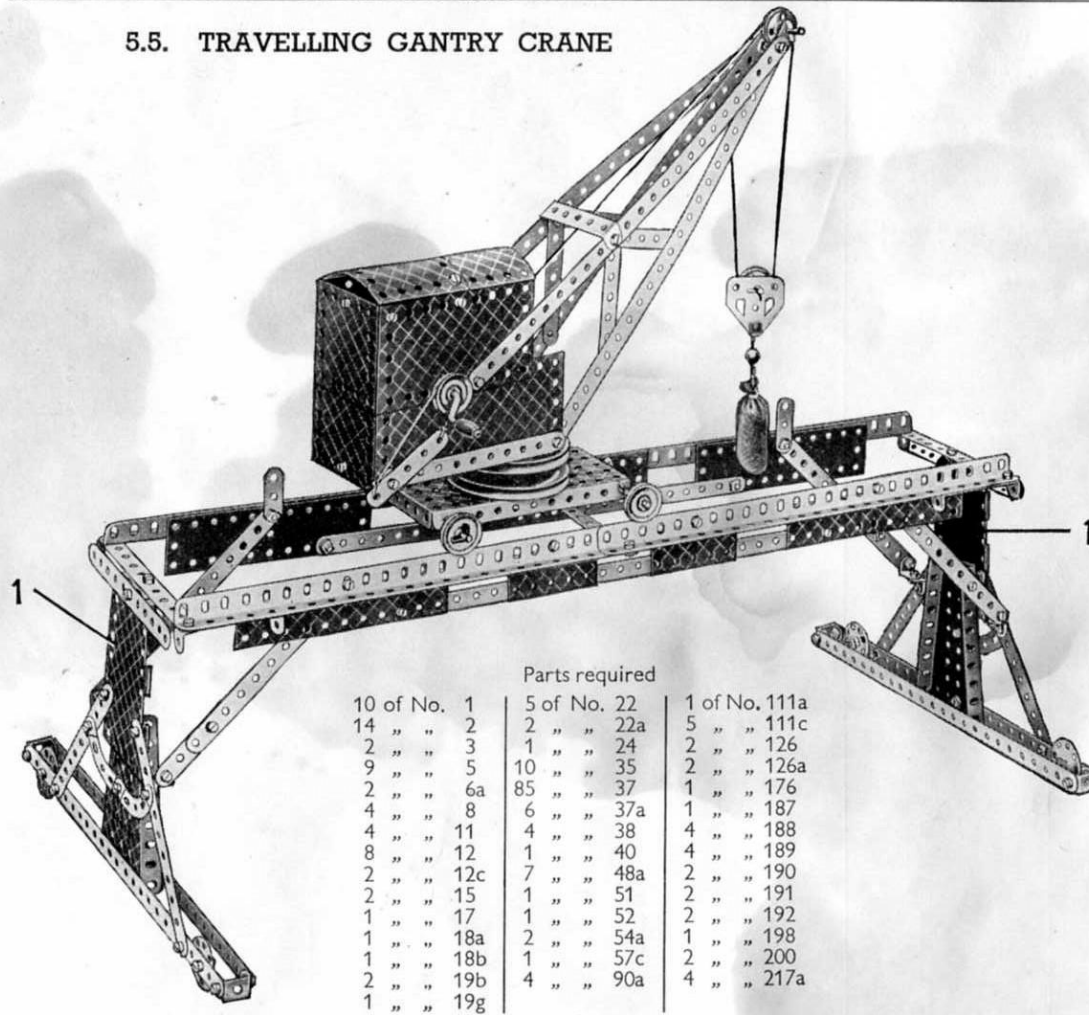
The Clockwork Motor is fastened by two 1"  $\times$  1" Angle Brackets to a  $5\frac{1}{2}$ "  $\times$   $2\frac{1}{2}$ " Flanged Plate bolted inside the base. The drive is taken from a 1" fast Pulley on the driving shaft of the Motor, to a 3" Pulley fixed on a Crank Handle journaled in two of the 12 $\frac{1}{2}$ " Strips of the tower.

The Crank Handle is lengthened by joining to it a  $3\frac{1}{2}$ " Rod with a Rod Connector. It carries also a 1" fast Pulley, which is connected by Cord to a second 3" Pulley mounted on a 5" Rod, bearings for which are provided by the centre holes of two 1 $\frac{1}{2}$ " Strips near the top of the tower. A 1" Pulley fitted with a Rubber Ring is fastened to this Rod, inside the tower. The Rubber Ring bears against the rim of a Road Wheel fastened on the lower end of the vertical 4" Rod to which the beam carrying the aeroplanes also is fastened.

The beam consists of two 12 $\frac{1}{2}$ " Angle Girders bolted to a Bush Wheel and overlapped one hole. The top Girders of the beam are joined together at the centre by an Obtuse Angle Bracket.

Parts required	1 of No. 45
10 of No. 1	1 " " 48
14 " " 2	8 " " 48a
2 " " 3	1 " " 51
10 " " 5	1 " " 52
2 " " 6a	1 " " 54a
4 " " 8	3 " " 90a
3 " " 10	4 " " 111c
2 " " 11	4 " " 125
10 " " 12	2 " " 126
2 " " 12a	2 " " 126a
1 " " 12c	3 " " 155a
1 " " 15	1 " " 187
1 " " 15b	4 " " 189
3 " " 16	2 " " 190
2 " " 18a	2 " " 191
2 " " 19b	4 " " 192
1 " " 19g	1 " " 198
4 " " 22	2 " " 199
2 " " 22a	2 " " 200
1 " " 24	1 " " 213
10 " " 35	2 " " 214
83 " " 37	4 " " 215
4 " " 37a	3 " " 217a
6 " " 38	
1 " " 40	1 No. 1 Clockwork Motor

## 5.5. TRAVELLING GANTRY CRANE



Parts required		
10 of No. 1	5 of No. 22	1 of No. 111a
14 " " 2	2 " " 22a	5 " " 111c
2 " " 3	1 " " 24	2 " " 126
9 " " 5	10 " " 35	2 " " 126a
2 " " 6a	85 " " 37	1 " " 176
4 " " 8	6 " " 37a	1 " " 187
4 " " 11	4 " " 38	4 " " 188
8 " " 12	1 " " 40	4 " " 189
2 " " 12c	7 " " 48a	2 " " 190
2 " " 15	1 " " 51	2 " " 191
1 " " 17	1 " " 52	2 " " 192
1 " " 18a	2 " " 54a	1 " " 198
1 " " 18b	1 " " 57c	2 " " 200
2 " " 19b	4 " " 90a	4 " " 217a
1 " " 19g		

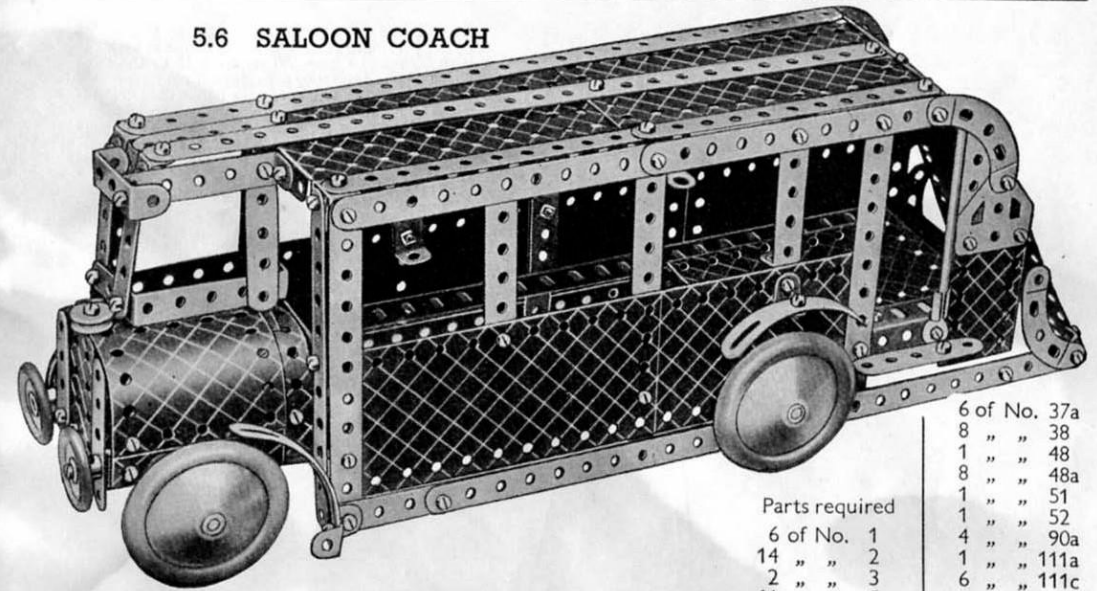
The pin has been withdrawn from a Hinged Flat Plate and the halves are used as flat plates 1 in the construction of the supports for the gantry. Four 1 1/2 inch Discs are fastened to the 12 1/2 inch Strips by lock-nutted Bolts, so that the gantry can travel along the ground. Each of the rails along which the crane runs consists of two 12 1/2 inch Angle Girders, overlapped three holes and joined across by 5 1/2 inch Strips. Trunnions connect the rails to the supports.

A 5 1/2 inch x 2 1/2 inch Flanged Plate fitted with a 3 inch Pulley forms the base of the crane, and the 1 inch Pulleys are fastened on 5 inch Rods journaled in the end holes of the Flanged Plate.

The cab of the crane consists of Flexible Plates fastened together by 2 1/2 inch x 1/4 inch Double Angle Strips, and a Crank Handle fitted with a 1 inch Pulley and a Road Wheel is passed through the sides. The Bolts that hold the lower 12 1/2 inch Strips of the jib carry also a 2 1/2 inch x 1 1/2 inch Flanged Plate that has a second 3 inch Pulley fixed to it. A 2 inch Rod in the boss of this Pulley passes through the lower Pulley and Flanged Plates, and is retained in position beneath it by a Bush Wheel.

A Cord is tied to a Cord Anchoring Spring on the shaft of a Crank Handle, and after passing over the 1 inch loose Pulleys at the jib head and in the pulley block, is fastened to the jib as shown.

## 5.6 SALOON COACH



Two 12 1/2 inch Angle Girders joined by 3 1/2 inch Strips at each end comprise the chassis, and to this the Flexible Plates forming the sides are bolted. Supports for the roof are provided by 5 1/2 inch Strips to which a 5 1/2 inch x 2 1/2 inch Flanged Plate and two 5 1/2 inch x 1 1/2 inch Flexible Plates are fastened by Angle Brackets. The curved back of the coach is formed by two 1 1/2 inch radius Curved Plates, a 5 1/2 inch x 1 1/2 inch Flexible Plate, and a 5 1/2 inch x 2 1/2 inch Flexible Plate. The Flexible Plates are curved and bolted to the 1 1/2 inch radius Curved Plates so that they overlap three holes.

The tail lamp is a 1 inch Pulley, which is secured to a Threaded Pin fastened to one of the Flexible Plates.

The bonnet is built up from two U-section Curved Plates and a 2 1/2 inch x 1 1/2 inch Flexible Plate. The radiator is a 2 1/2 inch x 1 1/2 inch Flanged Plate.

## Parts required

6 of No. 1		
14 " " 2	6 of No. 1	6 of No. 37a
2 " " 3	1 " " 2	8 " " 38
11 " " 5	2 " " 3	1 " " 48
2 " " 6a	1 " " 5	8 " " 48a
3 " " 8	1 " " 6a	1 " " 51
2 " " 10	2 " " 8	1 " " 52
3 " " 11	2 " " 10	4 " " 90a
12 " " 12	3 " " 11	1 " " 111a
2 " " 12c	2 " " 12	2 " " 111c
1 " " 15	2 " " 12c	1 " " 115
1 " " 15a	1 " " 15	2 " " 125
1 " " 16	2 " " 15a	2 " " 126a
3 " " 22	1 " " 16	2 " " 155a
1 " " 23	3 " " 22	4 " " 187
1 " " 35	1 " " 23	4 " " 188
85 " " 37	2 " " 35	3 " " 189
	4 " " 37	2 " " 190
		2 " " 191
		4 " " 192
		2 " " 199
		2 " " 200
		1 " " 212
		4 " " 215

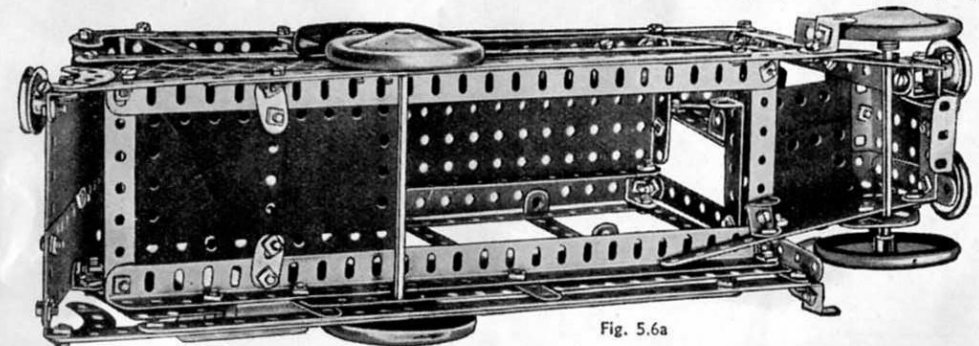


Fig. 5.6a

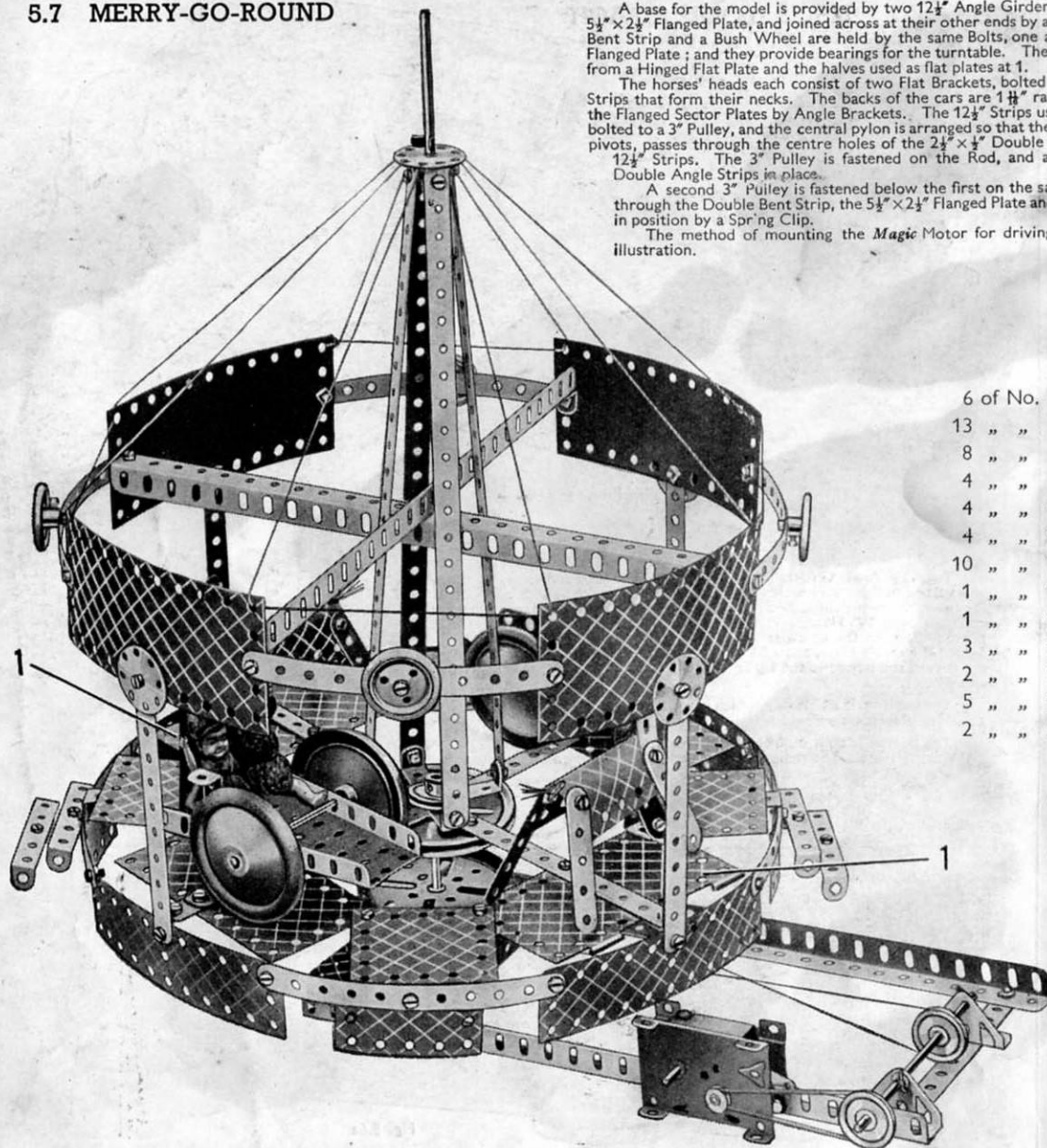
## 5.7 MERRY-GO-ROUND

A base for the model is provided by two 12½" Angle Girders bolted to the end flanges of a 5½"×2½" Flanged Plate, and joined across at their other ends by a 5½" Strip as shown. A Double Bent Strip and a Bush Wheel are held by the same Bolts, one above and the other below the Flanged Plate; and they provide bearings for the turntable. The centre pin has been withdrawn from a Hinged Flat Plate and the halves used as flat plates at 1.

The horses' heads each consist of two Flat Brackets, bolted to the 2½" small radius Curved Strips that form their necks. The backs of the cars are 1½" radius Curved Plates, attached to the Flanged Sector Plates by Angle Brackets. The 12½" Strips used for bracing the platform are bolted to a 3" Pulley, and the central pylon is arranged so that the 4" Rod, on which the turntable pivots, passes through the centre holes of the 2½"×½" Double Angle Strips at the ends of the 12½" Strips. The 3" Pulley is fastened on the Rod, and a 1" Pulley clamps the 2½"×½" Double Angle Strips in place.

A second 3" Pulley is fastened below the first on the same Rod, and the Rod is passed through the Double Bent Strip, the 5½"×2½" Flanged Plate and the Bush Wheel. It is retained in position by a Spring Clip.

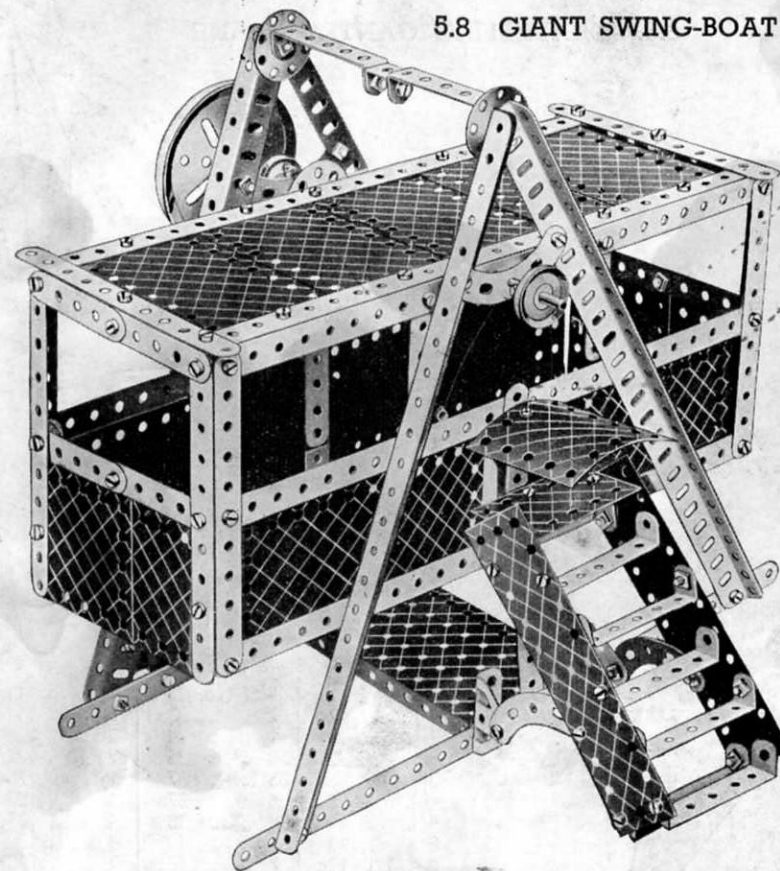
The method of mounting the *Magic Motor* for driving the model is clear from the illustration.



## Parts required

6 of No. 1	1 of No. 24
13 " " 2	5 " " 35
8 " " 5	85 " " 37
4 " " 8	2 " " 37a
4 " " 10	2 " " 38
4 " " 11	1 " " 40
10 " " 12	1 " " 45
1 " " 15	8 " " 48a
1 " " 15b	1 " " 52
3 " " 16	2 " " 54a
2 " " 19b	4 " " 90a
5 " " 22	2 " " 111c
2 " " 22a	4 " " 125
	2 " " 126
	4 " " 155a
	4 " " 187
	4 " " 188
	4 " " 189
	4 " " 190
	2 " " 191
	4 " " 192
	1 " " 198
	2 " " 199
	2 " " 200
	4 " " 217a
	1 <i>Magic Motor</i>

## 5.8 GIANT SWING-BOAT



## Parts required

10 of No. 1	4 of No. 22	6 of No. 111c
12 " " 2	1 " " 24	2 " " 126
2 " " 3	3 " " 35	2 " " 126a
12 " " 5	85 " " 37	1 " " 147b
4 " " 8	6 " " 37a	3 " " 188
4 " " 11	6 " " 38	2 " " 189
6 " " 12	1 " " 45	4 " " 190
2 " " 12a	8 " " 48a	2 " " 191
1 " " 15	1 " " 51	4 " " 192
1 " " 16	1 " " 52	1 " " 198
1 " " 17	2 " " 54a	1 " " 200
2 " " 19b	4 " " 90a	1 " " 213
1 " " 19g	1 " " 111a	2 " " 217a
		1 <i>Magic Motor</i>

## 5.8 GIANT SWING-BOAT—continued

The main supports for the swing-boat are formed by  $12\frac{1}{2}$ " Angle Girders, which are bolted to a base made by fastening two  $12\frac{1}{2}$ " Strips to a  $5\frac{1}{2}$ " $\times$  $2\frac{1}{2}$ " Flanged Plate. The steps are supported by two  $2\frac{1}{2}$ " small radius Curved Strips, bolted to the sides of the staircase and to two Trunnions fastened to the base. The platform at the top consists of a  $2\frac{1}{2}$ " $\times$  $1\frac{1}{2}$ " Flexible Plate held in position by two  $1$ " $\times$  $1$ " Angle Brackets.

The  $1\frac{1}{8}$ " radius Curved Plate is fastened to a Double Bent Strip bolted to one end of a  $5\frac{1}{2}$ " Strip, the other end of which is fastened to the base.

The swing-boat is pivoted on a compound rod consisting of a  $5$ " Rod and a  $4$ " Rod joined by a Rod Connector. The compound rod is held in the boss of a Bush Wheel bolted to the side of the swing-boat.

The *Magic* Motor is bolted direct to the base. The drive is taken by a Driving Band from the small pulley of the Motor to a  $1$ " Pulley on the shaft of a  $3\frac{1}{2}$ " Crank Handle journaled in holes in two Flanged Sector Plates. A second  $1$ " Pulley on the Crank Handle is connected by a Driving Band to a  $3$ " Pulley on a  $2$ " Rod journaled in the Flanged Sector Plates. A  $5\frac{1}{2}$ " Strip is attached to a Pivot Bolt, and its other end is pivoted on a Bolt lock-nutted to the top  $3$ " Pulley. The two Flanged Sector Plates are bolted at the bottom to a  $2\frac{1}{2}$ " $\times$  $1\frac{1}{2}$ " Flanged Plate and to two Double Brackets.

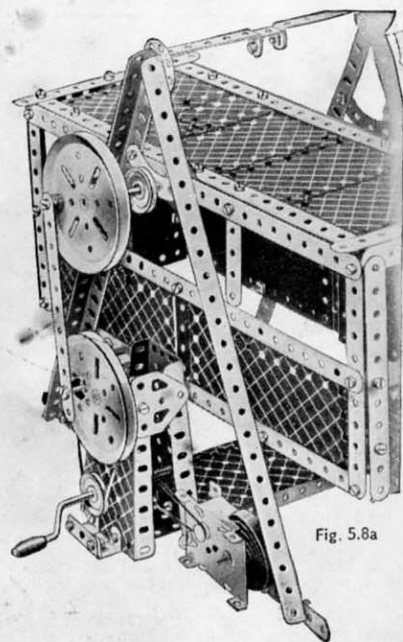
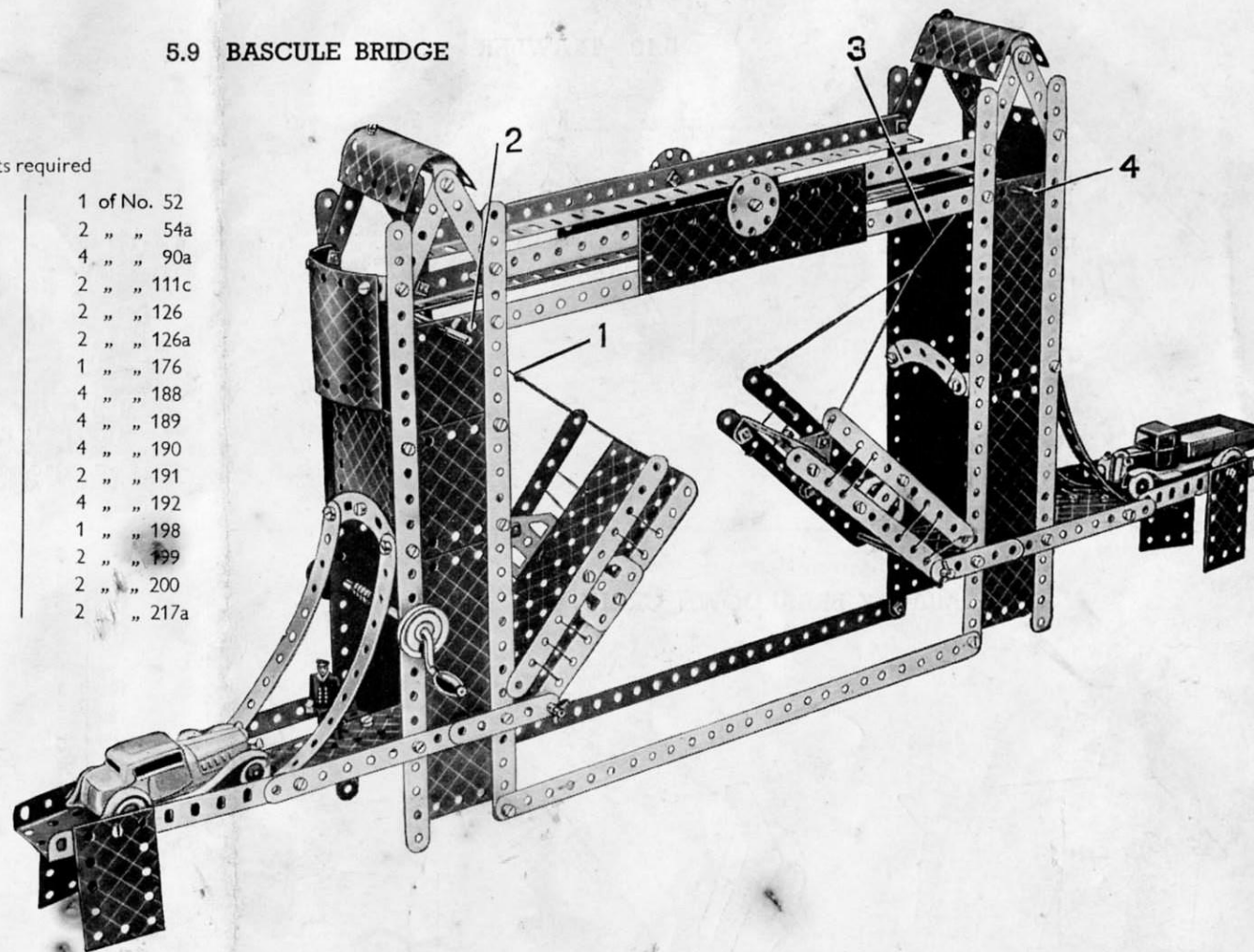


Fig. 5.8a

## 5.9 BASCULE BRIDGE

## Parts required

10 of No. 1	1 of No. 52
14 " " 2	2 " " 54a
12 " " 5	4 " " 90a
4 " " 8	2 " " 111c
10 " " 12	2 " " 126
4 " " 12c	2 " " 126a
4 " " 16	1 " " 176
1 " " 19g	4 " " 188
2 " " 22	4 " " 189
8 " " 35	4 " " 190
84 " " 37	2 " " 191
2 " " 37a	4 " " 192
8 " " 38	1 " " 198
1 " " 40	2 " " 199
8 " " 48a	2 " " 200
1 " " 51	2 " " 217a



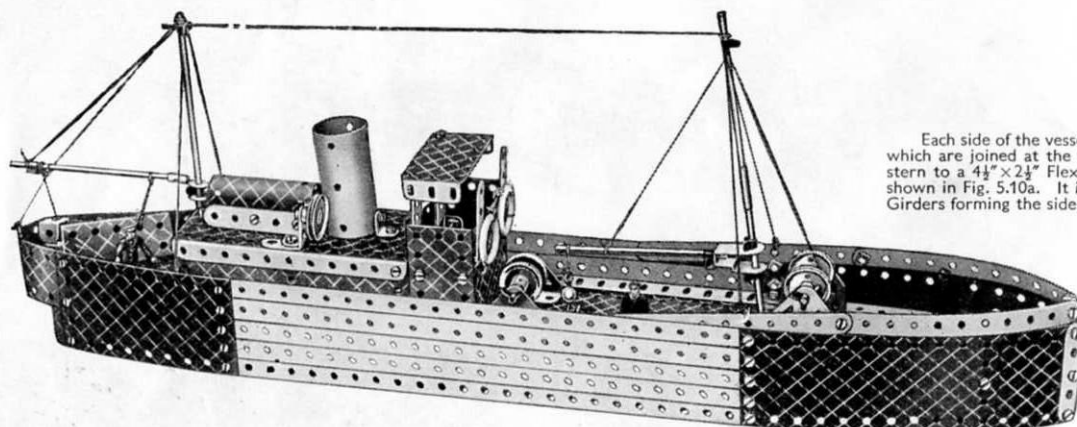
The centre pin has been withdrawn from a Hinged Flat Plate, and one of the halves is used in the construction of the side of one of the towers. Each of the main towers consists of four  $12\frac{1}{2}$ " Strips to which are bolted Flexible Plates as shown. The  $12\frac{1}{2}$ " Strips are braced across by the  $2\frac{1}{2}$ " $\times$  $1\frac{1}{2}$ " Double Angle Strips that support the approach roadway, the  $2\frac{1}{2}$ " small radius Curved Strips, and a further Double Angle Strip at the top of the tower. The U-Section Curved Plates are spaced from the  $2\frac{1}{2}$ " $\times$  $1\frac{1}{2}$ " Double Angle Strips by three Washers. The two towers are joined across at the top by four Angle Girders, and at the bottom by two  $12\frac{1}{2}$ " Strips.

Four  $2\frac{1}{2}$ " Strips form bearings for the  $3\frac{1}{2}$ " Rods on which the halves of the span are pivoted. The left-hand half is a  $5\frac{1}{2}$ " $\times$  $2\frac{1}{2}$ " Flanged Plate fitted with Flat Trunnions and  $5\frac{1}{2}$ " Strips as shown. The other half of the span is a part of the Hinged Flat Plate, and is connected to two  $5\frac{1}{2}$ " Strips by a  $2\frac{1}{2}$ " $\times$  $1\frac{1}{2}$ " Double Angle Strip and Angle Brackets.

The halves of the span are raised and lowered by turning a Crank Handle journaled in the sides of the left-hand tower. Cord 1 passes over Rod 2 and is fastened to a Cord Anchoring Spring on the Crank Handle. Cord 3 passes over Rod 4 and around Rod 2, and is then knotted to Cord 1 inside the tower.

These Models can be built with MECCANO No. 5 Outfit (or No. 4 and No. 4a Outfits)

## 5.10 TRAWLER

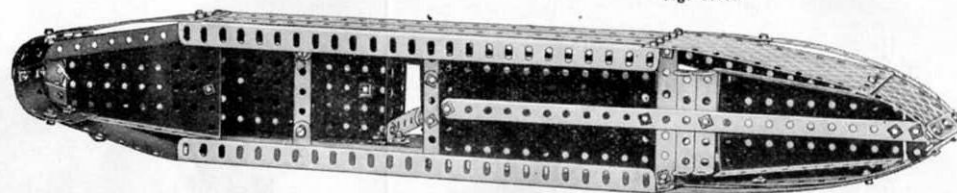


Each side of the vessel consists of three 12½" Strips and two Angle Girders, which are joined at the forward end to a 5½" x 2½" Flexible Plate, and at the stern to a 4½" x 2½" Flexible Plate. The deck of the model is constructed as shown in Fig. 5.10a. It is secured to Strips bolted between two of the Angle Girders forming the sides of the ship.

The sides of the cabin behind the bridge are attached by a 2½" x ½" Double Angle Strip and Flat Brackets to the two Angle Girders in the sides of the ship. The back of the cabin is completed with 2½" x ½" Double Angle Strips. The back of the wheelhouse, a 2½" x 2½" Flexible Plate, is bolted to the 5½" x 2½" Flanged Plate, the Bolts holding also Angle Brackets and 2½" Strips. The front of the wheelhouse is a 2½" x 1½" Flexible Plate, which is held in position by two Angle Brackets.

The funnel, a 2½" Cylinder, is fastened to the top of the cabin by an Angle Bracket.

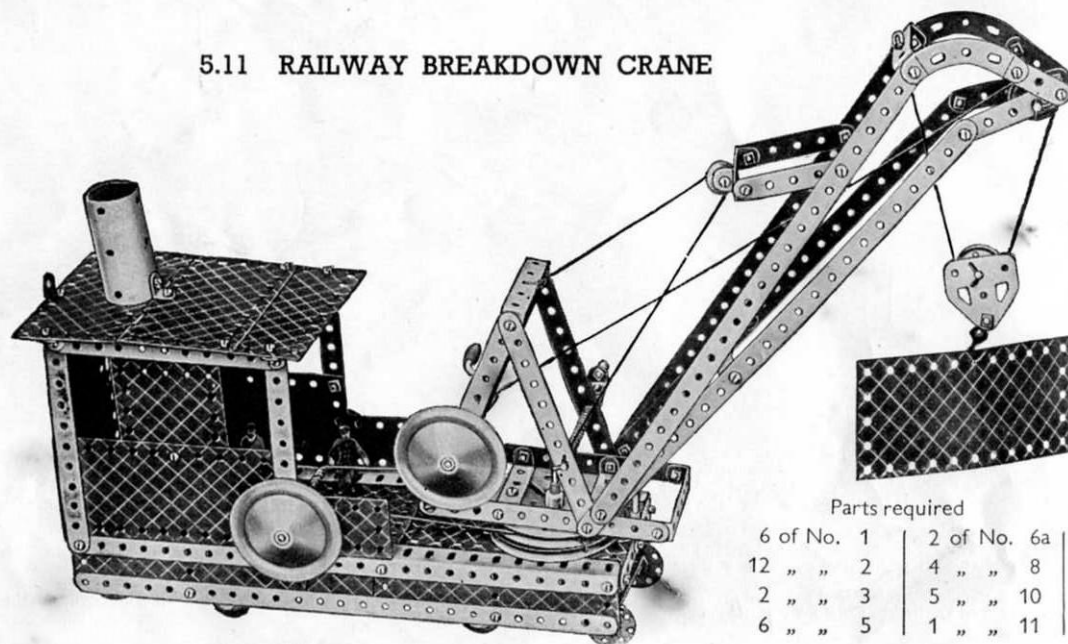
Fig. 5.10a



Parts required

7 of No. 1	1 of No. 15a	1 of No. 48	1 of No. 176
8 " " 2	2 " " 15b	5 " " 48a	4 " " 188
2 " " 3	1 " " 16	1 " " 51	3 " " 189
9 " " 5	2 " " 17	1 " " 52	4 " " 190
2 " " 6a	4 " " 22	2 " " 54a	2 " " 191
4 " " 8	2 " " 22a	1 " " 57c	3 " " 192
5 " " 10	1 " " 24	2 " " 111a	2 " " 199
1 " " 11	14 " " 35	6 " " 111c	1 " " 212
10 " " 12	85 " " 37	2 " " 125	1 " " 213
2 " " 12a	6 " " 37a	2 " " 126	1 " " 216
1 " " 12c	1 " " 40	2 " " 126a	1 " " 217a
1 " " 15	1 " " 44	2 " " 155a	

## 5.11 RAILWAY BREAKDOWN CRANE



Parts required

6 of No. 1	2 of No. 6a
12 " " 2	4 " " 8
2 " " 3	5 " " 10
6 " " 5	1 " " 11

10 of No. 12	1 of No. 57c
1 " " 15	2 " " 90a
4 " " 16	2 " " 111a
1 " " 17	6 " " 111c
2 " " 18a	1 " " 115
1 " " 18b	3 " " 125
2 " " 19b	2 " " 126a
1 " " 19g	1 " " 147b
5 " " 22	1 " " 176
2 " " 22a	1 " " 186a
1 " " 23	4 " " 187
1 " " 24	4 " " 188
14 " " 35	4 " " 189
79 " " 37	4 " " 190
12 " " 37a	2 " " 191
14 " " 38	4 " " 192
1 " " 40	1 " " 198
1 " " 48	1 " " 212
6 " " 48a	1 " " 216
1 " " 52	4 " " 217a
2 " " 54a	1 " " 217b

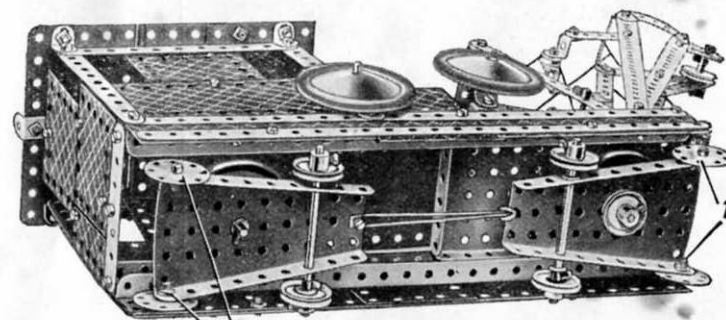


Fig. 5.11a

The chassis of the model consists of two U-section girders, built up from Angle Girders and joined at each end by 3½" Strips and Angle Brackets. A 5½" x 2½" Flanged Plate and a 5½" x 2½" Flexible Plate, overlapping one hole, are attached to the Angle Girders by Flat Brackets. The framework on which the jib is pivoted is fastened to a 3" Pulley by two ¾" Bolts, which have two Washers on their shanks for spacing purposes. The ¾" Bolts on which the jib luffs are lock-nutted.

The 3" Pulley on the jib swivels on a 3½" Rod passed through its boss, and is held in place by a Cord Anchoring Spring.

The front bogie (Fig. 5.11a) pivots on the 3½" Rod and is held between a Road Wheel and a 1" Pulley as shown. The rear bogie is similarly pivoted on a 2" Rod, bearings for which are provided by the 5½" x 2½" Flexible Plate and two 2½" Strips overlapped three holes. The bogies are connected by a Driving Band, and the Bolts 1 are lock-nutted. Luffing of the jib is controlled by the built-up crank handle, consisting of a Double Bracket fitted with an Angle Bracket that carries a Pivot Bolt. The Bolt holding the Angle Bracket clamps the Double Bracket to the Rod.

Hoisting is controlled by the Crank Handle, and the slewing movement is carried out by a belt of Cord passed around the upper 3" Pulley at the base of the jib and then wound several times around the Rod journaled in the sides of the cab.

## 5.12 ELECTRIC LOCOMOTIVE

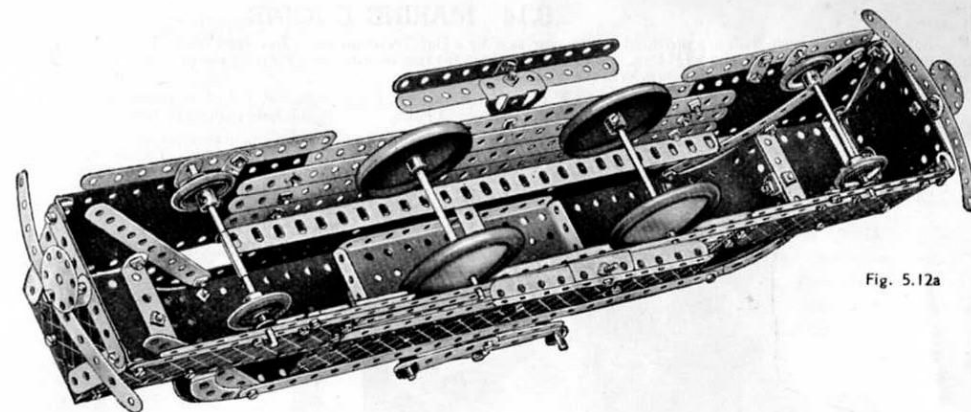
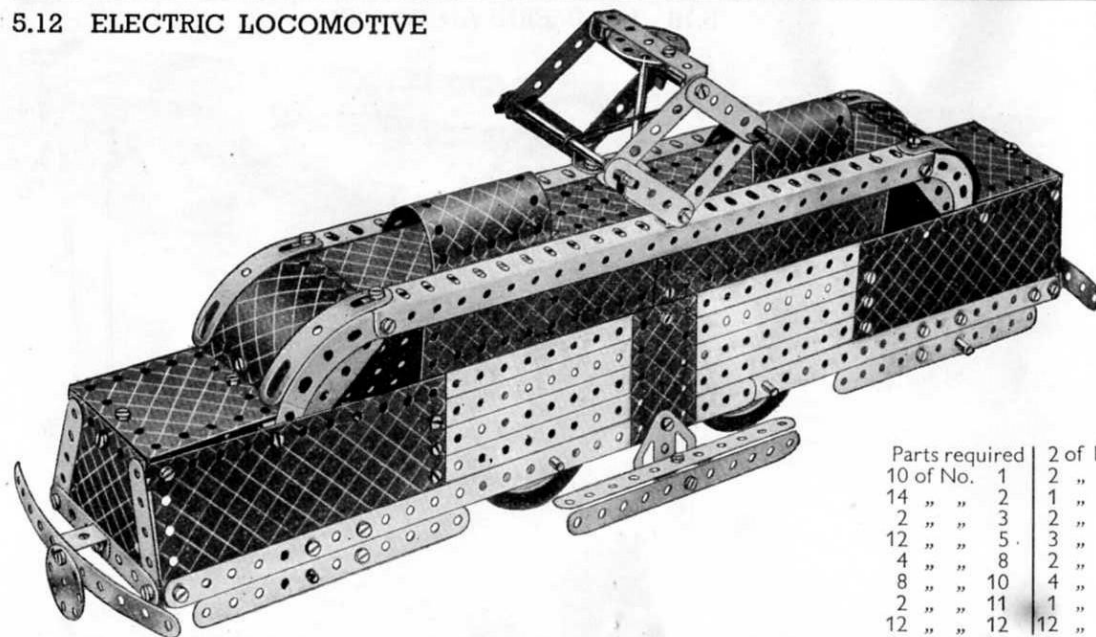


Fig. 5.12a

Parts required	2 of No. 12a	83 of No. 37	2 of No. 126	4 of No. 192
10 of No. 1	2 " " 12c	6 " " 37a	4 " " 155a	2 " " 199
14 " " 2	1 " " 15	4 " " 38	1 " " 176	2 " " 200
2 " " 3	2 " " 15b	1 " " 45	1 " " 186	1 " " 213
12 " " 5	3 " " 16	5 " " 48a	4 " " 187	4 " " 215
4 " " 8	2 " " 17	1 " " 52	2 " " 188	2 " " 217a
8 " " 10	4 " " 22	4 " " 90a	4 " " 189	
2 " " 11	1 " " 24	2 " " 111a	4 " " 190	
12 " " 12	12 " " 35	6 " " 111c	2 " " 191	

The method of constructing the sides and roof will be clear from the illustrations. The front wheel axle consists of two 2" Rods joined by a Rod Connector.

Each side of the pantograph consists of four 2½" Strips, pairs of which are lock-nutted to an Angle Bracket and a 2½"×½" Double Angle Strip respectively. They are pivoted together on 3½" Rods, and a Driving Band is stretched between the Rods as shown. The Bush Wheel carries in its boss a 5" Rod that passes through a Double Bent Strip and the 5½"×2½" Flanged Plate.

The two U-Section Curved Plates are attached to the roof by Obtuse Angle Brackets.

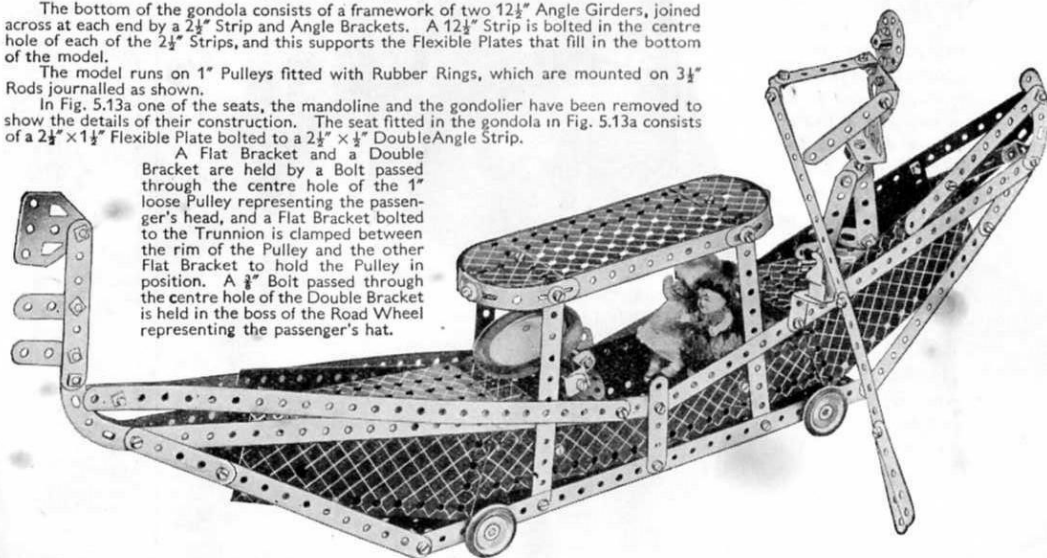
## 5.13 GONDOLA

The bottom of the gondola consists of a framework of two 12½" Angle Girders, joined across at each end by a 2½" Strip and Angle Brackets. A 12½" Strip is bolted in the centre hole of each of the 2½" Strips, and this supports the Flexible Plates that fill in the bottom of the model.

The model runs on 1" Pulleys fitted with Rubber Rings, which are mounted on 3½" Rods journaled as shown.

In Fig. 5.13a one of the seats, the mandoline and the gondolier have been removed to show the details of their construction. The seat fitted in the gondola in Fig. 5.13a consists of a 2½"×1½" Flexible Plate bolted to a 2½"×½" Double Angle Strip.

A Flat Bracket and a Double Bracket are held by a Bolt passed through the centre hole of the 1" loose Pulley representing the passenger's head, and a Flat Bracket bolted to the Trunnion is clamped between the rim of the Pulley and the other Flat Bracket to hold the Pulley in position. A ½" Bolt passed through the centre hole of the Double Bracket is held in the boss of the Road Wheel representing the passenger's hat.



Parts required	7 of No. 1	1 of No. 51
14 " " 2	1 " " 52	
2 " " 3	2 " " 54a	
12 " " 5	4 " " 90a	
2 " " 6a	6 " " 111c	
2 " " 8	1 " " 115	
7 " " 10	3 " " 125	
3 " " 11	2 " " 126	
5 " " 12	2 " " 126a	
1 " " 12a	4 " " 155a	
4 " " 12c	1 " " 187	
2 " " 16	1 " " 188	
1 " " 18a	4 " " 189	
4 " " 22	1 " " 190	
1 " " 22a	2 " " 191	
1 " " 24	4 " " 192	
2 " " 35	2 " " 199	
85 " " 37	2 " " 214	
6 " " 37a	4 " " 215	
6 " " 38	1 " " 217a	
1 " " 44		
1 " " 48		
3 " " 48a		

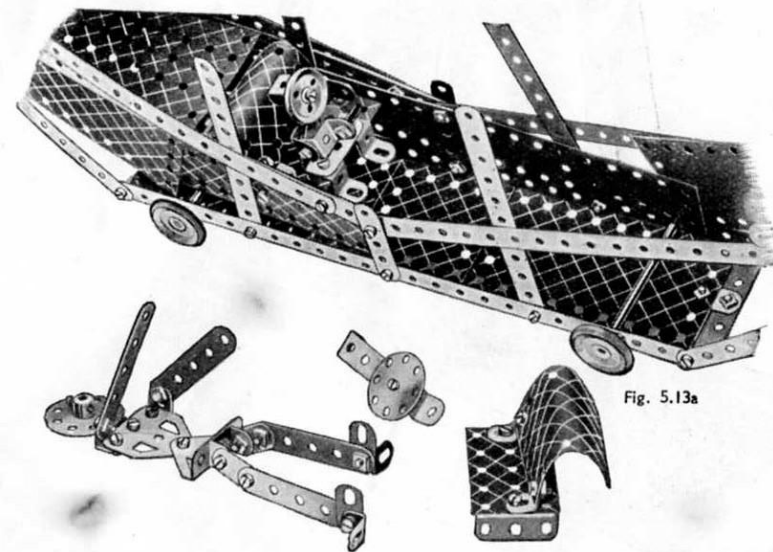


Fig. 5.13a

## 5.14 MARINE ENGINE

Bearings for the crankshaft are provided on the rear side by a Flat Trunnion and a Reversed Angle Bracket bolted to it, and on the other side by a second Flat Trunnion and a  $1\frac{1}{2}$ " Disc. A  $3\frac{1}{2}$ " Rod is held in the rear bearings by a 1" Pulley and a Spring Clip, and in the other bearings is a 2" Rod, which is retained in place by a Bush Wheel and a Spring Clip.

To the inner ends of these Rods are fastened 3" Pulleys that form the crank webs. A 2" Rod is pushed through the outer hole of one of these and then into a Reversed Angle Bracket bolted to the second Pulley. The Rod is held in place by four Spring Clips.

The main connecting rod consists of two  $5\frac{1}{2}$ " Strips overlapped seven holes. Two  $5\frac{1}{2}$ " Strips bolted together provide a guide for the piston rod, and the crosshead is a Double Bracket pivoted to the Connecting Rod by a  $1\frac{1}{2}$ " Rod. Two  $3\frac{1}{2}$ " Rods joined by a Rod Connector form the slide valve, which is held in the Cranked Bent Strip 2, by a Cord Anchoring Spring and a 1" Pulley. The  $5\frac{1}{2}$ " Strip forming the valve connecting rod is carried on a Bolt 1 lock-nutted to the Bush Wheel.

Parts required	1 of No. 52	4 of No. 189
6 of No. 1	1 " " 54a	4 " " 190
12 " " 2	1 " " 80c	2 " " 191
1 " " 3	2 " " 111c	4 " " 192
6 " " 5	3 " " 125	1 " " 212
1 " " 6a	2 " " 126	1 " " 213
4 " " 8	2 " " 126a	1 " " 214
4 " " 11	1 " " 176	4 " " 215
11 " " 12	3 " " 187	1 " " 216
1 " " 12a	4 " " 188	2 " " 217a
2 " " 15		
3 " " 16		
2 " " 17		
2 " " 18a		
2 " " 19b		
4 " " 22		
1 " " 24		
9 " " 35		
85 " " 37		
5 " " 37a		
3 " " 38		
1 " " 44		
1 " " 48		
7 " " 48a		

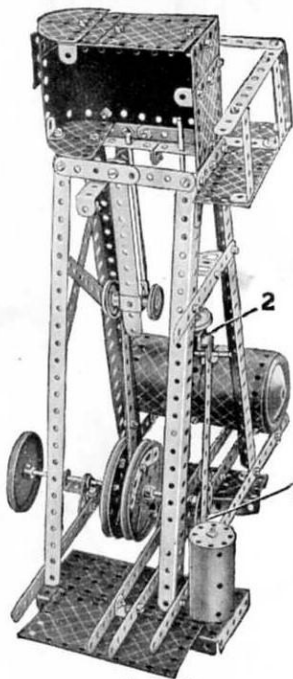
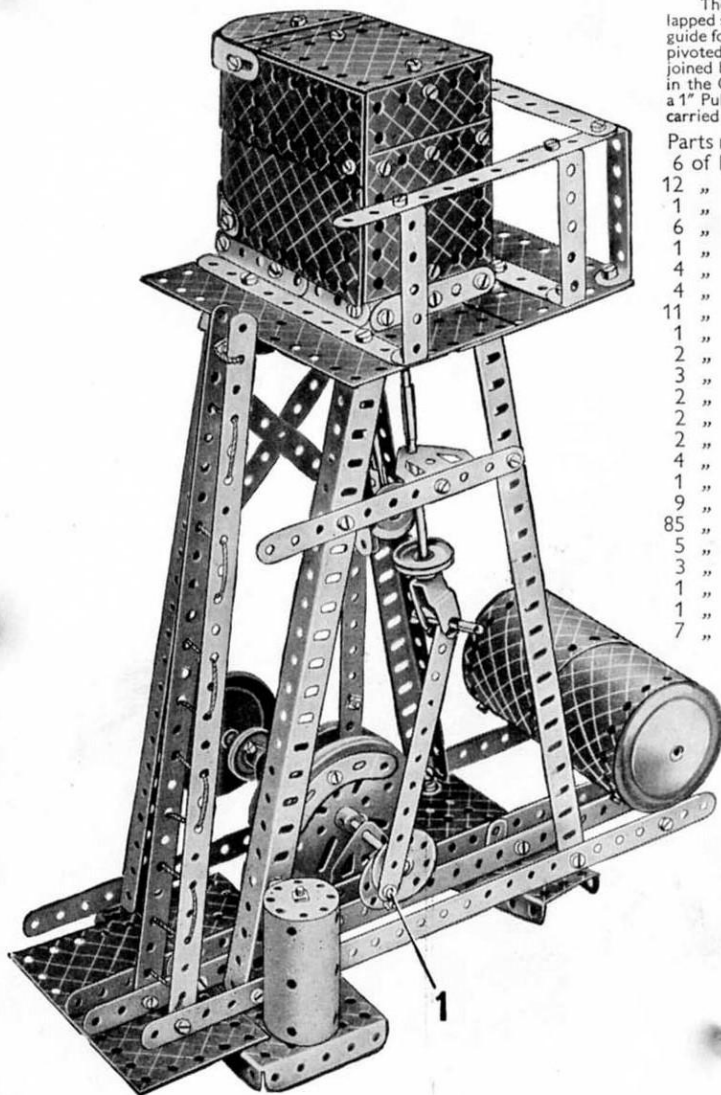
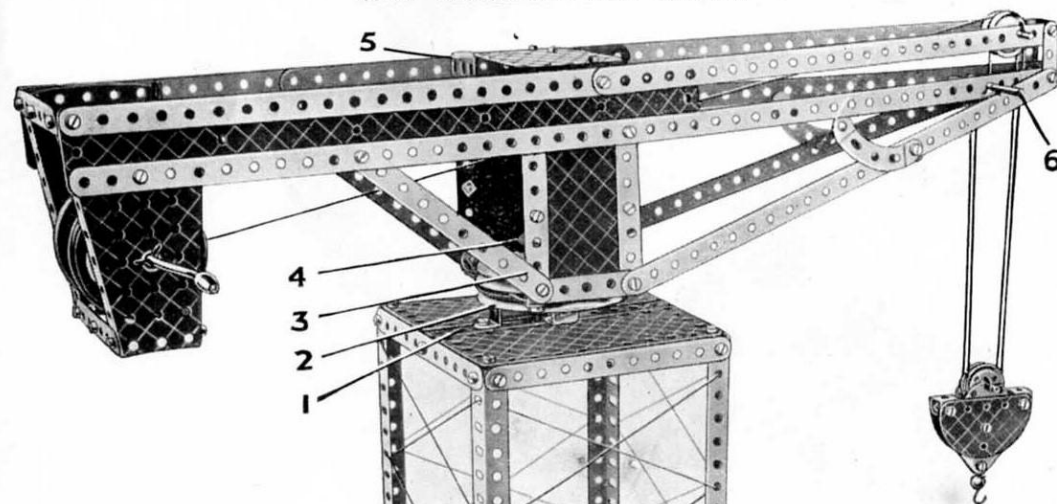


Fig. 5.14a

## 5.15 HAMMERHEAD CRANE



The top of the tower is filled in with a  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plate 1 extended on each side by a  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plate. The 3" Pulley 2 on which the jib swivels is bolted to the tower by four Reversed Angle Brackets, and in its boss is secured a 2" Rod on which the 3" Pulley 3 is free to turn. A 1" Pulley 4 fitted with a Rubber Ring is fastened at the upper end of the 2" Rod and retains the jib in position on its pivot.

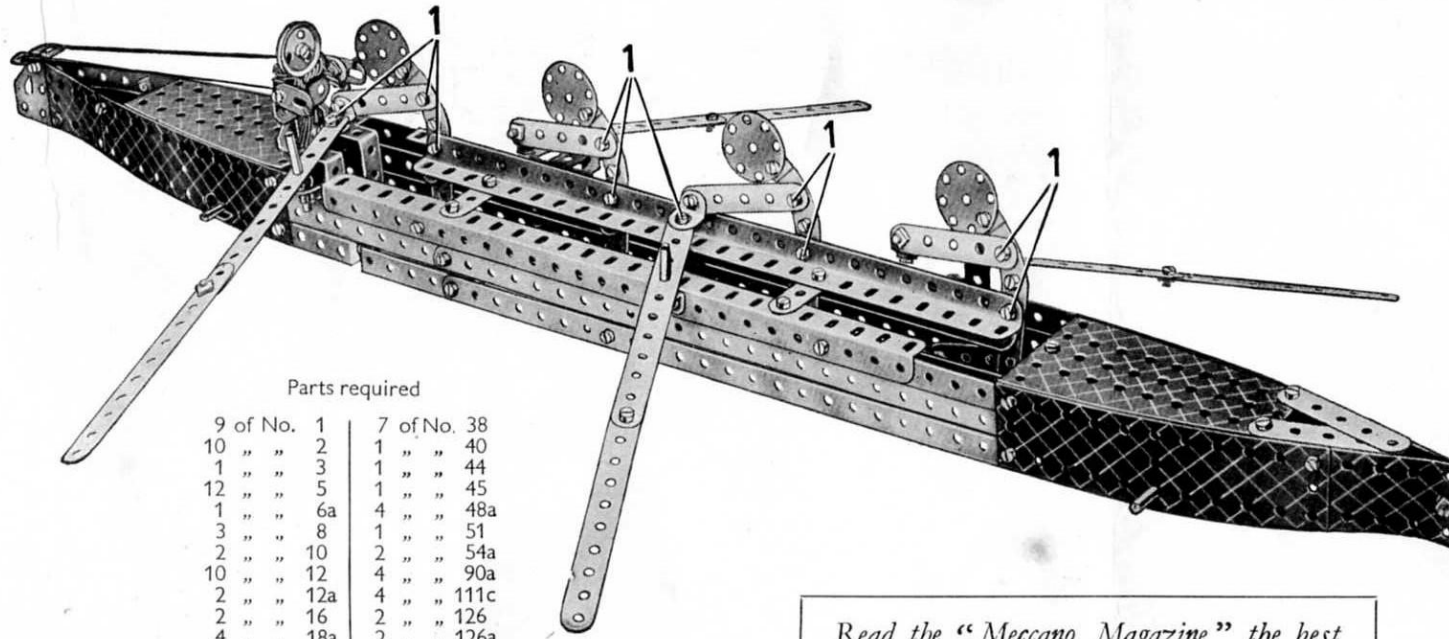
The  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ " Flanged Plate 5 is connected to the other side of the jib by a  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ " Double Angle Strip, on top of which is bolted a  $2\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plate.

The hoisting Cord is tied to the Crank Handle journalled in the Flanged Sector Plates at the rear end of the jib. It is then taken over one of two 1" Pulleys mounted at the front end of the jib, then down and around one of the 1" loose Pulleys in the pulley block, up and over the other 1" fast Pulley in the jib and around the other 1" loose Pulley of the Pulley block. Finally it is tied to a Flat Bracket in the middle of Rod 6.

## Parts required

10 of No. 1	1 of No. 51
14 " " 2	1 " " 52
2 " " 3	2 " " 54a
12 " " 5	1 " " 57c
2 " " 6a	2 " " 90a
4 " " 8	1 " " 111a
1 " " 10	4 " " 111c
4 " " 11	4 " " 125
9 " " 12	2 " " 126a
1 " " 16	1 " " 155a
1 " " 17	1 " " 176
3 " " 18a	2 " " 187
2 " " 19b	4 " " 188
1 " " 19g	4 " " 189
4 " " 22	3 " " 190
2 " " 22a	2 " " 191
10 " " 35	4 " " 192
90 " " 37a	1 " " 198
85 " " 37b	1 " " 213
9 " " 38	2 " " 214
1 " " 40	3 " " 217a
2 " " 48a	

## 5.16 ROWING FOUR



Parts required

9 of No. 1	7 of No. 38
10 " " 2	1 " " 40
1 " " 3	1 " " 44
12 " " 5	1 " " 45
1 " " 6a	4 " " 48a
3 " " 8	1 " " 51
2 " " 10	2 " " 54a
10 " " 12	4 " " 90a
2 " " 12a	4 " " 111c
2 " " 16	2 " " 126
4 " " 18a	2 " " 126a
1 " " 18b	1 " " 147b
5 " " 22	4 " " 155a
2 " " 22a	1 " " 186
1 " " 24	4 " " 188
11 " " 35	4 " " 189
77 " " 37	4 " " 217a
14 " " 37a	

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Each side of the boat consists of an Angle Girder extended by 12½" Strips, the one at the stern overlapping nine holes, and that at the bows overlapping eight holes. Two 5½"×1½" Flexible Plates are bolted to the 12½" Strips at the bows and stern as shown. The sides are filled in by 12½" Strips and 2½"×½" Double Angle Strips bolted to the 5½"×1½" Flexible Plates. Flanged Sector Plates form the deck and are bolted to the sides at their broad ends.

The hull is braced by a 2½"×1½" Flanged Plate bolted across it as shown in Fig. 5.16a. The rowing crew are carried on an Angle Girder bolted to two 2½" Strips fastened to the Angle Girders forming the sides. Each member of the crew consists of a 2½" small radius Curved Strip overlapping a 2½" Strip three holes. A further 2½" Strip fitted with an Angle Bracket and bolted to the "body" forms the arms, and a 1½" Disc represents the head. The four figures are pivotally attached to the Angle Girder in the positions shown. The lower end of the 2½" Strip forming part of the body of each figure is also pivotally attached to a 12½" Strip underneath the boat. The oars are pivotally attached to the Angle Brackets and they also are pivoted on 1½" Rods as shown.

The Nuts on Bolts 1 are left sufficiently loose to enable the oars to move easily, but for better working they should all be lock-nutted. To do this seven Nuts more than are included in the Outfit will be required.

The drive is taken from the Pulleys on which the model runs to the Rod carrying the Bush Wheel (Fig. 5.16a). The Bush Wheel is connected to the Pivot Bolt on the 12½" Strip by a 3½" Strip. The Pivot Bolt carries six Washers on its shank. Bolt 2 should be lock-nutted.

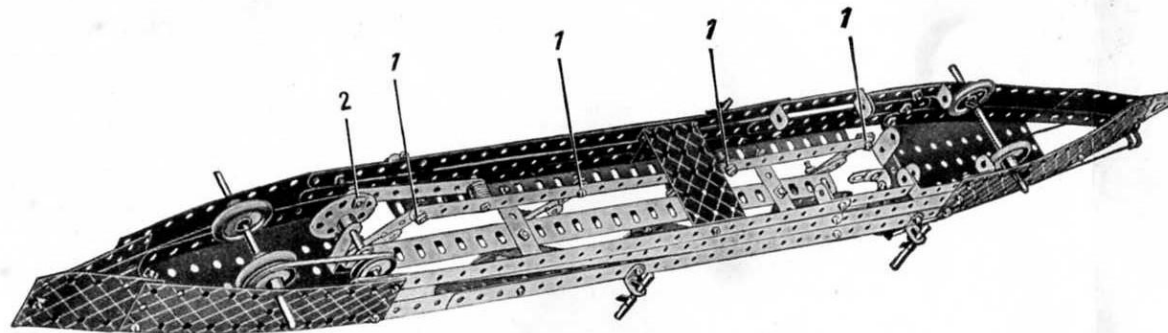


Fig. 5.16a

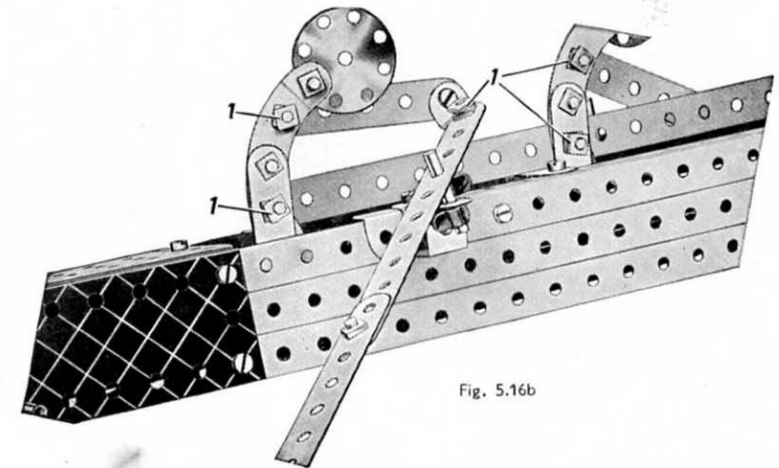
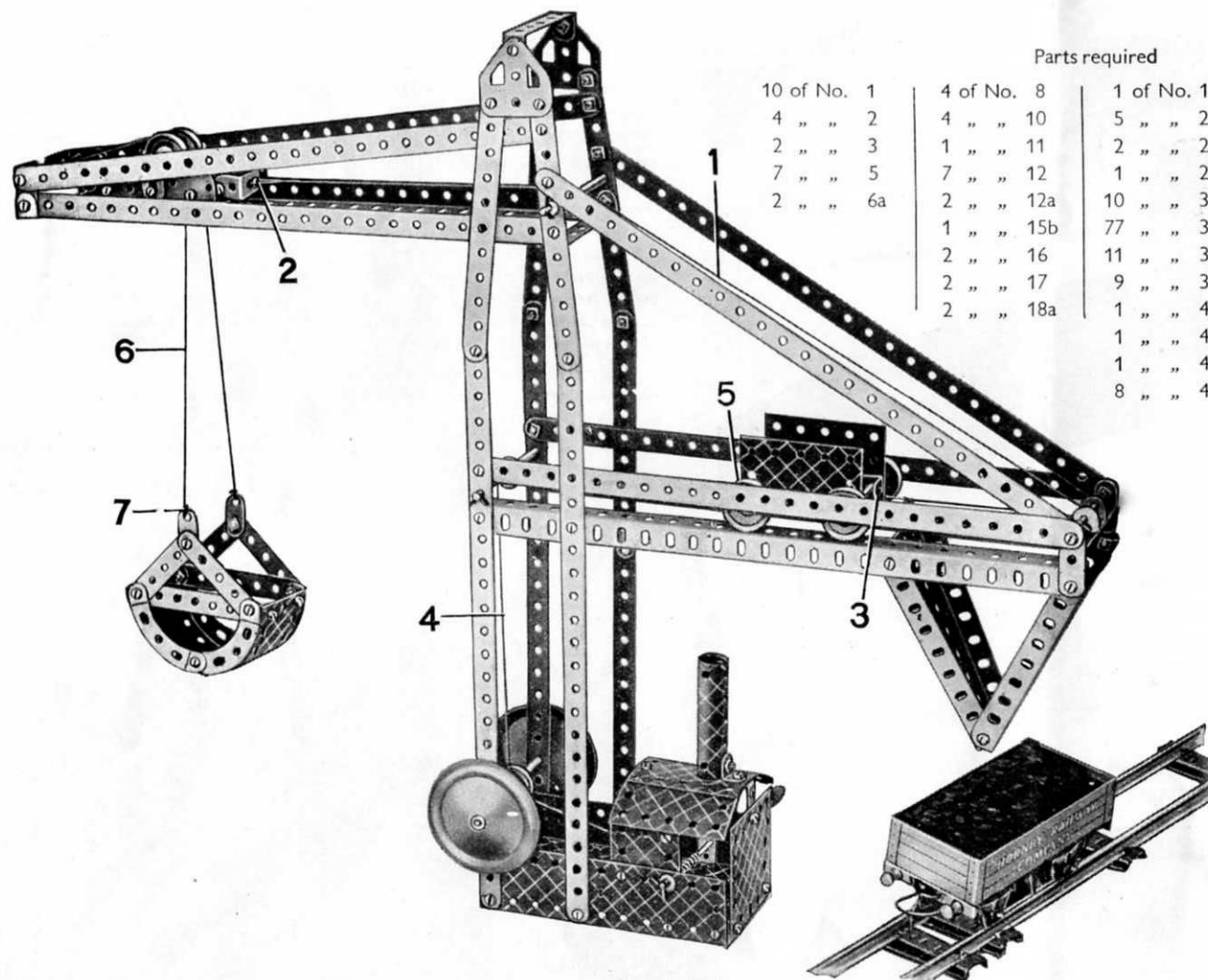


Fig. 5.16b

This Model can be built with MECCANO No. 5 Outfit (or No. 4 and No. 4a Outfits)

### 5.17 AUTOMATIC SHIP-COALER



#### Parts required

10 of No. 1	4 of No. 8	1 of No. 19g	1 of No. 51
4 " " 2	4 " " 10	5 " " 22	1 " " 52
2 " " 3	1 " " 11	2 " " 22a	2 " " 54a
7 " " 5	7 " " 12	1 " " 23	4 " " 90a
2 " " 6a	2 " " 12a	10 " " 35	5 " " 111c
	1 " " 15b	77 " " 37	4 " " 125
	2 " " 16	11 " " 37a	2 " " 126a
	2 " " 17	9 " " 38	2 " " 187
	2 " " 18a	1 " " 40	4 " " 188
		1 " " 45	3 " " 189
		1 " " 48	1 " " 190
		8 " " 48a	1 " " 199
			2 " " 200
			4 " " 217a
			2 " " 217b

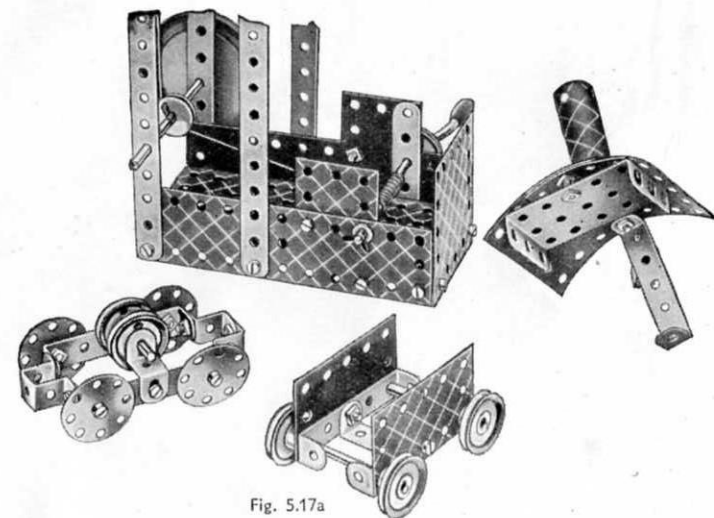


Fig. 5.17a

The construction of the control cabin, hoisting carriage and truck is shown in Fig. 5.17a. The  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flanged Plate is lock-nutted to the  $1\frac{1}{4}"$  radius Curved Plates, which are overlapped three holes. The chimney is a U-Section Curved Plate, bent to shape. The built-up pulley on the same  $4"$  Rod as the Road Wheels consists of two  $\frac{3}{4}"$  Discs spaced by two Washers, and is retained in position by two Spring Clips.

The rails on which the grab hoist and truck run are Angle Girders. Those forming the rails for the grab hoist are bolted at their inner ends to the rear pair of  $5\frac{1}{2}"$  Strips at the top of the tower, but are not connected to the second pair of Strips. This enables the hoist to travel the full length of the rails. The  $1\frac{1}{4}"$  Discs that form the wheels of the grab hoist revolve on Bolts lock-nutted to the  $2\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strips.

The grab consists of  $2\frac{1}{2}"$  small radius Curved Strips bolted to  $3\frac{1}{2}"$  Strips, and the  $5\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plate is attached to them by Angle Brackets.

The operating Cords are arranged as follows. Cord 1 is tied at 2 to the grab hoist, passed over a  $3\frac{1}{2}"$  Rod in the tower, and then around a  $1\frac{1}{2}"$  Rod held by Spring Clips in a Double Bracket. Finally it is tied to the rear of the truck at 3. Cord 4 is fastened to the truck at 5, led over a  $\frac{1}{2}"$  loose Pulley on a  $3\frac{1}{2}"$  Rod halfway up the tower, and around the built-up pulley on the Rod that carries the Road Wheels. It is then wound around the Crank Handle.

Cord 6 is fastened to Flat Bracket 7 on the grab, and is taken over one of the  $1"$  loose Pulleys on the grab hoist. It then passes through the end holes of the  $1" \times 1"$  Angle Brackets at the end of the jib, and is led over the second  $1"$  loose Pulley and finally tied to the other Flat Bracket on the grab.

The length of the grab operating Cord should be adjusted so that the grab reaches the tower at the same time as the truck reaches the inner end of the rails.

## 5.18 RACING YACHT

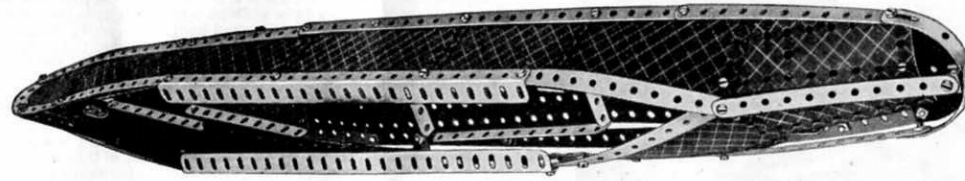


Fig. 5.18a

Construction should be commenced by building up the sides of the hull, and reference to the illustrations will make the details clear. The pin has been withdrawn from a Hinged Flat Plate, and the two parts are bolted to the Angle Girders, one at each side of the hull near the stern. The Strips along the sides of the deck are then added. They are bolted to two Flanged Sector Plates forming the forward part of the deck, and to two Angle Brackets amidships and at the stern. The Flanged Sector Plates are bolted so that the narrow end of one overlaps the broad end of the other by two holes.

Two  $5\frac{1}{2}'' \times 1\frac{1}{4}''$  Flexible Plates connect the rear Flanged Sector Plate to a  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flanged Plate, to which the small boat is bolted. Two  $5\frac{1}{2}''$  Strips overlapped three holes are fastened to the Flanged Plate and to a  $2\frac{1}{2}''$  Strip at the stern. Two  $2\frac{1}{2}'' \times 2\frac{1}{2}''$  Flexible Plates are bolted to this compound strip, together with a  $2\frac{1}{2}'' \times 1\frac{1}{4}''$  Flanged Plate and two  $2\frac{1}{2}'' \times 1\frac{1}{4}''$  Flexible Plates. The 1" Pulleys are secured by Bolts that pass through the deck into their bosses. The Bush Wheel is similarly fastened to the Trunnion. The small boat consists of two U-Section Curved Plates overlapped one hole and attached to the deck by an Angle Bracket.

The mast, which consists of three  $12\frac{1}{2}''$  Strips, a  $5\frac{1}{2}''$  Strip and a  $2\frac{1}{2}''$  Strip, is fastened between two Angle Brackets by a  $\frac{1}{2}''$  Bolt, on the shank of which are four Washers between the Angle Brackets. The method of rigging the model will be clear from Fig. 5.18b.

The sails can be cut from white cardboard or stiff paper. The mainsail measures  $20'' \times 38'' \times 43''$ . The two sails at the bows each measure  $10'' \times 22'' \times 25''$ . The topsail is  $12'' \times 14'' \times 24''$ , and is 6" in width at its widest part.

## Parts required

10 of No. 1	8 of No. 35	1 of No. 126a
14 " " 2	85 " " 37	3 " " 155a
2 " " 3	4 " " 37a	1 " " 176
12 " " 5	14 " " 38	4 " " 188
1 " " 6a	1 " " 40	4 " " 189
2 " " 8	1 " " 45	4 " " 190
2 " " 10	3 " " 48a	2 " " 191
10 " " 12	1 " " 51	4 " " 192
2 " " 12a	1 " " 52	1 " " 198
2 " " 15	2 " " 54a	2 " " 199
1 " " 15b	3 " " 90a	2 " " 200
2 " " 16	2 " " 111a	1 " " 212
3 " " 22	6 " " 111c	1 " " 214
1 " " 24	1 " " 126	2 " " 215

In this illustration the mast is shown with a section cut out so that the details of the upper part of the mast may be included in the page.

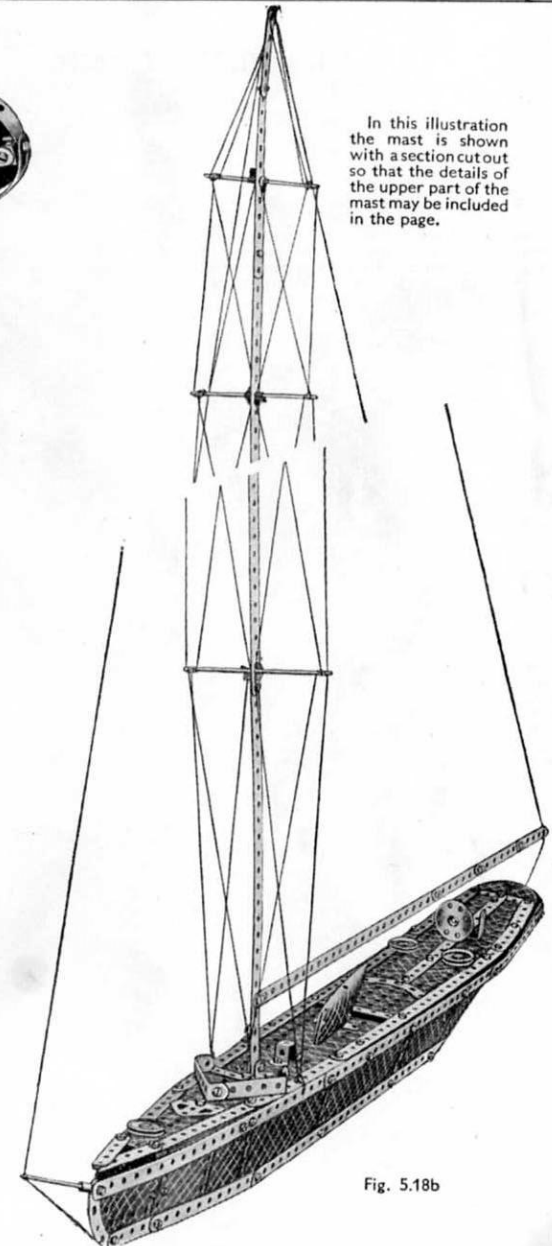


Fig. 5.18b

## 5.19 MILITARY TANK

Angle Girders form the main members of the model and the upper pair are connected by three  $5\frac{1}{2}$ " Strips, the lower pair comprising the chassis being connected by a  $5\frac{1}{2}$ " Strip near the front and by two  $2\frac{1}{2}$ " Strips, overlapped one hole, at the rear. At 1 (Fig. 5.19a) the halves of a Hinged Flat Plate are used separately as flat plates. Flat Trunnions are bolted to the  $2\frac{1}{2}$ " Strips that space the upper and lower pairs of Angle Girders at the rear of the tank, and they form part of the creeper track covers.

The revolving gun turret is shown in Fig. 5.19a. The rear gun is a  $3\frac{1}{2}$ " Rod, which is fitted with a Reversed Angle Bracket on the inside of the Flanged Plate, and is retained in position by Spring Clips. A 5" Rod is fixed in the boss of the 3" Pulley to which the turret is bolted, and a Road Wheel is secured to its top end. The lower end of the Rod passes through the  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plate and through a Double Bent Strip. A 1" Pulley retains the complete unit in position. The Flanged Sector Plate shown in the upper illustration is bolted to a second Flanged Sector Plate, and overlaps it by eight holes.

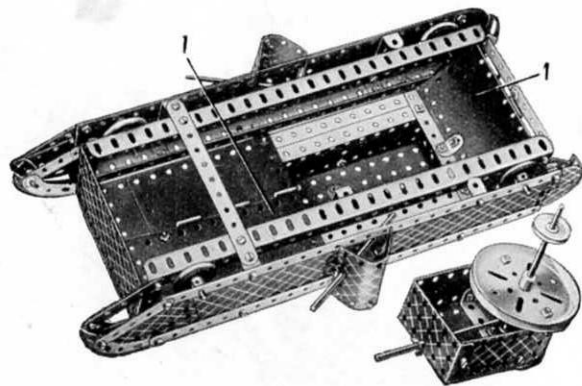


Fig. 5.19a

Parts required		Parts required	
4 of No.	1	1 of No.	187
8 "	2	3 "	188
11 "	5	4 "	189
4 "	8	3 "	190
6 "	12	2 "	191
1 "	12c	4 "	192
2 "	15	1 "	198
1 "	15b	2 "	199
2 "	16	2 "	214
4 "	18a	4 "	215
1 "	19b		
5 "	22		
8 "	35		
83 "	37		
2 "	38		
1 "	45		
6 "	48a		
1 "	51		
1 "	52		
2 "	54a		
4 "	90a		
1 "	125		
2 "	126		
2 "	126a		
4 "	155a		

## 5.20 DERRICK CRANE

Reference to the illustrations will make clear the construction of the base and cabin. Each side of the jib consists of three  $12\frac{1}{2}$ " Strips, which are joined across at the lower ends by a  $1\frac{1}{2}$ " x  $\frac{1}{2}$ " Double Angle Strip, in the centre by a  $2\frac{1}{2}$ " x  $\frac{1}{2}$ " Double Angle Strip, and at the top by a Cranked Bent Strip. A  $1\frac{1}{2}$ " Rod locked in the boss of the upper 3" Pulley passes through a second 3" Pulley bolted to the base, and is held in position by a Spring Clip. The Double Bracket at the upper ends of the  $12\frac{1}{2}$ " Strips is lock-nutted to the  $2\frac{1}{2}$ " x  $1\frac{1}{2}$ " Flanged Plate.

The 5" Rod 1, which controls the swivelling of the jib, has a belt of Cord wound around it several times. The Cord is taken round the 3" Pulley at the bottom of the jib. Crank Handle 2 controls the hoisting movement. Cord is wound a few turns around the shaft of the Crank Handle, then passed under a 2" Rod at the base of the jib, and over a 1" loose Pulley on a  $1\frac{1}{2}$ " Rod at the top of the jib. The Cord is then led through the pulley block and tied to an Angle Bracket bolted to the jib. The  $3\frac{1}{2}$ " Rod 3 carries a Bush Wheel, to which a Threaded Pin is fitted to form a handle for controlling the luffing movement of the jib.

Cord is tied to a Flat Bracket on the 2" Rod in the jib post and is taken around a 1" Pulley in the jib. It is then passed around a  $\frac{1}{2}$ " loose Pulley on the 2" Rod and led over a second Pulley on the same Rod as the first 1" Pulley. Finally it is led back over the 2" Rod and wound around Rod 3.

Parts required		1 of No. 23	1 of No. 57c	1 of No. 213	
10 of No.	1	1 "	24	2 "	90a
10 "	2	14 "	35	4 "	111c
2 "	3	69 "	37	1 "	115
2 "	5	6 "	37a	2 "	126
3 "	8	10 "	38	2 "	126a
1 "	10	1 "	40	1 "	147b
1 "	11	1 "	44	1 "	176
6 "	12	1 "	48	1 "	198
2 "	12a	1 "	48a		
4 "	12c	1 "	51		
1 "	15	1 "	52		
3 "	16	2 "	54a		
2 "	17				
2 "	18a				
1 "	18b				
2 "	19b				
1 "	19g				
5 "	22				
2 "	22a				

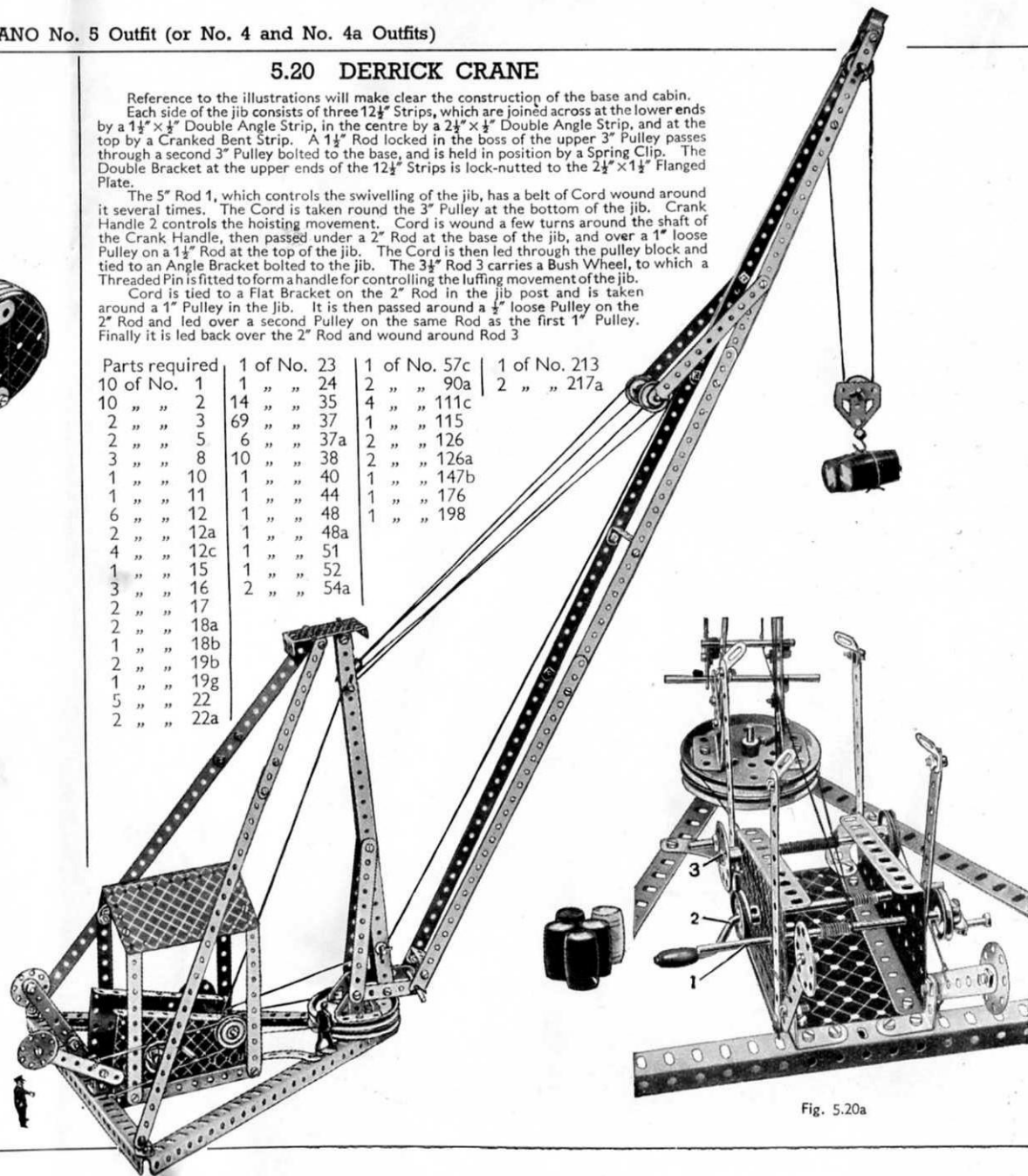

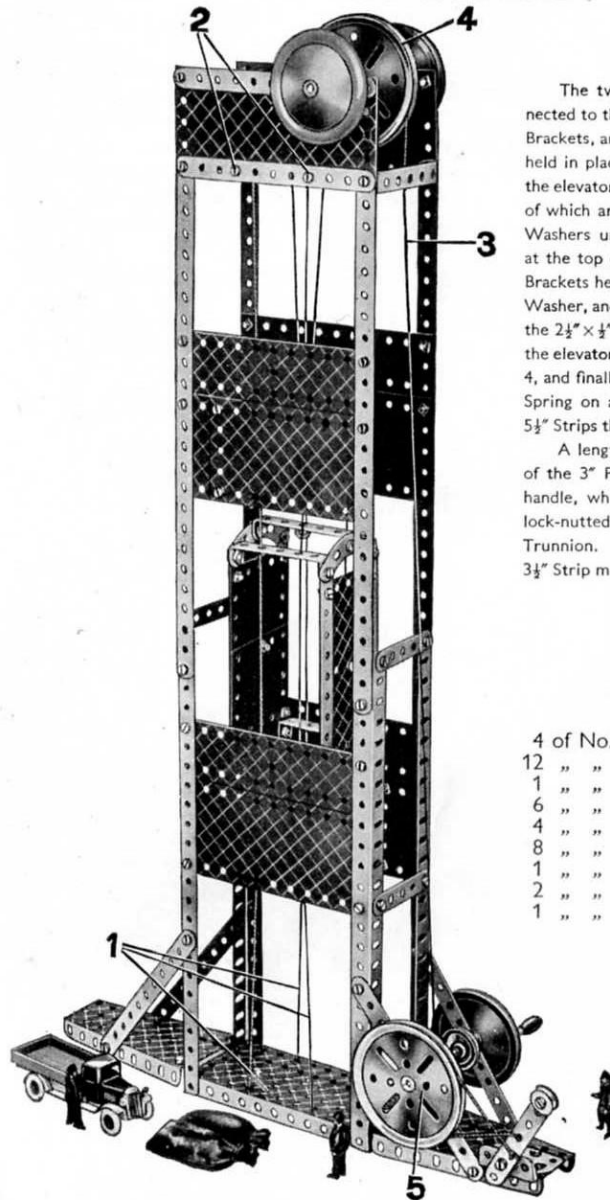


Fig. 5.20a

## 5.21 ELEVATOR



The two Flanged Sector Plates are connected to the  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flanged Plate by Angle Brackets, and the four  $12\frac{1}{2}''$  Angle Girders are held in place by the same Bolts. Guides for the elevator are provided by four Cords, three of which are shown at 1. These are tied to Washers underneath the Flanged Plate, and at the top of the shaft are fastened to Angle Brackets held by Bolts 2. Cord 3 is tied to a Washer, and passes through the centre hole of the  $2\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strip at the top of the elevator. It then passes over the 3" Pulley 4, and finally is fastened to a Cord Anchoring Spring on a Crank Handle journaled in the  $5\frac{1}{2}''$  Strips that brace the elevator shaft.

A length of Cord passes around the rim of the 3" Pulley 5 and is tied to the brake handle, which is a  $3\frac{1}{2}''$  Strip. This Strip is lock-nutted to a Trunnion fastened to a Flat Trunnion. The  $\frac{1}{2}''$  loose Pulley bolted to the  $3\frac{1}{2}''$  Strip maintains the brake band in tension.

Parts required	
4 of No. 1	2 of No. 22
12 " " 2	1 " " 23
1 " " 3	83 " " 37
6 " " 5	2 " " 37a
4 " " 8	7 " " 38
8 " " 12	1 " " 40
1 " " 15b	7 " " 48a
2 " " 19b	1 " " 52
1 " " 19g	2 " " 54a
	2 " " 90a
	1 " " 111c
	1 " " 126
	1 " " 126a
	1 " " 176
	3 " " 187
	2 " " 188
	4 " " 189
	4 " " 190
	2 " " 191
	4 " " 192

Each rim of the wheel consists of four  $12\frac{1}{2}''$  Strips bolted so that they overlap three holes. The rims are connected by 4" compound strips, and are secured by  $6\frac{1}{2}''$  compound strips to a Bush Wheel and the inner holes of a 3" Pulley on the supporting shaft. The shaft consists of a 5" and a 4" Rod fastened together by a Rod Connector, and is journaled in the centre holes of two  $1\frac{1}{2}''$  Discs secured to the ends of two  $12\frac{1}{2}''$  Angle Girders bolted to the base. The base is formed by bolting  $5\frac{1}{2}''$  Strips to the shorter flanges of a  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flanged Plate, and then extending the length of the Flanged Plate by a Flanged Sector Plate. The construction of the cars can be seen from the illustration.

The drive is taken by Cord from a 1" Pulley on the shaft of a Crank Handle to a 3" Pulley on the shaft of the wheel. The Crank Handle is journaled in the holes of a Cranked Bent Strip bolted to the Flanged Sector Plate, and also in the upper hole of a  $1\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strip fixed to the  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flanged Plate. The Flexible Plates forming the pay-box are joined together and secured to the framework of the model by  $2\frac{1}{2}'' \times \frac{1}{2}''$  Double Angle Strips.

Fig. 5.22a shows the Big Wheel driven by an E120 Electric Motor. The drive is taken through a Worm meshed with a 1" Gear, and the 1" Pulley held on a Rod in the Cranked Bent Strip is driven by a Driving Band that runs on the same Rod as the 1" Gear, in order to give a slow drive.

## Parts required

8 of No. 1	1 of No. 24	1 of No. 125
14 " " 2	9 " " 35	2 " " 126
2 " " 3	85 " " 37	2 " " 126a
11 " " 5	3 " " 37a	1 " " 147b
2 " " 6a	12 " " 38	2 " " 187
4 " " 8	1 " " 40	4 " " 188
5 " " 10	1 " " 44	2 " " 190
4 " " 11	1 " " 48	3 " " 192
12 " " 12	4 " " 48a	2 " " 199
2 " " 12a	1 " " 51	2 " " 200
1 " " 15	1 " " 52	1 " " 213
1 " " 15b	1 " " 54a	1 " " 214
4 " " 16	3 " " 111c	2 " " 215
2 " " 19b		4 " " 217a
1 " " 19g		
3 " " 22		
2 " " 22a		
1 " " 23		

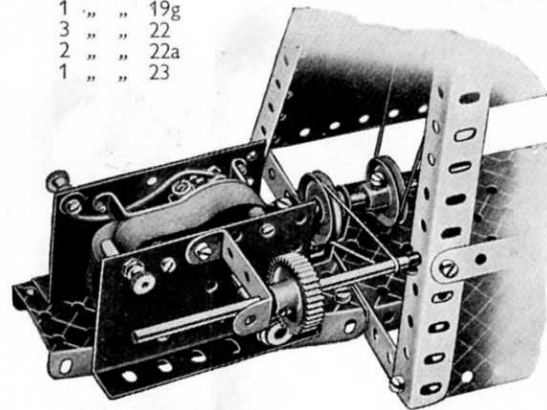
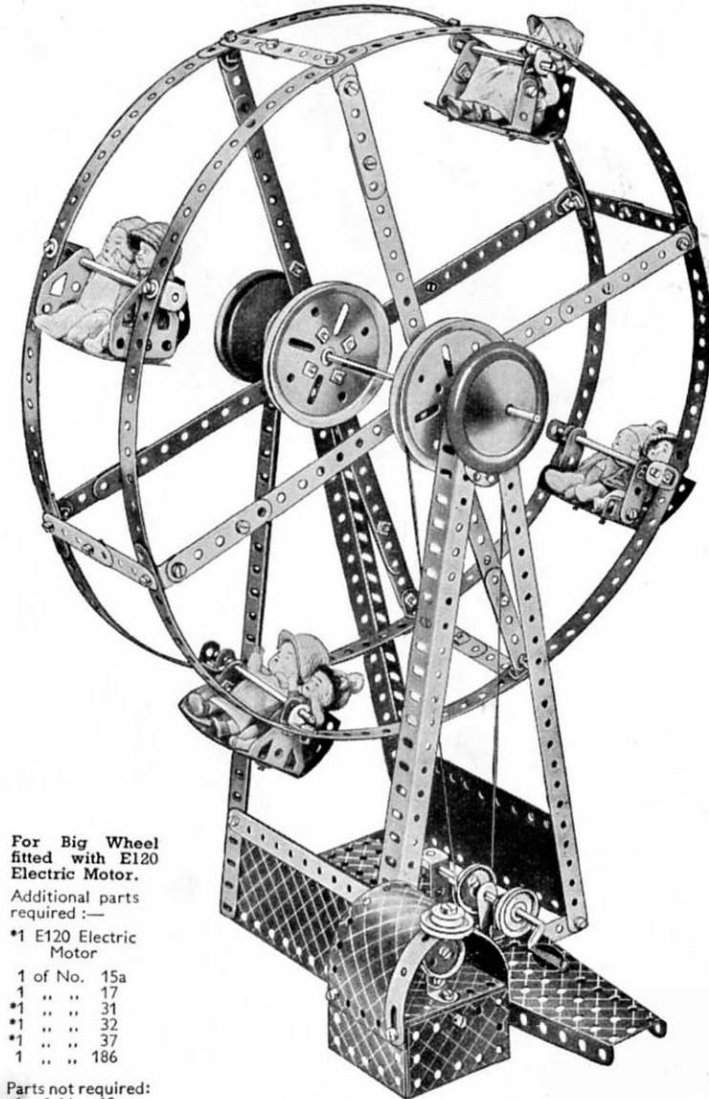


Fig. 5.22a Sectional view showing Motor fitted

## 5.22 BIG WHEEL



For Big Wheel fitted with E120 Electric Motor.

Additional parts required :-

\*1 E120 Electric Motor

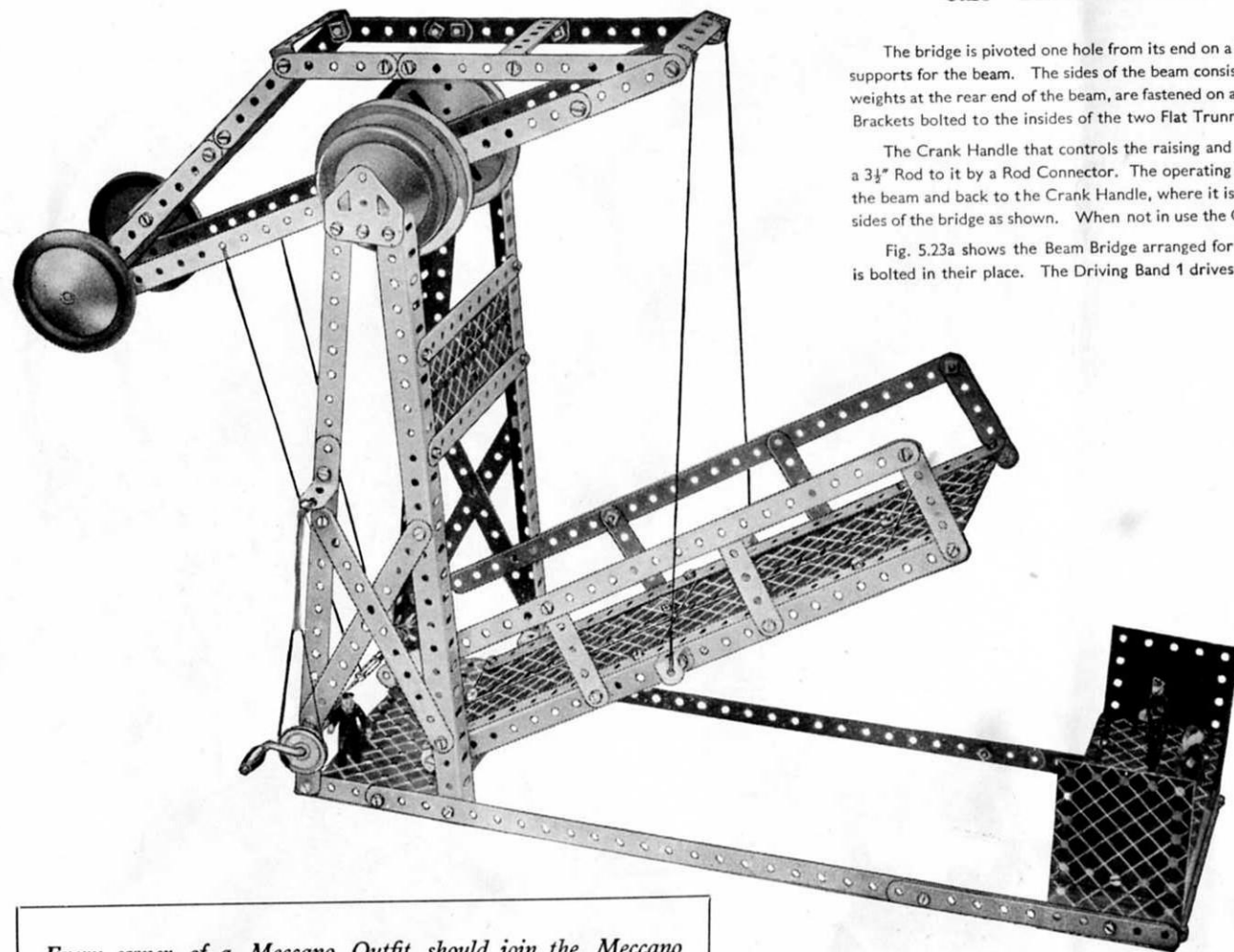
1 of No. 15a
1 " " 17
*1 " " 31
*1 " " 32
*1 " " 37
1 " " 186

Parts not required:  
1 of No. 19g

\*Not included in Outfit.

This Model can be built with MECCANO No. 5 Outfit (or No. 4 and No. 4a Outfits)

### 5.23 BEAM BRIDGE



The bridge is pivoted one hole from its end on a 5" Rod, which is supported in two Reversed Angle Brackets bolted to two of the 12 1/2" Angle Girders forming the supports for the beam. The sides of the beam consist of compound strips, and they are joined by 2 1/2" x 1/2" Double Angle Strips. The Road Wheels, which act as counterweights at the rear end of the beam, are fastened on a 4" Rod. The beam is pivoted 1" out of centre to the front on a 5" Rod, which is supported in two Reversed Angle Brackets bolted to the insides of the two Flat Trunnions at the tops of the towers.

The Crank Handle that controls the raising and lowering of the bridge is journalled near the lower ends of the rear beam supports, and is lengthened by joining a 3 1/2" Rod to it by a Rod Connector. The operating Cord is fastened to the Crank Handle by a Spring Clip, wound around its shaft several times and then taken through the beam and back to the Crank Handle, where it is again tied. Cords attached to the front end of the beam are tied to Double Brackets fastened halfway along the sides of the bridge as shown. When not in use the Crank Handle is kept stationary by a Cord band brake tensioned by a Driving Band.

Fig. 5.23a shows the Beam Bridge arranged for operation by an E20b Electric Motor. The two 5 1/2" Strips bracing the beam supports are removed, and the Motor is bolted in their place. The Driving Band 1 drives the 1" Pulley direct from the Rod carrying the 1/2" Pinion.

Every owner of a Meccano Outfit should join the Meccano Guild. This is a world-wide guild for boys, started at the request of boys and as far as possible conducted by boys. Write for full particulars and an application form to the Meccano Guild Secretary, Binns Road, Liverpool, 13.

Parts required			
10 of No.	1	4 of No.	187
13 " "	2	2 " "	188
2 " "	3	2 " "	189
10 " "	5	4 " "	190
4 " "	8	2 " "	191
5 " "	10	4 " "	192
2 " "	11	1 " "	213
8 " "	12	<b>For Beam Bridge fitted with E20b Electric Motor.</b>	
1 " "	12a		
2 " "	15	<b>Additional parts required :-</b>	
1 " "	15b		
1 " "	16	<b>*1 E20b Electric Motor</b>	
2 " "	19b		
1 " "	19g	<b>*1 of No. 15</b>	
1 " "	22		
4 " "	35	<b>*1 " " 22</b>	
82 " "	37		
1 " "	40	<b>*1 " " 23a</b>	
7 " "	48a		
1 " "	52	<b>*1 " " 32</b>	
4 " "	125		
2 " "	126a	<b>2 " " 37</b>	
1 " "	186a		
		<b>2 " " 126</b>	
		<b>1 " " 186</b>	
		<b>Parts not required :-</b>	
		<b>2 of No. 2</b>	
		<b>1 " " 19g</b>	
		<b>1 " " 186a</b>	
		<b>1 " " 213</b>	
		<b>*Not included in Outfit.</b>	

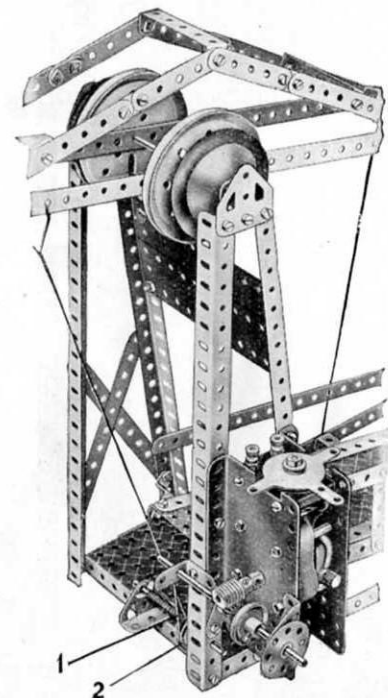


Fig. 5.23a Sectional view showing Motor fitted.

## 5.24 PITHEAD GEAR

The rear side of the engine house consists of a Flanged Sector Plate and a  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flanged Plate, which are bolted to an Angle Girder that forms part of the base of the model.

The  $2\frac{1}{2}"$  Cylinder lock-nutted to the  $5\frac{1}{2}" \times 2\frac{1}{2}"$  Flanged Plate, is fitted at each end with  $1\frac{1}{2}"$  Discs by passing a 3" Screwed Rod through holes in their circumferences and screwing Nuts on each end of it. The piston is a  $4\frac{1}{2}"$  Rod fitted with a Rod and Strip Connector, and is retained in position by a Cord Anchoring Spring on a Threaded Pin fastened to a Bush Wheel. A 5" Rod is journaled in the holes of the two  $2\frac{1}{2}"$  Strips at the head of the shaft, and it carries at its centre a 1" fast Pulley. On each side of the Pulley are a 3" Pulley and a Road Wheel.

A 4" Rod is held in place in the holes of the  $5\frac{1}{2}"$  Strips by Spring Clips, and directly below this Rod, at the bottom of the shaft, is a  $3\frac{1}{2}"$  Rod, which is supported in the holes of two Reversed Angle Brackets. This Rod carries a  $\frac{1}{2}"$  loose Pulley between two Spring Clips. The arrangement of the Cord forming the guides for the cage can be seen in the illustration. A length of Cord is tied through one of the holes in the 1" loose Pulley at the top of the cage, and is passed over the 1" fast Pulley between the two 3" Pulleys at the top of the shaft. It is then wound six times around the 5" Rod in the engine house, and then led around the  $\frac{1}{2}"$  loose Pulley. Finally the Cord is tied to another hole in the 1" loose Pulley.

Fig. 5.24a shows the Pithead Gear adapted for Clockwork Motor drive. The Motor is bolted to the Angle Girder at the base, and the drive is taken from the 1" Pulley fastened on the Motor shaft to a 1" Pulley on the 5" Rod carrying the Bush Wheel.

Parts Required				
10 of No. 1	2 of No. 12a	5 of No. 22	1 of No. 48	2 of No. 125
14 " " 2	4 " " 12c	1 " " 22a	7 " " 48a	1 " " 126
2 " " 3	2 " " 15	1 " " 23	1 " " 51	1 " " 126a
11 " " 5	1 " " 15a	1 " " 24	1 " " 52	2 " " 155a
1 " " 6a	1 " " 15b	9 " " 35	1 " " 54a	1 " " 176
4 " " 8	1 " " 16	85 " " 37	1 " " 80c	1 " " 186
2 " " 10	1 " " 17	4 " " 37a	1 " " 111a	3 " " 187
2 " " 11	2 " " 19b	10 " " 38	3 " " 111c	3 " " 188
5 " " 12	1 " " 19g	1 " " 40	1 " " 115	4 " " 189
				4 " " 190
				1 " " 191
				4 " " 192
				1 " " 198
				1 " " 199
				1 " " 212
				1 " " 216
				2 " " 217a

For model Pit-head Gear fitted with No. 1a or No. 2 Clockwork Motor.

Additional Parts required :-

\*1 No. 1a or No. 2 Clockwork Motor

Parts not required  
2 of No. 155a

\*Not included in Outfit.

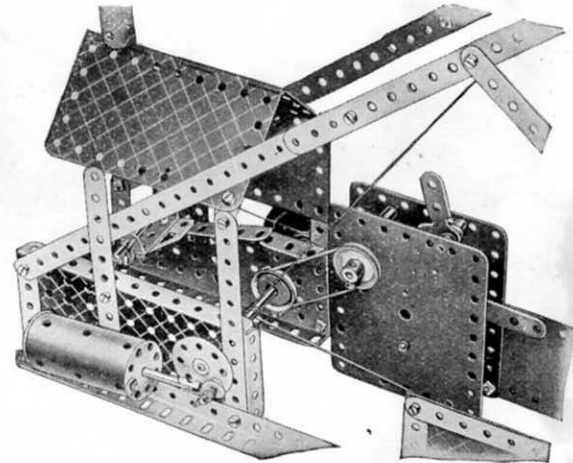
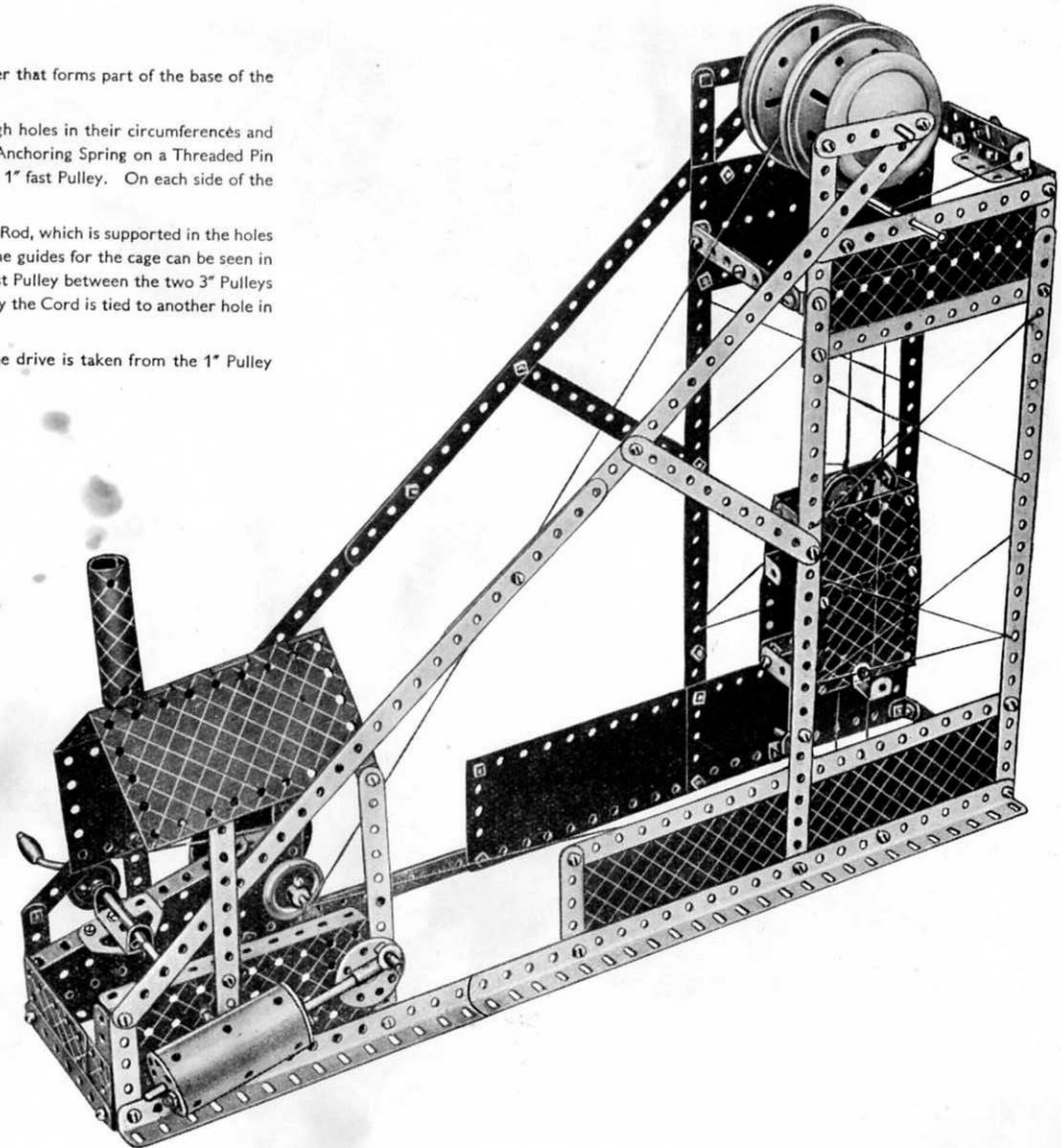
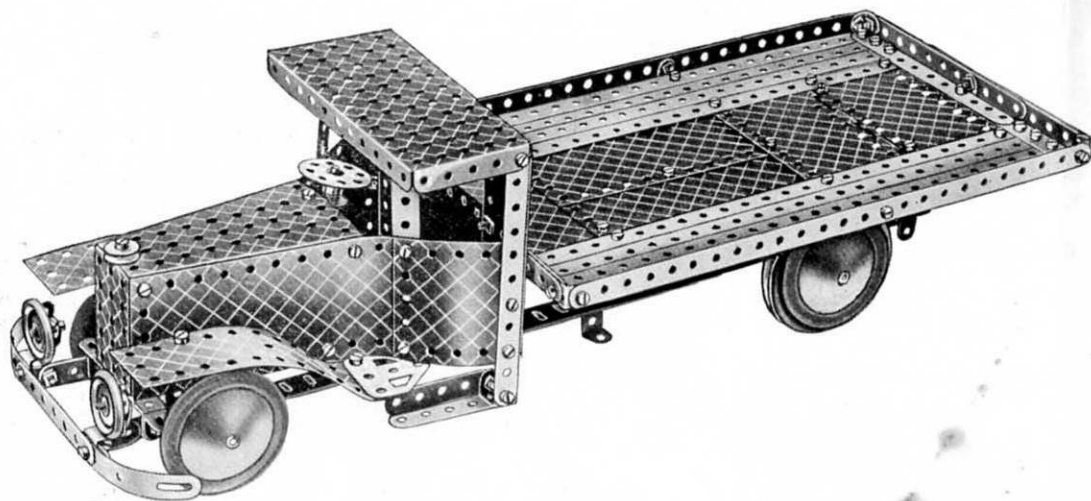


Fig. 5.24a Sectional view showing Motor fitted



This Model can be built with MECCANO No. 5 Outfit (or No. 4 and No. 4a Outfits)



#### Parts required

10 of No. 1	12 of No. 11	1 of No. 17	6 of No. 37a	6 of No. 111c	2 of No. 189
12 " " 2	8 " " 12	2 " " 19b	12 " " 38	2 " " 125	2 " " 191
1 " " 3	2 " " 12a	2 " " 22	8 " " 48a	2 " " 126	4 " " 192
9 " " 5	1 " " 12c	1 " " 23	1 " " 51	2 " " 126a	1 " " 198
2 " " 6a	1 " " 15	1 " " 24	1 " " 52	2 " " 155a	2 " " 200
4 " " 8	1 " " 15b	4 " " 35	2 " " 54a	4 " " 187	1 " " 213
2 " " 10	1 " " 16	85 " " 37	2 " " 111a	3 " " 188	2 " " 215

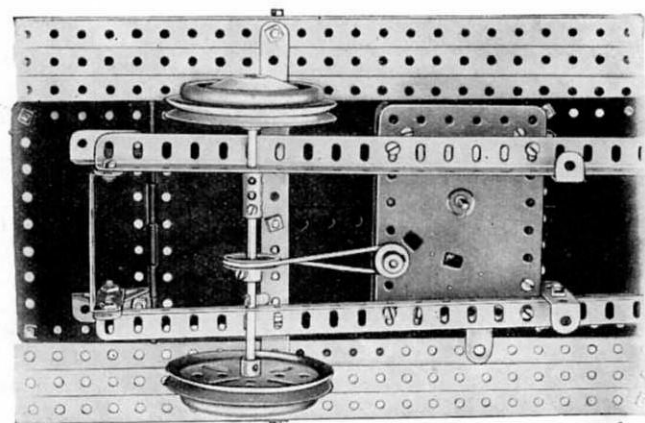


Fig. 5.25b. Sectional view showing Motor fitted.

#### For Motor Lorry fitted with No. 1 Clockwork Motor

Additional Parts required:—

- \* 1 No. 1 Clockwork Motor
- 1 of No. 22
- \* 1 " " 23a
- \* 4 " " 37
- \* 1 " " 63
- 1 " " 186a

Parts not required  
1 of No. 213

\*Not included in Outfit.

## 5.25 MOTOR LORRY

The chassis of the lorry consists of two side members each built up from two  $12\frac{1}{2}$ " Angle Girders overlapped 14 holes, and joined at each end by  $2\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double Angle Strips. The front Road Wheels are mounted on a 5" Rod passed through the side members of the chassis, and the back Road Wheels are secured on a compound rod consisting of a  $3\frac{1}{2}$ " and a  $1\frac{1}{2}$ " Rod joined by a Rod Connector and journalled in a similar manner.

Flanged Sector Plates form the top and base for the bonnet and radiator. The narrow end of the bonnet is bolted to the centre hole of the  $2\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double Angle Strip joining the forward ends of the chassis, and the wider end is attached to the centre of a  $5\frac{1}{2}$ " Strip bolted across the chassis. The sides of the bonnet are  $5\frac{1}{2}$ "  $\times$   $2\frac{1}{2}$ " Flexible Plates, and are bolted to the flanges of the Flanged Sector Plates. The radiator is a  $2\frac{1}{2}$ "  $\times$   $1\frac{1}{2}$ " Flanged Plate, which is fastened by its flanges to the forward ends of the two Flanged Sector Plates. The radiator cap is represented by a  $\frac{1}{2}$ " Loose Pulley. The bumper consists of a  $3\frac{1}{2}$ " Strip, to the ends of which are bolted 3" Formed Slotted Strips, and it is fastened to the front end of the chassis by  $1"$   $\times$   $1"$  Angle Brackets and  $1\frac{1}{2}$ " Strips.

The platform of the lorry is secured to the chassis at the front by  $2\frac{1}{2}$ "  $\times$   $\frac{1}{2}$ " Double Angle Strips and at the rear by Trunnions and  $2\frac{1}{2}$ " Strips.

Fig. 5.25b shows the Motor Lorry fitted with a No. 1 Clockwork Motor. The Motor is held to the chassis by four Bolts, and a  $\frac{1}{2}$ " fast Pulley is fastened to the Motor shaft as shown. The drive is transmitted by a Driving Band to a  $1"$  Pulley on the rear axle.

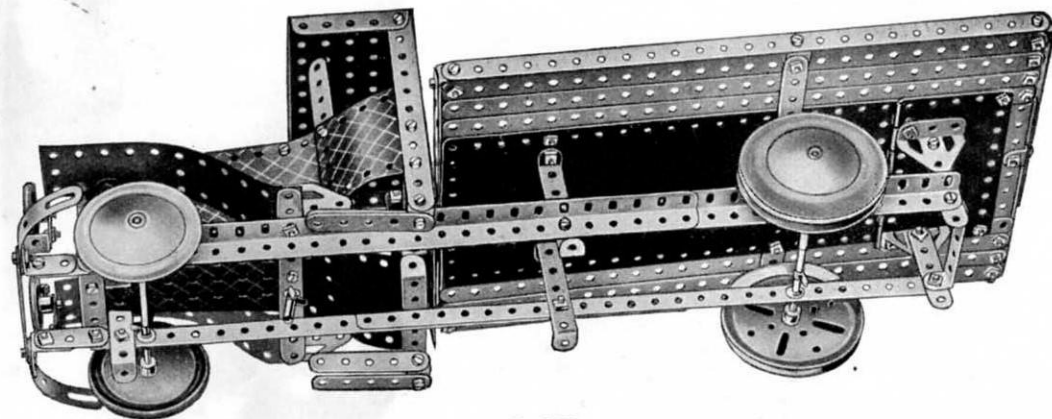
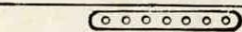


Fig. 5.25a

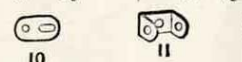
## MECCANO PARTS



Perforated Strips			
No.		No.	
1.	12 $\frac{1}{2}$ "	3.	3 $\frac{1}{2}$ "
1a.	9 $\frac{1}{2}$ "	4.	3"
1b.	7 $\frac{1}{2}$ "	5.	2 $\frac{1}{2}$ "
2.	5 $\frac{1}{2}$ "	6.	2"
2a.	4 $\frac{1}{2}$ "	6a.	1 $\frac{1}{2}$ "



Angle		Girders	
7.	24 $\frac{1}{2}$ "	9a.	4 $\frac{1}{2}$ "
7a.	18 $\frac{1}{2}$ "	9b.	3 $\frac{1}{2}$ "
8.	12 $\frac{1}{2}$ "	9c.	3"
8a.	9 $\frac{1}{2}$ "	9d.	2 $\frac{1}{2}$ "
8b.	7 $\frac{1}{2}$ "	9e.	2"
9.	5 $\frac{1}{2}$ "	9f.	1 $\frac{1}{2}$ "



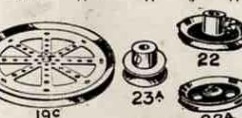
10.	Flat Brackets	
11.	Double Brackets	
12.	Angle Brackets,	$\frac{1}{2}'' \times \frac{1}{2}''$
12a.	..	$1'' \times 1''$
12b.	..	$1'' \times \frac{1}{2}''$
12c.	Obtuse Angle Brackets,	

Axle Rods			
13.	11 $\frac{1}{2}$ "	16	3 $\frac{1}{2}$ "
13a.	8 $\frac{1}{2}$ "	16a.	2 $\frac{1}{2}$ "
14.	6 $\frac{1}{2}$ "	16b.	3"
15.	5 $\frac{1}{2}$ "	17.	2"
15a.	4 $\frac{1}{2}$ "	17a.	1 $\frac{1}{2}$ "
15b.	4"	17b.	1"

19g.	Crank Handles, 3 $\frac{1}{2}$ " with	19h.	" "
19h.	" "	19i.	" "
19s.	" "	19t.	" "



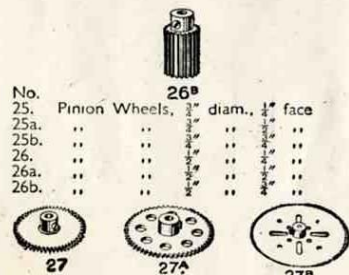
		19A
19a.	Wheels, 3" diam., with	
20.	Flanged Wheels, 1 <sup>1</sup> / <sub>2</sub> " dia	
20b.	" "	



Pulley Wheels	
19b.	3" diam. with centre boss
19c.	6" " " "
20a.	2" " " "
21.	1 $\frac{1}{2}$ " " " "
22.	1" " " "
23a.	1" " " "
22a.	1" " without " "
23.	1" " " "



24.	Bush Wheels
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Gear Wheels	
27a.	50 teeth, to gear with $\frac{1}{2}$ " pinion
27b.	57 " " " $\frac{3}{4}$ " " (3 $\frac{1}{2}$ " diam.)
27c.	133 " " " 2" " (2 $\frac{1}{2}$ " diam.)



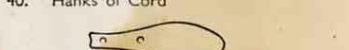
30.	Bevel Gears, 1 $\frac{1}{2}$ " diam., 26 teeth	30	
30a.	" " 1 $\frac{1}{2}$ " diam., 16 "		
30c.	" " 1 $\frac{1}{2}$ " diam., 48 "		Can only be used together



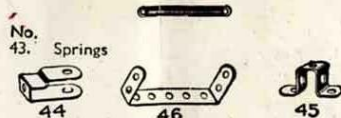
31.	Gear Wheels, 1 $\frac{1}{2}$ " diam., 38 teeth	
32.	Worms	
		
	34 <sup>a</sup>	
34.	Spanners	
34b.	Box Spanners	



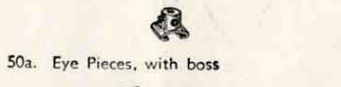
36a.	..	Extra Long	
36b.	..	Special	
37.	Nuts and Bolts, $\frac{3}{8}$ "	...	box of 12
37a.	Nuts ...	...	box of 50
37b.	Bolts, $\frac{1}{2}$ "	...	box of 50
37f.	Nuts and Bolts, $\frac{7}{8}$ "	...	box of 50
37g.	..	$\frac{3}{4}$ "	box of 50
37h.	..	$\frac{1}{2}$ "	box of 144
3d.	Washers ...	...	pkt. of 20
38s.	..	...	box of 60
40.	Hooks of Cord.		



41.	Propeller Blades
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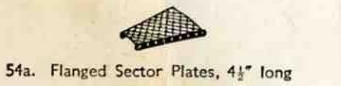
44.	Cranked	Bent	Strips	
45.	Double			
46.	Double	Angle	Strips.	2 1/2" x 1"
47.	"	"	"	2 1/2" x 1"
47a.	"	"	"	3" x 1"
48.	"	"	"	1" x 1"
48a.	"	"	"	2" x 1"
48b.	"	"	"	3" x 1"
48c.	"	"	"	4" x 1"
48d.	"	"	"	5" x 1"



52

53

51. Flanged Plates,  $2\frac{1}{2}'' \times 1\frac{1}{2}''$   
 52. " " "  $5\frac{1}{2}'' \times 2\frac{1}{2}''$   
 52a. Flat Plates,  $5\frac{1}{2}'' \times 3\frac{1}{2}''$   
 53. Flanged Plates,  $3\frac{1}{2}'' \times 2\frac{1}{2}''$   
 53a. Flat Plates,  $4\frac{1}{2}'' \times 2\frac{1}{2}''$



55. Perforated Strips, slotted,  $5\frac{1}{2}$ " long

55a. "

