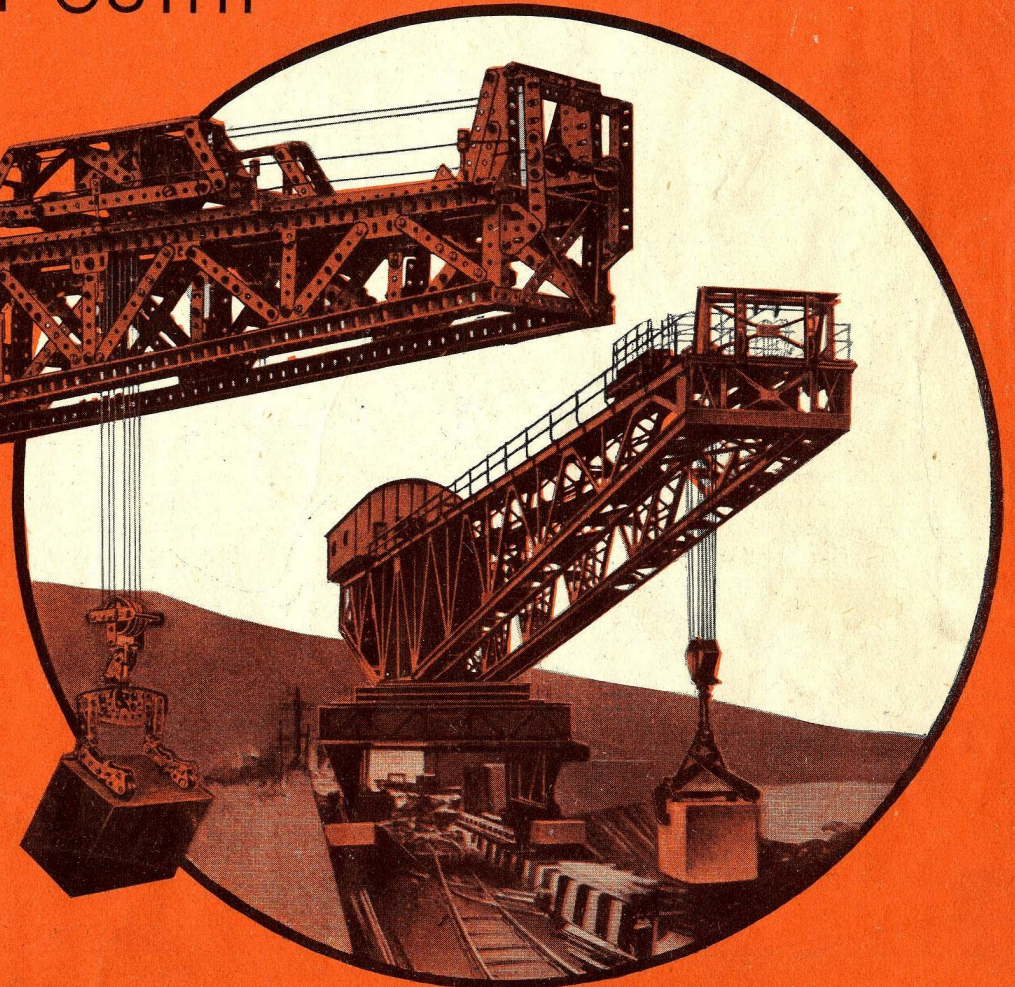
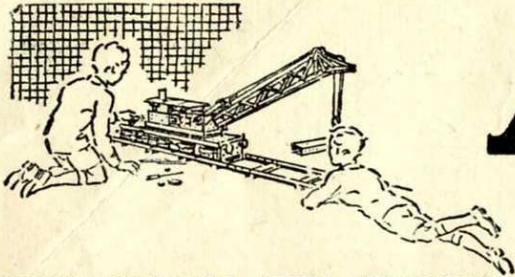


MECCANO

INSTRUCTIONS FOR
No. 5a ACCESSORY OUTFIT

No.
41.5a





MODEL-BUILDING WITH MECCANO

IMPORTANT

Wartime conditions and restrictions have made necessary certain alterations in the introductory page of this Manual. The most important are the following:—

The Meccano Lighting Set has been withdrawn, but the models shown with lighting arrangements can readily be built with only slight changes.

The Aeroplane and Motor Car Constructor Outfits also are withdrawn, and the miniature pilots and drivers shown in certain models are no longer available.

The Meccano Plates (Flanged, Flat, Curved, etc.) are shown in the Manuals with diagonal lines. On the new Meccano Plates these lines are omitted.

The only Meccano Motor at present available is the "MAGIC" Clockwork Motor. It is not included in Outfits.

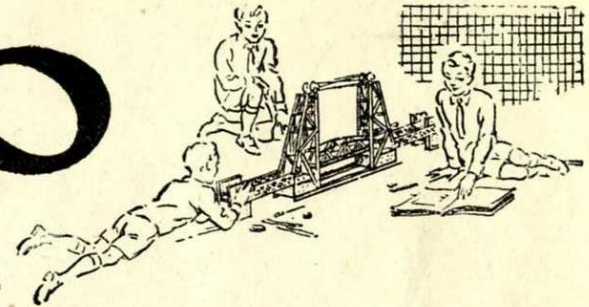
MECCANO LIMITED

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.

MECCANO

Real Engineering in Miniature



Meccano—Cranes, Clocks, Motor Cars, interests boys. A screwdriver and a necessary.

Instruction the fun is not over, but is as. First of all, re-build some of the try building models entirely of your and the inventor.

No. 10. Each Outfit from No. 1 up-cessory Outfit. Thus, Meccano No. 1 essage Outfit. No. 2a Outfit would which Outfit you commence, you can

nger Outfits contain a greater quantity

reased by the inclusion of the figures, and drivers from the Aeroplane and ailway Series; Meccano sacks, cable A Clockwork Motor is included in D only.

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

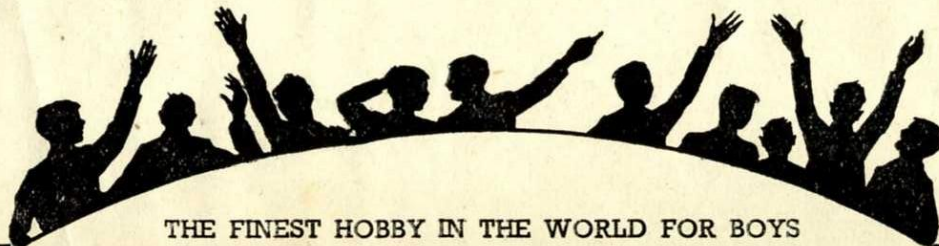
Every owner of a Meccano Outfit should join the Meccano Guild. This is a world-wide organisation, started at the request of Meccano boys. Its primary object is to bring boys together and to make them feel that they are all members of a great brotherhood, each trying to help others to get the very best 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.

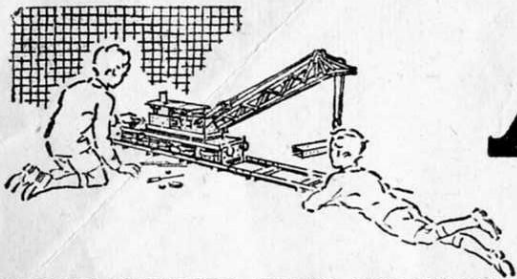
Recruiting Medallions are awarded to members who are successful in securing recruits for the Guild, and good work on behalf of Meccano clubs, or of the Guild generally, is recognised by the presentation of special Merit Medallions. Full particulars of both these awards will be sent post free on request.

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.

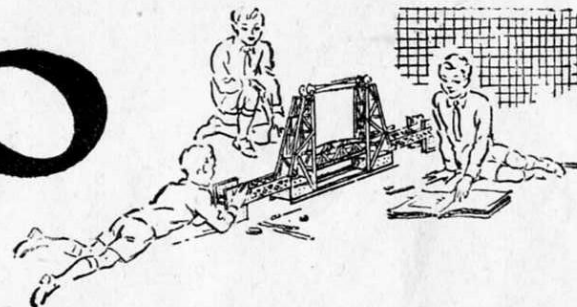


THE FINEST HOBBY IN THE WORLD FOR BOYS



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

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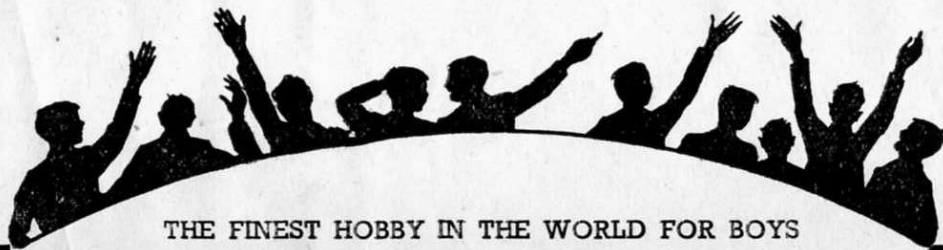
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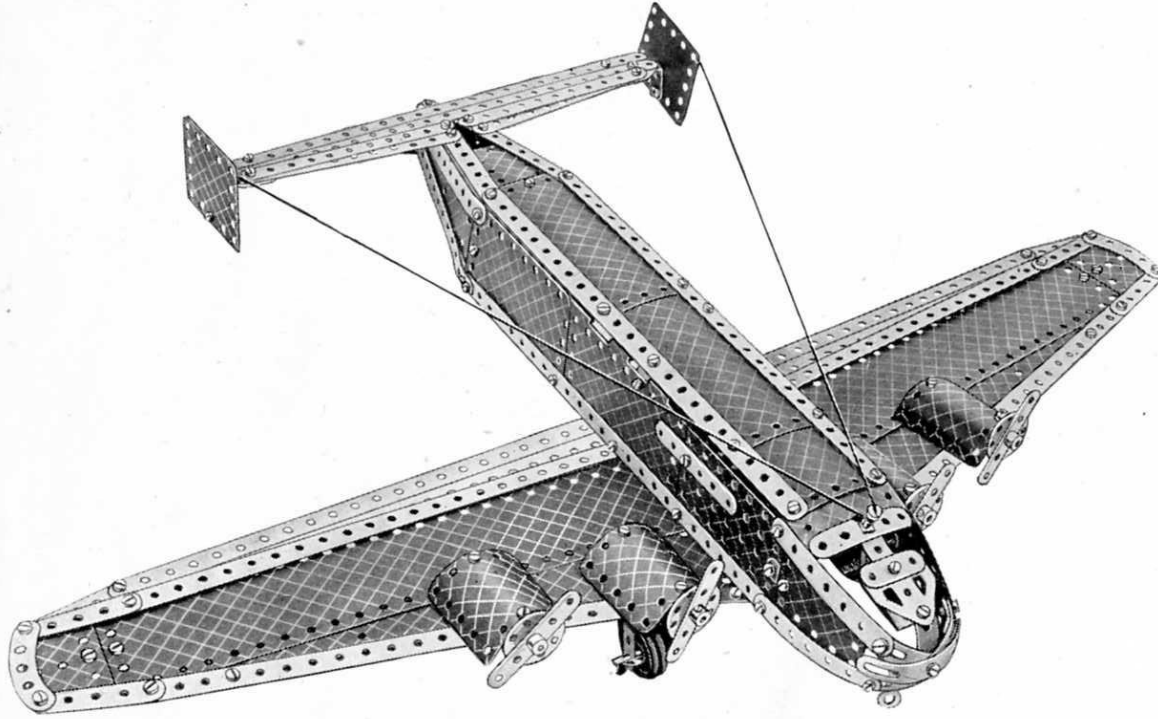
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THE FINEST HOBBY IN THE WORLD FOR BOYS

6.1 FOUR-ENGINE MONOPLANE



The sides of the fuselage are constructed on two 12 1/2" Angle Girders 1, and as they are identical their construction can be followed from the illustration above. The fuselage top is connected to the sides by Obtuse Angle Brackets, the tail of the fuselage is tapered to a point with 5 1/2" Strips and 5 1/2" x 1 1/2" Flexible Plates, the upper Strips being joined by two Angle Brackets. Two 3 1/2" Strips and a 2 1/2" x 1 1/2" Flexible Plate form each side of the forward part of the fuselage and the nose is made up of four Formed Slotted Strips bolted together through their centre holes.

Three 12 1/2" Strips form the trailing edge of each wing, and the leading edge also is a 12 1/2" Strip. These are lengthened with 2 1/2" Strips and are connected by a 2 1/2" Curved Strip at the tip, the framework so formed being filled in with a 12 1/2" Strip Plate, a 5 1/2" x 2 1/2" and a 5 1/2" x 1 1/2" Flexible Plate. A Semi-Circular Plate completes the tip.

The engine nacelles are 1 1/8" radius Curved Plates and 2 1/2" x 2 1/2" Flexible Plates, which are connected to the wings by Reversed Angle Brackets. A 1 1/4" Disc is attached to the front of each nacelle by an Angle Bracket. The shanks of the 3/8" Bolts 2 form propeller shafts on which the propellers, 2 1/2" Strips, are retained by Collars.

U-Section Curved Plates bolted underneath the wings form supports for 2 1/2" Curved Strips, which provide bearings for the landing wheel axles. The axles are 1 1/2" Rods, and each carries two 1" Pulleys.

A direction-finding aerial is represented by Rod and Strip Connector 3 mounted on a Threaded Pin.

Parts required

12 of No. 1	3 of No. 18a	2 of No. 90	4 of No. 189
10 " " 2	4 " " 22	4 " " 90a	5 " " 190
4 " " 3	1 " " 23	1 " " 111	2 " " 191
2 " " 4	7 " " 35	2 " " 111a	4 " " 192
11 " " 5	108 " " 37a	6 " " 111c	2 " " 197
2 " " 6a	99 " " 37b	1 " " 115	1 " " 198
2 " " 8	3 " " 38	4 " " 125	2 " " 199
6 " " 10	1 " " 40	3 " " 126a	2 " " 200
6 " " 12	2 " " 48a	1 " " 147b	1 " " 212
2 " " 12a	2 " " 53	4 " " 155a	2 " " 214
6 " " 12c	4 " " 59	4 " " 188	4 " " 215

4 of No. 217a

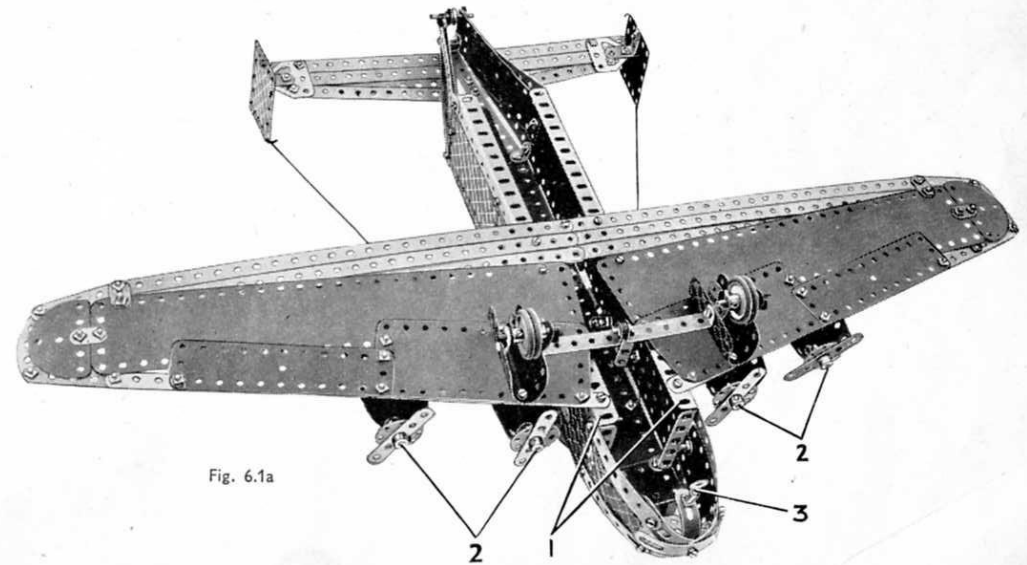
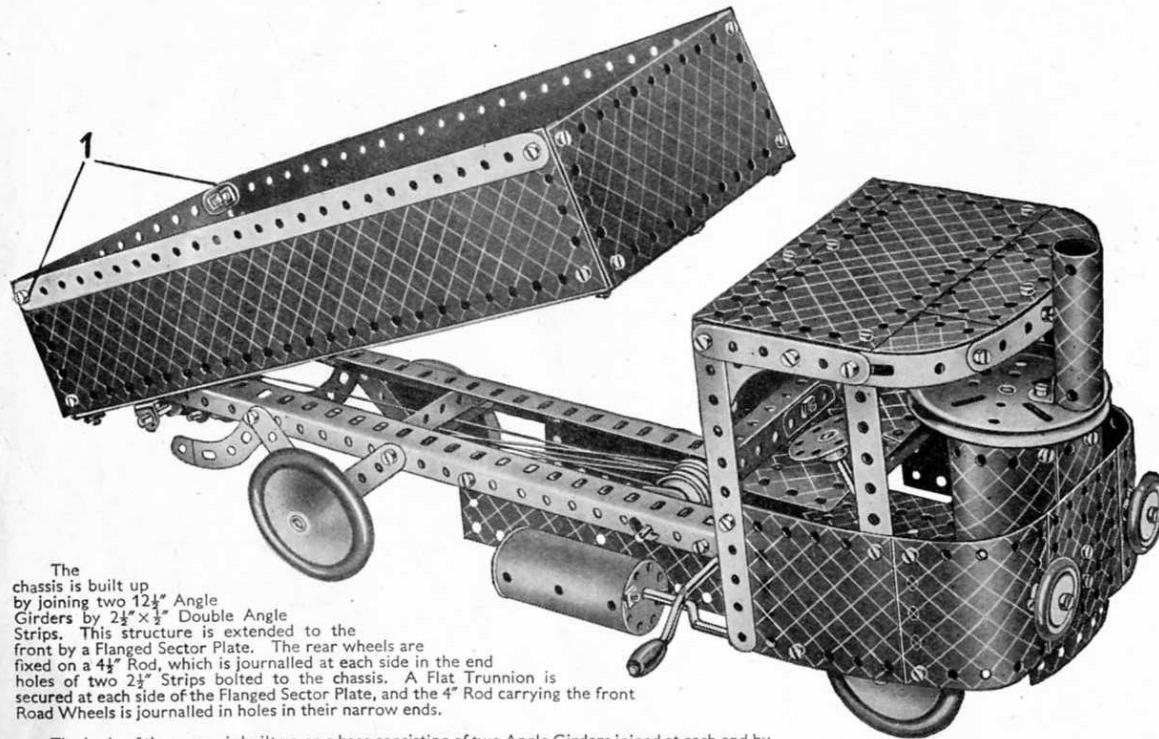


Fig. 6.1a



The chassis is built up by joining two $12\frac{1}{2}$ " Angle Girders by $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips. This structure is extended to the front by a Flanged Sector Plate. The rear wheels are fixed on a $4\frac{1}{2}$ " Rod, which is journalled at each side in the end holes of two $2\frac{1}{2}$ " Strips bolted to the chassis. A Flat Trunnion is secured at each side of the Flanged Sector Plate, and the $4\frac{1}{2}$ " Rod carrying the front Road Wheels is journalled in holes in their narrow ends.

The body of the wagon is built up on a base consisting of two Angle Girders joined at each end by a $5\frac{1}{2}$ " Strip. The bottom is filled in with $12\frac{1}{2}$ " Strips bolted between the two $5\frac{1}{2}$ " Strips. Two $12\frac{1}{2}$ " Strip Plates 1 bolted to the Angle Girders form the sides, and a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate is secured by four Angle Brackets to the front end. The $\frac{3}{4}$ " Bolts 1, which hold two Angle Brackets supporting the rear $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate, are lock-nutted, and the end of the body is free to swing open when the body is tipped.

The body of the wagon is pivoted on a $5\frac{1}{2}$ " Rod, which passes through holes in the Angle Girders forming the chassis and through two Double Brackets bolted beneath the body.

The tipping mechanism is shown in Fig. 6.2a. A $3\frac{1}{2}$ " Rod is passed through the Angle Girders forming the sides of the chassis, and it carries between the Angle Girders a Flat Bracket, a $1\frac{1}{2}$ " fast Pulley, a $1\frac{1}{2}$ " loose Pulley and a $\frac{1}{2}$ " loose Pulley, all of which are held on the Rod by Spring Clips.

The Pulleys at the rear end of the body are carried on a $2\frac{1}{2}$ " Rod passed through holes in $1\frac{1}{2}$ " \times $1\frac{1}{2}$ " Angle Brackets. The $2\frac{1}{2}$ " Rod carries a Collar, a $1\frac{1}{2}$ " fast Pulley, a $1\frac{1}{2}$ " loose Pulley and a $\frac{1}{2}$ " fast Pulley.

The Cord is tied to a Cord Anchoring Spring on the Crank Handle. It is then taken over the Rods and Pulleys in the following order:—Over the front Rod, rear Rod, $\frac{1}{2}$ " loose Pulley (front), $1\frac{1}{2}$ " fast Pulley (rear), $1\frac{1}{2}$ " loose Pulley (front), $1\frac{1}{2}$ " fast Pulley (rear), $1\frac{1}{2}$ " fast Pulley (front), $\frac{1}{2}$ " fast Pulley (rear). Finally it is tied to the Flat Bracket on the front Rod.

Several of the Flexible Plates have been removed from the model in Fig. 6.2b to show the construction of the cab. The back consists of a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, which is bolted to the chassis by one of its flanges, and is extended upwards by a flat plate 2 obtained by removing the centre pin from a Hinged Flat Plate. The front of the cab is formed by a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate attached to the Flanged Sector Plate by an Angle Bracket, and each side consists of a $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate and a $2\frac{1}{2}$ " \times $2\frac{1}{2}$ "

6.2 TIPPING STEAM WAGON

Parts required

11 of No. 1	2 of No. 15b	99 of No. 37	2 of No. 111a	2 of No. 191
10 " " 2	2 " " 16	10 " " 37a	4 " " 111c	3 " " 192
1 " " 3	1 " " 17	7 " " 38	1 " " 125	2 " " 197
2 " " 4	1 " " 19b	1 " " 40	1 " " 126	1 " " 198
8 " " 5	1 " " 19g	3 " " 48a	2 " " 126a	2 " " 199
4 " " 8	1 " " 19h	2 " " 48b	2 " " 155a	2 " " 200
1 " " 10	5 " " 22	1 " " 52	1 " " 176	2 " " 214
3 " " 11	2 " " 22a	1 " " 53	1 " " 186	2 " " 215
13 " " 12	1 " " 23	1 " " 54a	4 " " 187	1 " " 216
2 " " 12a	1 " " 23a	2 " " 59	4 " " 188	2 " " 217a
1 " " 15	1 " " 24	2 " " 80c	3 " " 189	2 " " 217b
1 " " 15a	14 " " 35	4 " " 90a	3 " " 190	

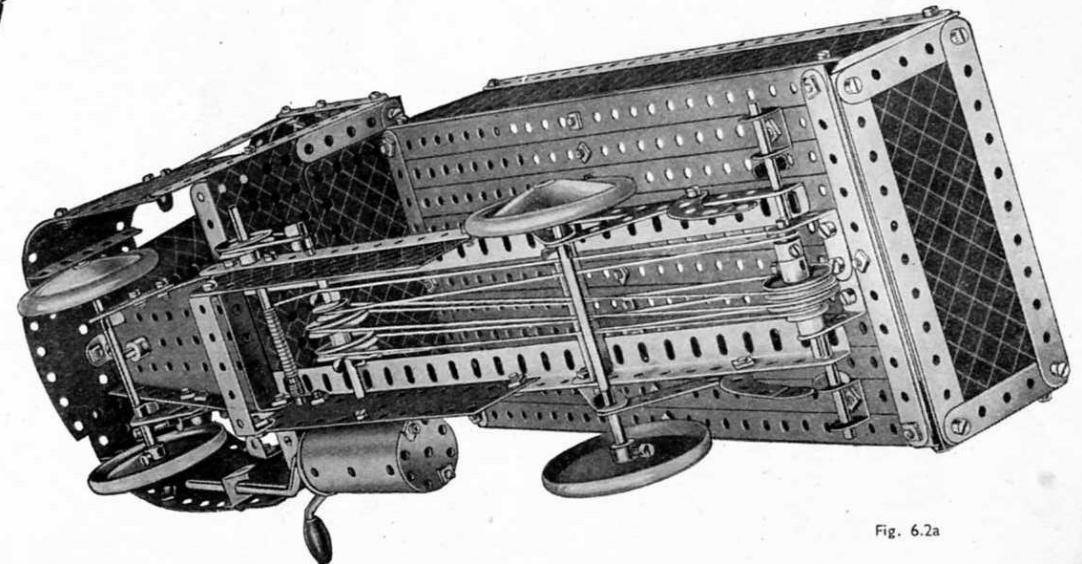


Fig. 6.2a

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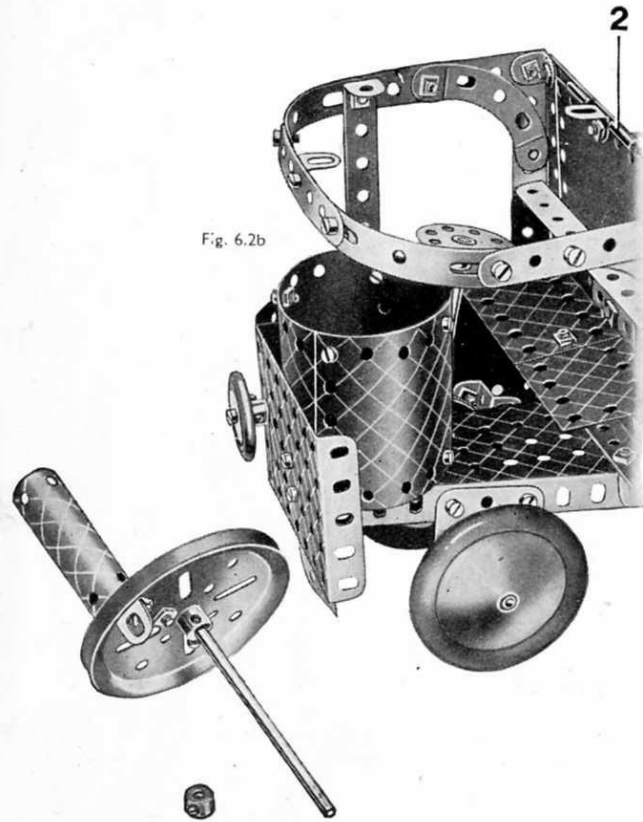


Fig. 6.2b

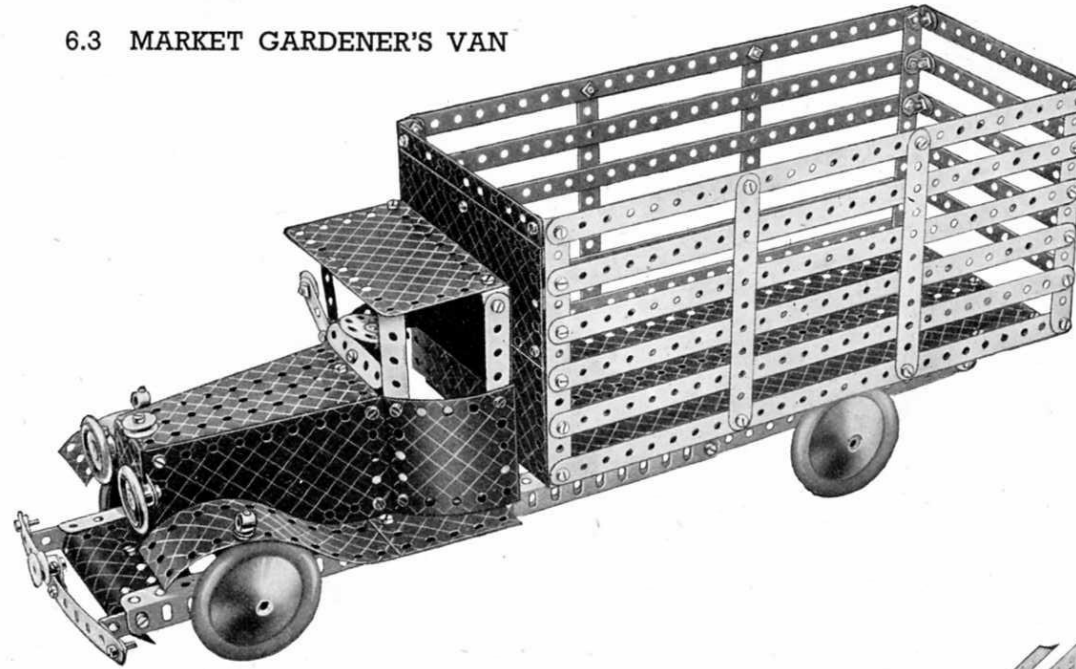
(Continued from previous page)

Flexible Plate, overlapped three holes and bolted together. The sides are secured at the forward end to the $3\frac{1}{2} \times 2\frac{1}{2}$ Flanged Plate, and at the rear to the shorter flanges of the $5\frac{1}{2} \times 2\frac{1}{2}$ Flanged Plate. The seat is represented by two $2\frac{1}{2} \times 1\frac{1}{2}$ Flexible Plates attached to the $5\frac{1}{2} \times 2\frac{1}{2}$ Flanged Plate by a Trunnion.

The steering wheel is formed by a Bush Wheel locked on the end of a 4" Rod, which passes through a Double Bracket and is fastened in position by two Spring Clips. The Double Bracket is bolted to one of the flanges of the Flanged Sector Plate.

The Boiler is constructed from two U-Section Curved Plates and two $1\frac{1}{8}$ " radius Curved Plates, and is bolted to the $3\frac{1}{2} \times 2\frac{1}{2}$ Flanged Plate at the front of the cab. The top of the cab consists of a $5\frac{1}{2} \times 1\frac{1}{2}$ Flexible Plate and a $5\frac{1}{2} \times 2\frac{1}{2}$ Flexible Plate, bolted together overlapping two holes, and then secured to the flat plate 2 by an Angle Bracket. The two Flexible Plates are extended to the front by a $2\frac{1}{2} \times 1\frac{1}{2}$ Flexible Plate and two Semi-Circular Plates.

6.3 MARKET GARDENER'S VAN



Parts required

12 of No. 1	9 of No. 38
14 " " 2	1 " " 51
2 " " 3	1 " " 52
2 " " 4	2 " " 54a
6 " " 5	2 " " 59
2 " " 5a	6 " " 111c
4 " " 8	2 " " 125
2 " " 10	2 " " 126
2 " " 11	2 " " 126a
16 " " 12	2 " " 155a
2 " " 12a	4 " " 187
6 " " 17c	2 " " 188
2 " " 15	3 " " 189
2 " " 15b	2 " " 191
2 " " 22	1 " " 192
1 " " 23	2 " " 197
1 " " 23a	1 " " 198
1 " " 24	1 " " 199
7 " " 35	2 " " 200
105 " " 37	1 " " 217b
1 " " 37a	

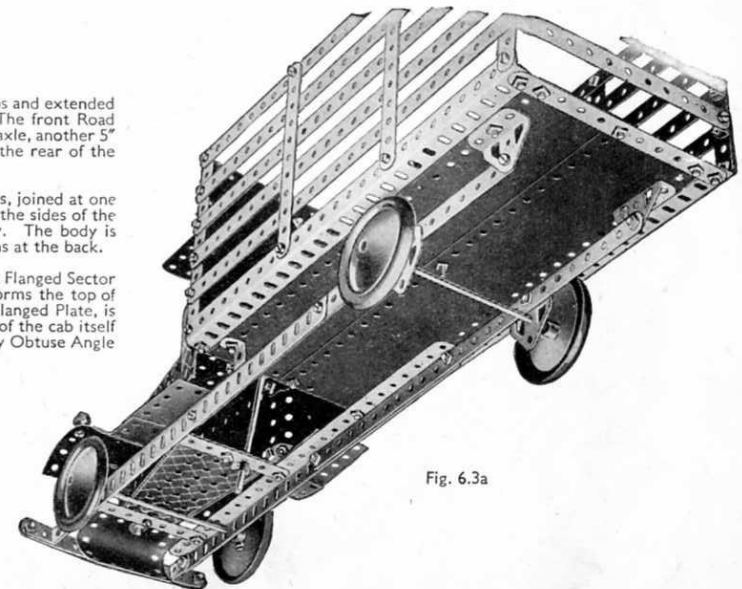
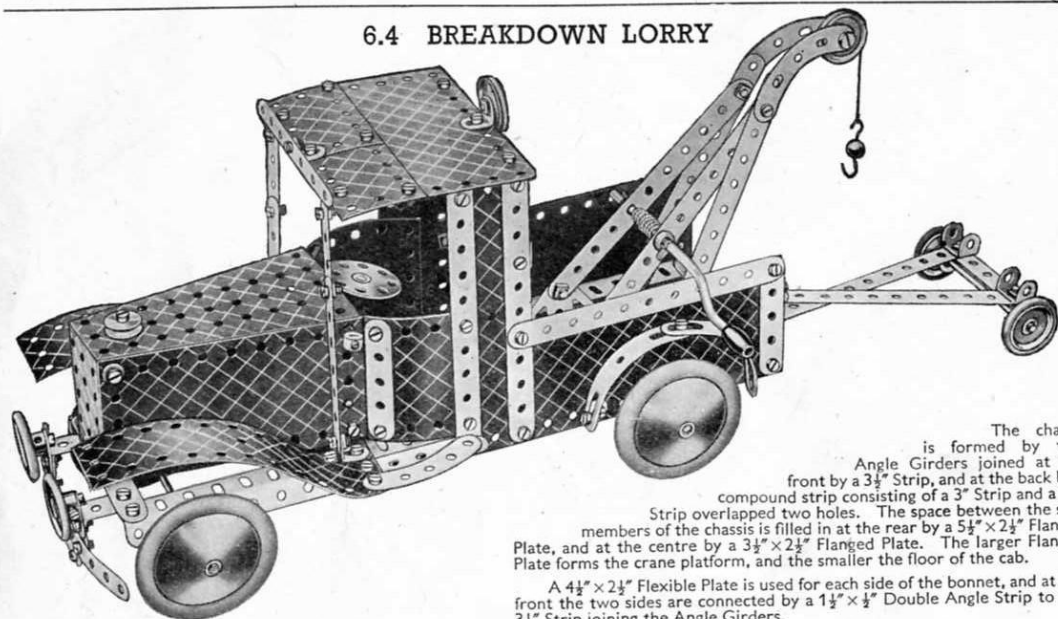


Fig. 6.3a

6.4 BREAKDOWN LORRY



The chassis is formed by two Angle Girders joined at the front by a $3\frac{1}{2}$ " Strip, and at the back by a compound strip consisting of a 3" Strip and a $1\frac{1}{2}$ " Strip overlapped two holes. The space between the side members of the chassis is filled in at the rear by a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, and at the centre by a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate. The larger Flanged Plate forms the crane platform, and the smaller the floor of the cab.

A $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate is used for each side of the bonnet, and at the front the two sides are connected by a $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip to the $3\frac{1}{2}$ " Strip joining the Angle Girders.

The sides of the cab consist of $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates, bolted to the chassis, a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate being bolted between them to form the lower part of the back. Two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates are fastened to a $3\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip to fill in the rest of the back, but a small space is left for the window.

The centre pin is withdrawn from a Hinged Flat Plate and one of the halves is used as a flat plate in the construction of the roof. The flat plate is secured by Angle Brackets to the sides of the cab.

Both the front and the rear Road Wheels are fastened on 5" Rods passed through holes in Flat Trunnions bolted to the sides of the chassis.

The steering wheel is a Bush Wheel fastened on a $3\frac{1}{2}$ " Rod passed through a Reversed Angle Bracket bolted to the top of the bonnet. The Rod also passes through the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate forming the floor of the cab.

Parts required

13 of No. 2	1 of No. 48a	4 of No. 126a
4 " " 3	1 " " 48b	1 " " 147b
1 " " 4	1 " " 51	4 " " 155a
8 " " 5	1 " " 52	1 " " 176
2 " " 6a	2 " " 53	4 " " 187
2 " " 8	1 " " 54a	4 " " 188
6 " " 10	1 " " 57c	4 " " 189
2 " " 11	3 " " 59	2 " " 191
12 " " 12	2 " " 90	2 " " 192
2 " " 12a	2 " " 90a	1 " " 198
4 " " 12c	3 " " 111c	2 " " 200
2 " " 15	1 " " 125	4 " " 215
1 " " 15a	2 " " 126	
2 " " 16		
1 " " 18b		
1 " " 19g		
5 " " 22		
1 " " 22a		
1 " " 23		
1 " " 24		
5 " " 35		
101 " " 37		
1 " " 37a		
6 " " 38		
1 " " 40		
1 " " 44		
1 " " 48		

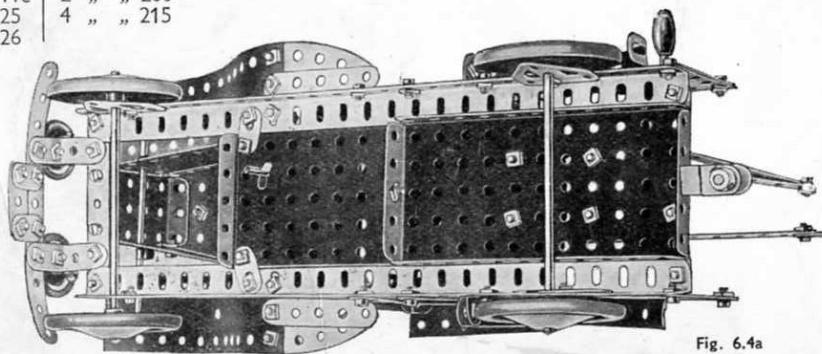
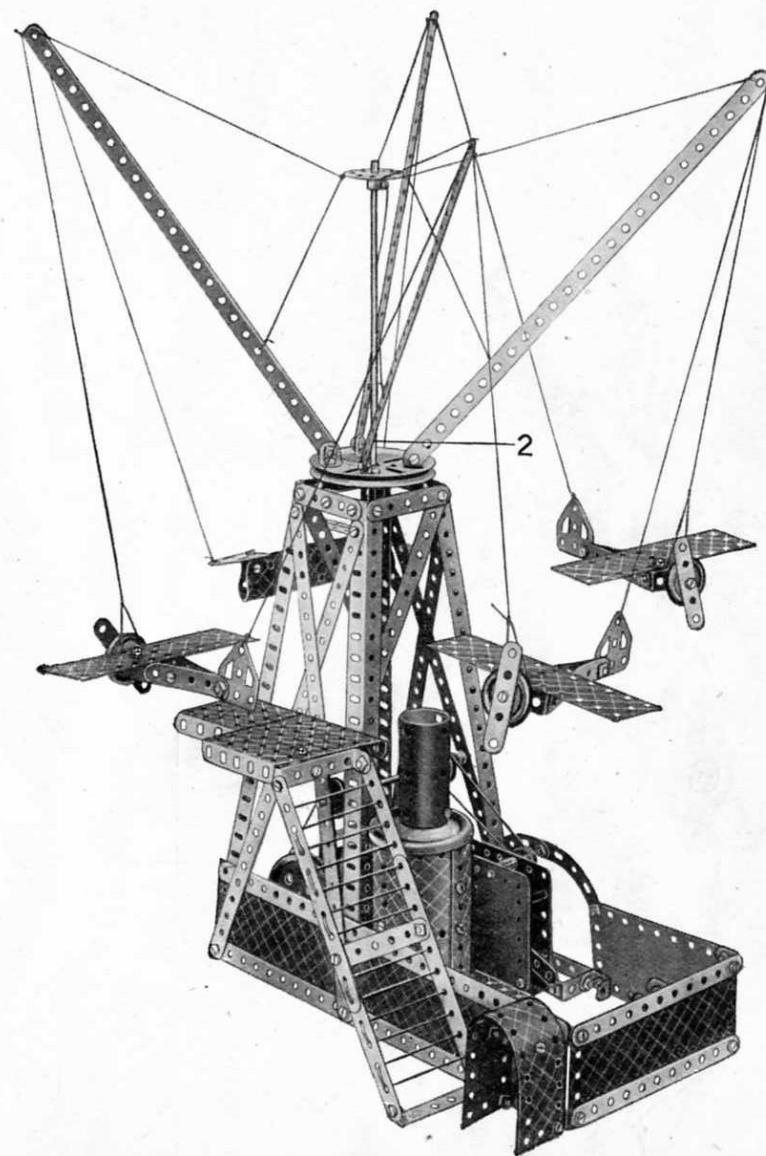


Fig. 6.4a

6.5 HIGH FLYERS



6.5 HIGH-FLYERS

A base for the model is provided by bolting two $12\frac{1}{2}$ " Strips to the Angle Girders that form the tower. Two $5\frac{1}{2}$ " Strips are bolted to the Angle Girders across their lower ends, and between them is fixed a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate. The Flanged Plate is extended on the inside by a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate attached to it by a Flat Bracket. The $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate is attached also to one of the $12\frac{1}{2}$ " Strips of the base by a $1"$ \times $1"$ Angle Bracket and a Double Bracket.

The boiler consists of two $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates bolted together and extended by two $1\frac{1}{8}$ " radius Curved Plates. They are then curved to shape and their ends are bolted together. The boiler is fixed to the side of the model. The Road Wheel is fastened on a 3" Screwed Rod, which is lock-nutted to a Flat Bracket bolted to a $1"$ \times $1"$ Angle Bracket inside the boiler. The $2\frac{1}{2}$ " Cylinder carries an Angle Bracket on its inside, and is fitted on to the Screwed Rod, where it is held in place by a Nut.

The No. 1 Clockwork Motor is fastened by Double Brackets to the $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate and the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate. The drive is taken by a Driving Band from a $\frac{1}{2}$ " fast Pulley on the driving shaft of the Motor, to a $1"$ fast Pulley on a 5" Rod journaled in the sides of the tower. This Rod carries also a second $1"$ Pulley, which is connected by a Driving Band to a 3" Pulley on the $3\frac{1}{2}$ " Rod carrying the Pulley 1 (Fig. 6.5a). Pulley 1 is fitted with a Rubber Ring, which is in contact with the rim of the Road Wheel at the bottom of the main shaft. The arms carrying the aeroplanes are fastened by Angle Brackets to a 3" Pulley on the main shaft, and are supported by Cords. The main shaft consists of an $11\frac{1}{2}$ " Rod and a $6\frac{1}{2}$ " Rod joined by a Rod Connector 2.

The construction of three of the aeroplanes will be clear from the illustration. The fuselage of the aeroplane partly hidden by the tower consists of two U-section Curved Plates bolted together at the tail. A $1"$ loose Pulley is attached to the fuselage by an Angle Bracket to form the engine. The wing is made of two $5\frac{1}{2}$ " Strips bolted to an Angle Bracket and to a Double Bracket fastened to the sides of the fuselage.

Parts required

11 of No. 1	1 of No. 52
12 " " 2	2 " " 53
4 " " 3	1 " " 54a
2 " " 4	4 " " 59
12 " " 5	1 " " 80c
1 " " 6a	2 " " 90a
4 " " 8	2 " " 111
3 " " 10	2 " " 111a
4 " " 11	6 " " 111c
15 " " 12	2 " " 126
2 " " 12a	4 " " 126a
1 " " 13	4 " " 155a
1 " " 14	2 " " 186
1 " " 15	2 " " 187
1 " " 16	3 " " 188
2 " " 19b	3 " " 189
5 " " 22	1 " " 191
2 " " 22a	4 " " 192
1 " " 23a	1 " " 197
1 " " 24	2 " " 199
105 " " 37	2 " " 200
6 " " 37a	1 " " 213
4 " " 38	1 " " 216
2 " " 40	1 No. 1 Clock-
2 " " 48	work Motor
8 " " 48a	

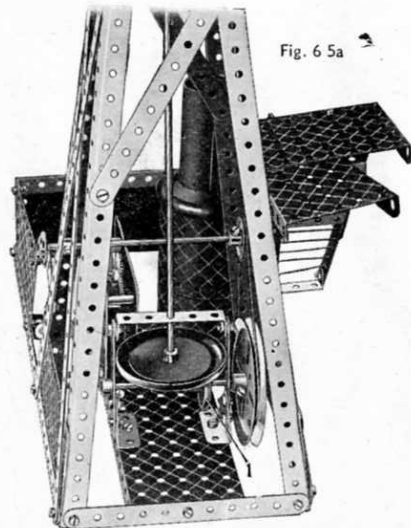


Fig. 6.5a

6.6. FURNITURE VAN

The construction of the model is commenced by building the van body, the base of which consists of two $12\frac{1}{2}$ " Angle Girders joined at each end by a $5\frac{1}{2}$ " Strip. The lower part of each side comprises $12\frac{1}{2}$ " Strip Plates and different sized Flexible Plates, and the two flat plates 1 form the upper part of the sides. The flat plates 1 are obtained by removing the centre pin from a Hinged Flat Plate and using the two halves separately. Each half is bolted over a framework of $12\frac{1}{2}$ " Strips and $5\frac{1}{2}$ " Strips, which can be seen in Fig. 6.6a. The top is constructed from $12\frac{1}{2}$ " Strips bolted at each end to $5\frac{1}{2}$ " Strips connected to the frame. The bonnet unit consists of two Flanged Sector Plates, the flanges of which are joined by $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates. The radiator is bolted in position to the two Flanged Sector Plates, the upper Bolt being $\frac{3}{4}$ " long and carrying a $\frac{1}{2}$ " loose Pulley to represent the radiator cap. The lower Flanged Sector Plate is bolted to a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, which is secured to the chassis. The front bumper is fastened by two Reversed Angle Brackets to the ends of two $3\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips fixed under the bonnet. The headlights are represented by $1"$ fast Pulleys on the shanks of two $\frac{3}{4}$ " Bolts, which are passed through a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip bolted to the radiator. Running boards are represented by $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates bolted to the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, and they provide supports for the front mudguards. The latter each consist of two Formed Slotted Strips coupled together by Flat Brackets, and they are secured to the running board by Angle Brackets.

The seat inside the cab is made with two U-Section Curved Plates connected by Flat Brackets and attached by an Angle Bracket to the back of the seat, which consists of a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate extended by a $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate.

Parts required

12 of No. 1	1 of No. 24	6 of No. 111c
13 " " 2	1 " " 35	2 " " 125
3 " " 3	103 " " 37	2 " " 155a
2 " " 4	8 " " 37a	4 " " 187
12 " " 5	5 " " 38	4 " " 188
4 " " 8	1 " " 48a	4 " " 189
8 " " 10	2 " " 48b	5 " " 190
2 " " 11	1 " " 51	2 " " 191
13 " " 12	1 " " 52	4 " " 192
1 " " 12a	2 " " 53	2 " " 197
1 " " 14	2 " " 54a	1 " " 198
1 " " 15	4 " " 59	2 " " 199
1 " " 18a	2 " " 90a	2 " " 200
2 " " 22	2 " " 111	2 " " 214
1 " " 23	2 " " 111a	4 " " 215

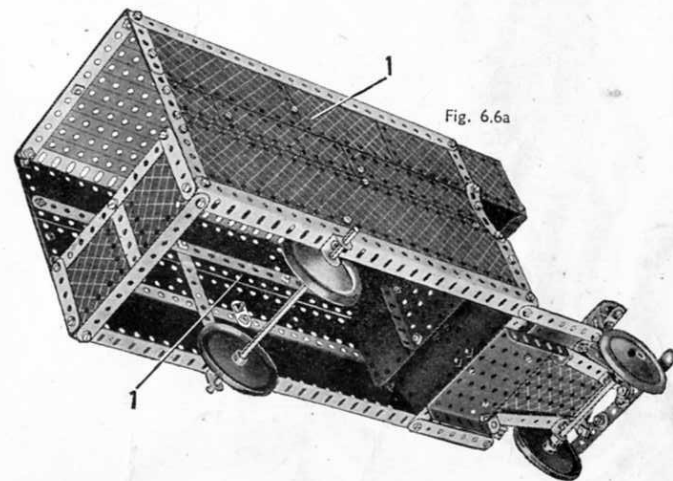
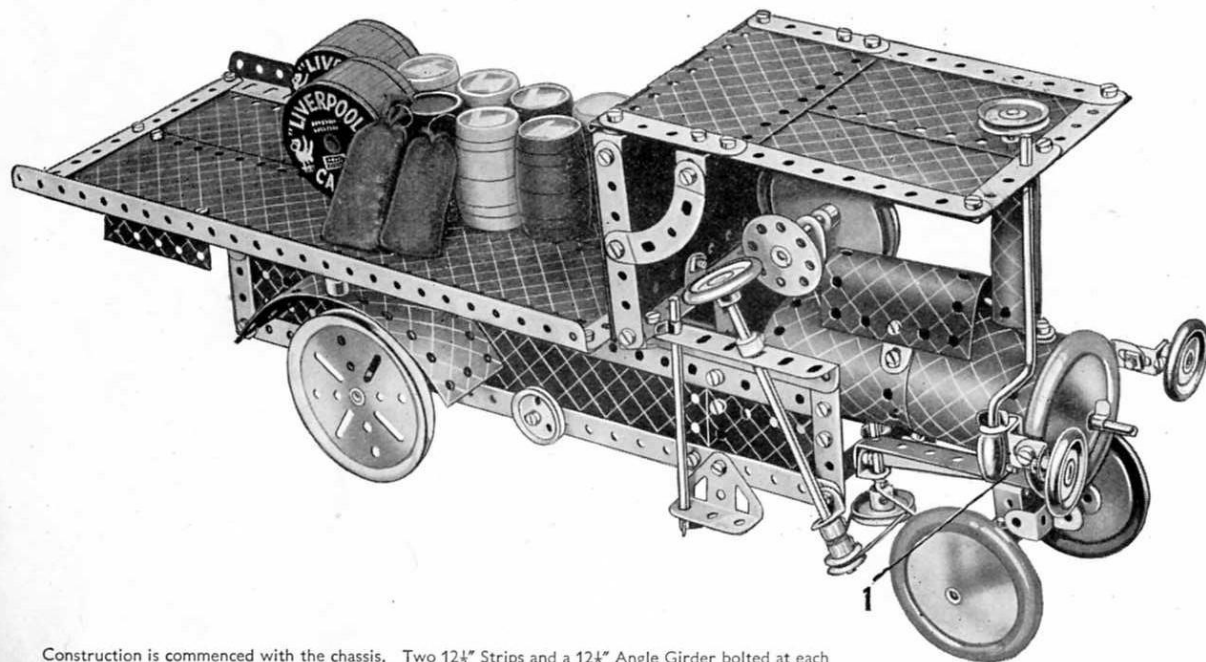


Fig. 6.6a

This Model can be built with MECCANO No. 6 Outfit (or No. 5 and No. 5a Outfits)



6.7 STEAM WAGON

Parts required

4 of No. 1	1 of No. 17	1 of No. 44	1 of No. 126
5 " " 2	1 " " 18a	1 " " 45	3 " " 155a
3 " " 3	2 " " 19b	1 " " 48	1 " " 186
1 " " 4	1 " " 19g	3 " " 48a	4 " " 187
12 " " 5	5 " " 22	1 " " 48b	4 " " 188
4 " " 8	1 " " 22a	1 " " 51	2 " " 189
3 " " 10	1 " " 23	2 " " 53	4 " " 190
4 " " 11	1 " " 23a	4 " " 59	2 " " 191
12 " " 12	1 " " 24	1 " " 80c	4 " " 192
2 " " 12a	8 " " 35	2 " " 90a	2 " " 197
5 " " 12c	101 " " 37	2 " " 111	1 " " 198
1 " " 13	4 " " 37a	2 " " 111c	2 " " 199
2 " " 15	8 " " 38	2 " " 125	2 " " 200
2 " " 15b	1 " " 40		

Construction is commenced with the chassis. Two $12\frac{1}{2}$ " Strips and a $12\frac{1}{2}$ " Angle Girder bolted at each end to two $2\frac{1}{2}$ " Strips form each side member. The sides of the chassis are filled in with Flexible Plates and two Flanged Plates. The side members of the chassis are then joined together, at the rear by $2\frac{1}{2}$ " Strips and at the front by a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip. The platform is bolted to the chassis by two $1"$ \times $1"$ Angle Brackets at the rear. At the front end it is bolted to a Flat Bracket attached to two $2\frac{1}{2}$ " Strips, which are overlapped one hole and bolted to the Angle Girders forming the side members of the chassis.

The boiler consists of two $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates extended by two $1\frac{1}{8}$ " radius Curved Plates and bent to shape, the end being joined together by two Obtuse Angle Brackets. The boiler front is a Road Wheel carried on an $11\frac{1}{2}$ " Rod, which is held by a Spring Clip in a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip. The chimney is a U-Section Curved Plate bent to shape, and is attached as follows. A 3" Screwed Rod is lock-nutted at one end to a Flat Bracket bolted to the boiler, and passed up the centre of the chimney. The free end of the Screwed Rod projects through the roof of the cab and is held in the boss of a 1" Pulley.

The rear part of the roof is formed by a Hinged Flat Plate, extended at the back of the cab by two $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates. These are attached to the platform body by an Angle Bracket, which is held by the same Bolt as the Flat Bracket already mentioned. The Angle Brackets bolted to the $3\frac{1}{2}$ " Strips at the side of the cab are spaced from the Hinged Flat Plate by two Washers.

The front axle is mounted in the following manner. A Double Bracket is fastened by Obtuse Angle Brackets to the underside of the boiler, and a $3\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip is bolted to it and to the Double Angle Strip spacing the front of the chassis. To the Double Angle Strip a Double Bent Strip carrying the front axle support is lock-nutted by Bolt 1.

The steering column is journalled in the Angle Girder at the side of the cab, and also in an Angle Bracket. The $\frac{1}{2}$ " Pulley on the lower end of the steering column is connected to a 1" Pulley held on a $1\frac{1}{2}$ " Rod, by a Driving Band. Cord is wound several times around the $1\frac{1}{2}$ " Rod, and is tied at each end to the $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip supporting the front axle.

The rear mudguards are held by $\frac{3}{8}$ " Bolts, and are spaced from the platform by a Collar and two Washers. The rear wheels are 3" Pulleys fastened on the ends of a 5" Rod

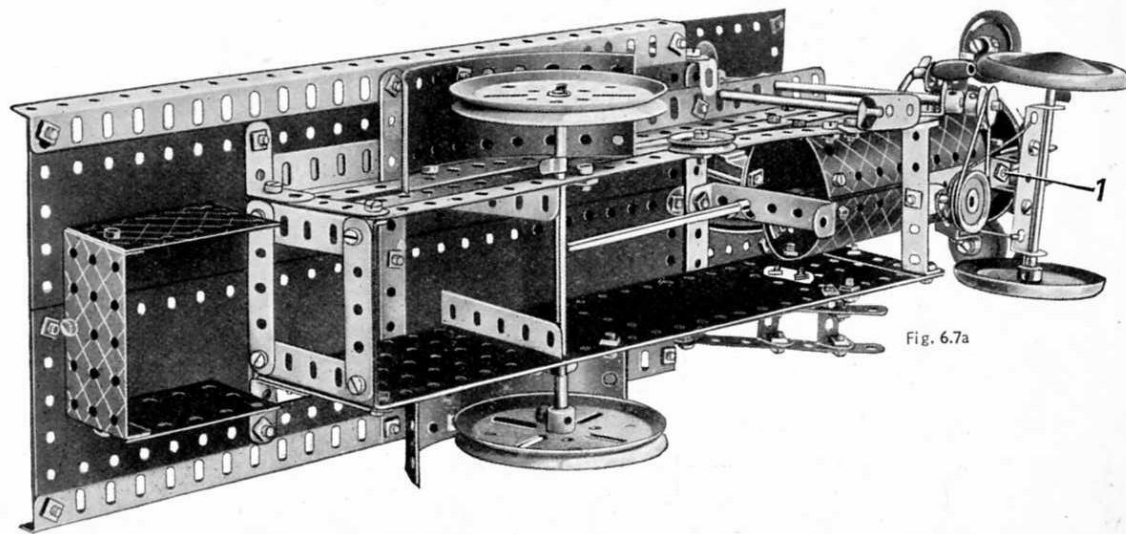
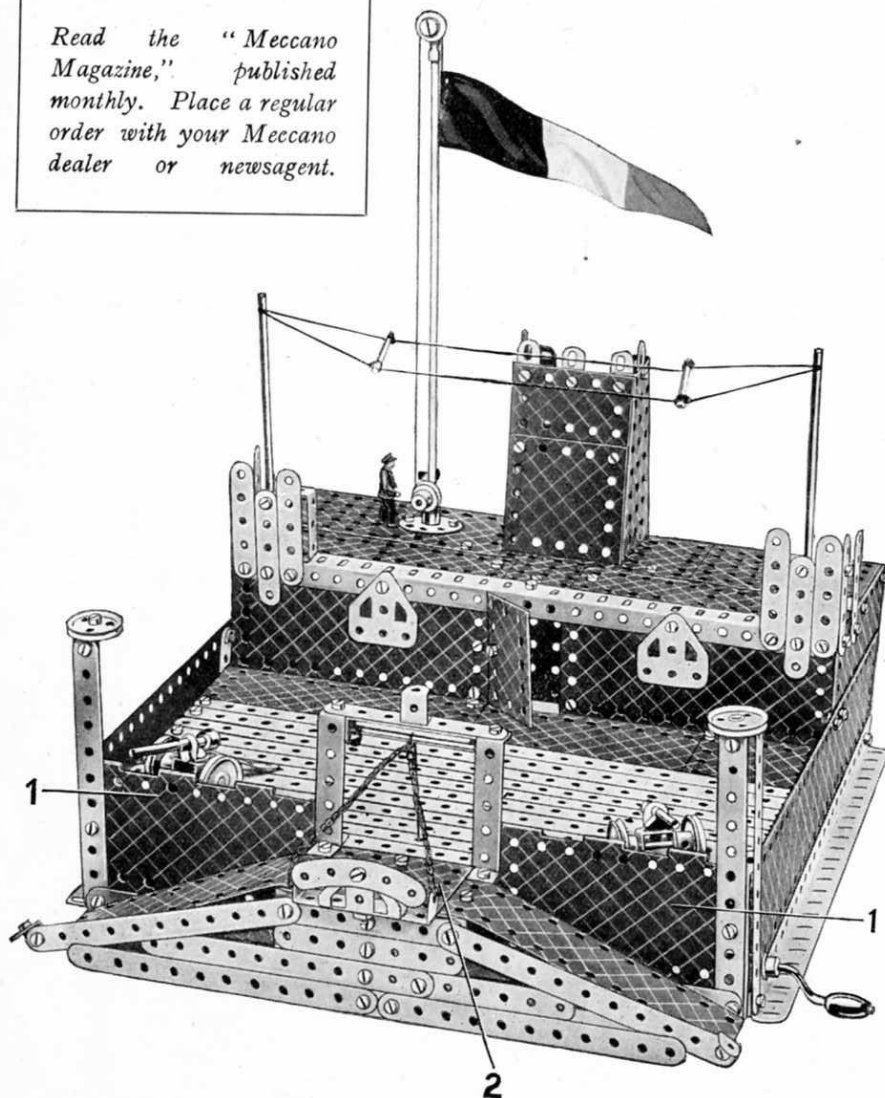


Fig. 6.7a

This Model can be built with MECCANO No. 6 Outfit (or No. 5 and No. 5a Outfits)

6.8 FOREIGN LEGION FORT

Read the "Meccano Magazine," published monthly. Place a regular order with your Meccano dealer or newsagent.



Parts required		
12 of No. 1	4 of No. 18a	2 of No. 54a
11 " " 2	1 " " 19h	4 " " 59
4 " " 3	4 " " 22	1 " " 90
1 " " 4	2 " " 22a	6 " " 111c
12 " " 5	1 " " 23	2 " " 125
2 " " 6a	1 " " 23a	2 " " 126
4 " " 8	1 " " 24	4 " " 126a
7 " " 10	10 " " 35	1 " " 147b
4 " " 11	105 " " 37	4 " " 188
16 " " 12	6 " " 37a	4 " " 189
2 " " 12a	12 " " 38	3 " " 190
1 " " 12c	1 " " 40	2 " " 191
1 " " 13	2 " " 48	4 " " 192
1 " " 14	7 " " 48a	2 " " 197
2 " " 15	1 " " 51	1 " " 198
2 " " 16	1 " " 52	1 " " 212
2 " " 17	2 " " 53	1 " " 213
	2 of No. 214	

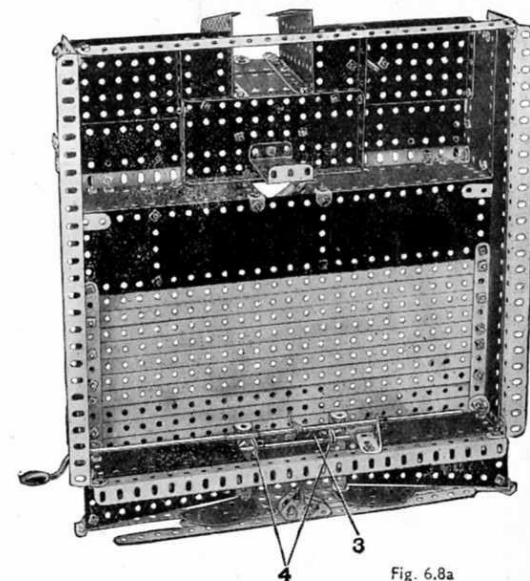


Fig. 6.8a

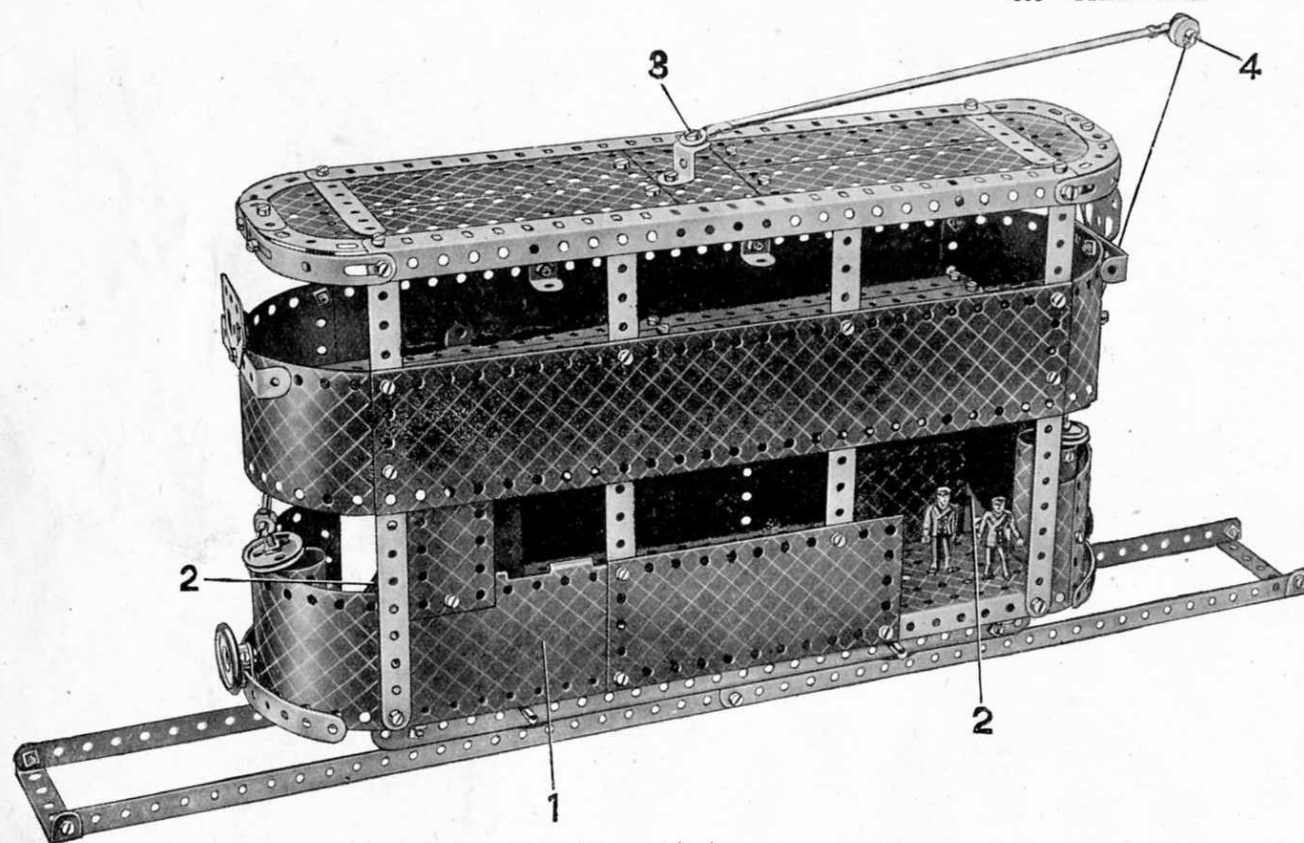
The base of the fort consists of two Angle Girders joined at each end by Angle Brackets to $12\frac{1}{2}$ " Strips. Two $12\frac{1}{2}$ " \times $2\frac{1}{2}$ " Strip Plates are bolted to the Angle Girders to form the sides. The $12\frac{1}{2}$ " Strips that form the floor of the court-yard are bolted to $5\frac{1}{2}$ " Strips attached by Angle Brackets to the $12\frac{1}{2}$ " \times $2\frac{1}{2}$ " Strip Plates. Reference to the illustrations will make clear the construction of the barrack rooms.

The observation tower is formed by two Flanged Sector Plates, the front flanges of which are joined by a $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " and a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate. The Flanged Sector Plates are bolted to the $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate forming the centre part of the roof. An $11\frac{1}{2}$ " Rod is used for the flag mast and is held upright in the boss of a Bush Wheel bolted to the roof. The Cord for raising and lowering the flag passes around a $\frac{1}{2}$ " fast Pulley at the bottom of the pole and a $\frac{1}{2}$ " loose Pulley at the top. The $\frac{1}{2}$ " fast Pulley is held on the shank of a $\frac{1}{2}$ " Bolt passed through a Double Bracket on the $11\frac{1}{2}$ " Rod, and the $\frac{1}{2}$ " loose Pulley is carried on a Pivot Bolt lock-nutted to a Rod and Strip Connector at the top of the Rod. The Rods forming the wireless masts are held in Collars bolted to the $2\frac{1}{2}$ " Strips at the corners of the roof.

The centre pin is removed from a Hinged Flat Plate, and the halves are used as flat plates 1 in the construction of the front of the fort. The approach roadways are formed by $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates bolted to the $2\frac{1}{2}$ " Strips fastened to the front $12\frac{1}{2}$ " Strip of the court-yard. The Strips at the front of the fort are supported by two Flat Trunnions (see Fig. 6.8a).

A $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate 2 is used for the drawbridge, and to its rear end is bolted a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip 3, which is pivoted on a $3\frac{1}{2}$ " Rod journaled in two Angle Brackets 4. The operation of raising and lowering the drawbridge is controlled by a Crank Handle, to the shaft of which a $6\frac{1}{2}$ " Rod is attached by a Rod Connector. Cord is wound around the $6\frac{1}{2}$ " Rod, led over a $3\frac{1}{2}$ " Rod at the top of the gateway, and finally is tied to the front of the drawbridge.

6.9 TRAMCAR



Parts required

11 of No. 1	9 of No. 12	4 of No. 35	1 of No. 52	3 of No. 125	2 of No. 197
13 " " 2	2 " " 12c	103 " " 37	2 " " 53	2 " " 126a	1 " " 198
3 " " 3	1 " " 13	8 " " 37a	2 " " 54a	1 " " 155a	2 " " 199
2 " " 4	2 " " 16	10 " " 38	2 " " 59	4 " " 188	2 " " 200
11 " " 5	2 " " 18a	1 " " 48	2 " " 80c	4 " " 189	2 " " 212
2 " " 6a	5 " " 22	6 " " 48a	1 " " 90	6 " " 190	2 " " 214
4 " " 8	2 " " 22a	1 " " 48b	4 " " 90a	2 " " 191	4 " " 215
6 " " 10	1 " " 23	1 " " 51	6 " " 111c	4 " " 192	4 " " 217a

1 of No. 217b

Construction is commenced with the chassis as shown in Fig. 6.9a. Two $12\frac{1}{2}$ " Strips are connected by Angle Brackets to two Angle Girders, and the last named are joined across at each end by compound strips consisting of two $2\frac{1}{2}$ " Strips overlapped two holes. The bottom is filled in by bolting a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate by its flange to the lower Angle Girder, and a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate to the other Angle Girder. A Flanged Sector Plate and a $5\frac{1}{2}$ " Strip are bolted to the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, and two further $5\frac{1}{2}$ " Strips are attached by Reversed Angle Brackets, one to the $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, and the other to the compound strip that spaces the Angle Girders.

The sides of the car are next added. One half of a Hinged Flat Plate is used at 1, and the other half is used in a similar position on the opposite side of the model. Five $5\frac{1}{2}$ " Strips carry the upper deck, and $2\frac{1}{2}$ " Strips and Double Angle Strips support the roof. The $5\frac{1}{2}$ " Strips 2 are bolted to $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates, which in turn are fastened to the floor of the tramcar.

The upper deck consists of five $12\frac{1}{2}$ " Strips, three of which are bolted to one side of a $3\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip, while the other two are fastened to a Flat Bracket that is attached to the Double Angle Strip. The floor is filled in with $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates, with a Flanged Sector Plate at the front end and a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate at the rear end.

U-Section Curved Plates are attached by Obtuse Angle Brackets to each end of the tram to represent the speed control boxes, the securing Bolts holding also an Angle Bracket. Two 3" Screwed Rods are each fitted with a 1" loose Pulley, and Collars with $1\frac{1}{2}$ " Rods locked in them are fixed on the upper end of each Screwed Rod to form the control switch.

A Reversed Angle Bracket is bolted to a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate in the roof of the tram and a Rod and Strip Connector is attached by lock-nutted Bolt 3 to its other end. A second Rod and Strip Connector is carried at the end of the $11\frac{1}{2}$ " Rod forming the trolley, and a $\frac{1}{2}$ " loose Pulley is attached by lock-nutted Bolt 4.

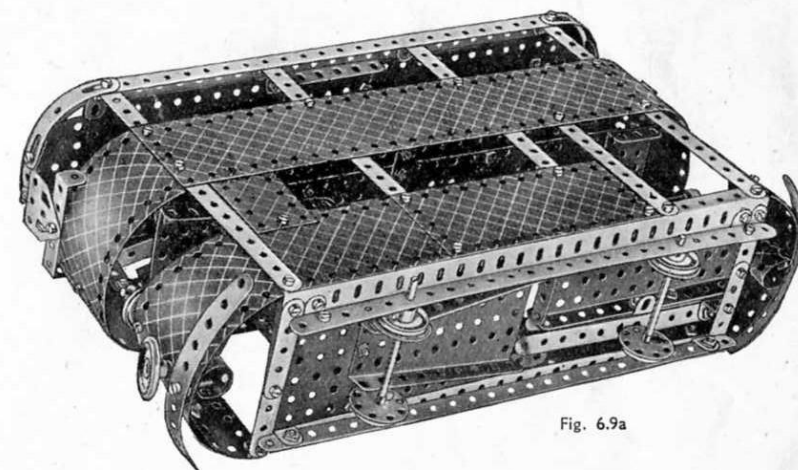
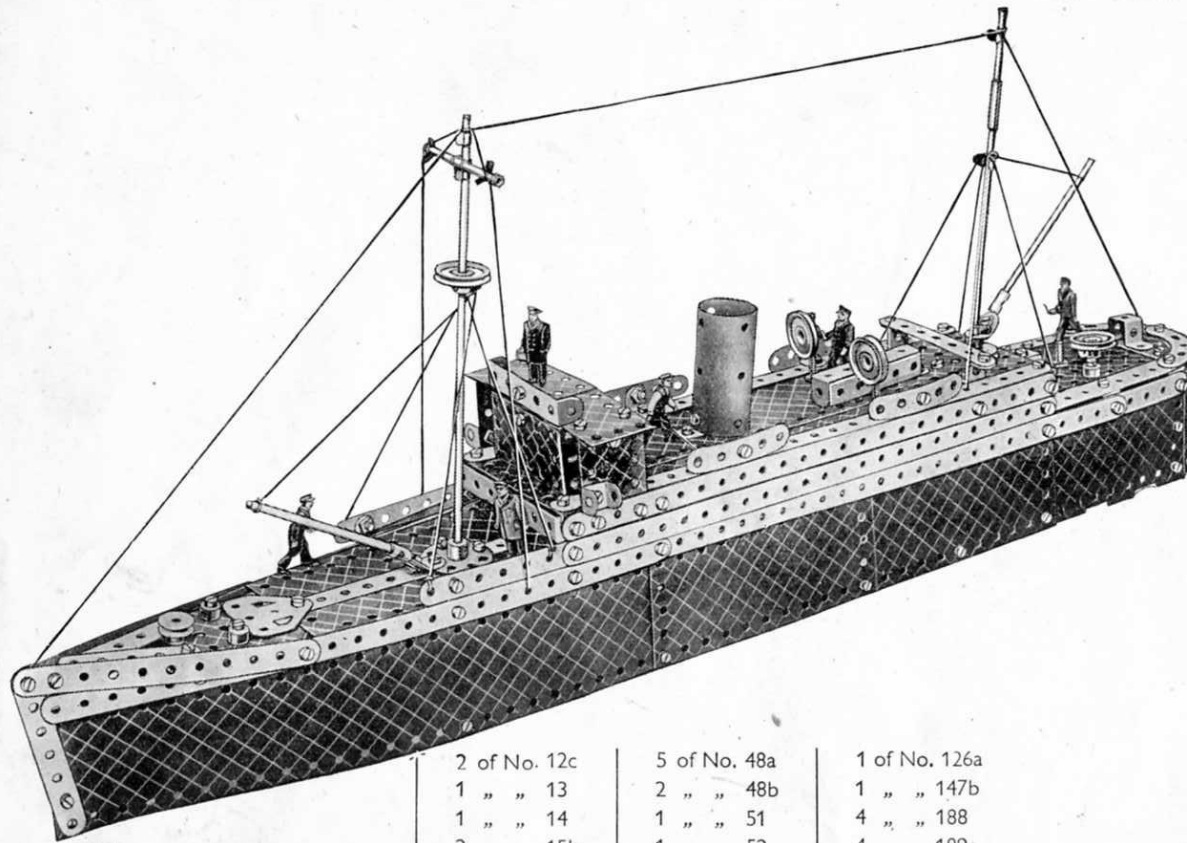


Fig. 6.9a

6.10 LINER



Parts required	2 of No. 12c	5 of No. 48a	1 of No. 126a
10 of No. 1	1 " " 13	2 " " 48b	1 " " 147b
9 " " 2	1 " " 14	1 " " 51	4 " " 188
3 " " 3	2 " " 15b	1 " " 52	4 " " 189
12 " " 5	2 " " 17	2 " " 53	4 " " 190
2 " " 8	5 " " 22	1 " " 54a	2 " " 191
2 " " 10	1 " " 23a	4 " " 59	4 " " 192
4 " " 11	1 " " 24	2 " " 80c	2 " " 197
14 " " 12	7 " " 35	2 " " 90a	1 " " 198
2 " " 12a	98 " " 37	2 " " 111a	2 " " 212
	10 " " 37a	6 " " 111c	1 " " 213
	3 " " 38	1 " " 115	1 " " 214
	1 " " 40	2 " " 125	1 " " 216
	1 " " 45	2 " " 126	

Construction of the model is commenced by connecting two Angle Girders together by $5\frac{1}{2}$ " Strips in the manner shown in Fig. 6.10a. Each side consists of a $12\frac{1}{2}$ " \times $2\frac{1}{2}$ " Strip Plate overlapping the Angle Girder 10 holes, and two $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates also bolted to the Angle Girder. The hull is extended rearwards at 1 (Fig. 6.10a) by the halves of a Hinged Flat Plate from which the centre pin has been withdrawn. The stern consists of two $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates, overlapped and bolted together along their long sides and fastened to the flat plates 1. The $12\frac{1}{2}$ " \times $2\frac{1}{2}$ " Strip Plates are connected together at their free ends, the Bolt holding also two $3\frac{1}{2}$ " Strips. The two compound strips consisting of two $12\frac{1}{2}$ " Strips and a $2\frac{1}{2}$ " Strip, which extend the full length of the ship on each side, are bolted to flat plates 1 and sloped upwards. The ends of the strips are clamped at the bows by the $5\frac{1}{2}$ " Strips.

The $12\frac{1}{2}$ " Strips forming the sides of the superstructure are fastened to the sides of the ship at each end by $2\frac{1}{2}$ " Strips. The boat deck is filled in at each end by a $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, and the centre portion, consisting of Flexible Plates bolted together as shown in Fig. 6.10a, is bolted to two $12\frac{1}{2}$ " Strips, which in turn are fastened to the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plates. The ventilators are represented by 1" fast Pulleys, which are secured on the ends of 3" Screwed Rods fastened to the deck by Nuts in the following manner. The Screwed Rods are inserted in one of the tapped holes in the boss of each Pulley, and the set screw is tightened up against the end of the Screwed Rod.

The front of the wheelhouse consists of a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate, secured by an Angle Bracket to the two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates forming the roof. A $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate is used also for each of the side supports or the wheelhouse, and the roof is fastened to them by two Trunnions.

The foredeck is formed by a Flanged Sector Plate, extended to the rear by two $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates and a $5\frac{1}{2}$ " Strip. The Flexible Plates are secured by 1" \times 1" Angle Brackets bolted to $\frac{1}{2}$ " \times $\frac{1}{2}$ " Angle Brackets to the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate forming the base of the wheelhouse.

The aft deck consists of a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate fixed to the boat deck by a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip, and to the stern by a Semi-Circular Plate. The spaces between the $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate and the sides of the ship are filled in by $5\frac{1}{2}$ " Strips. The Semi-Circular Plate and the $2\frac{1}{2}$ " small radius Curved Strips are fastened to the stern of the ship by an Angle Bracket.

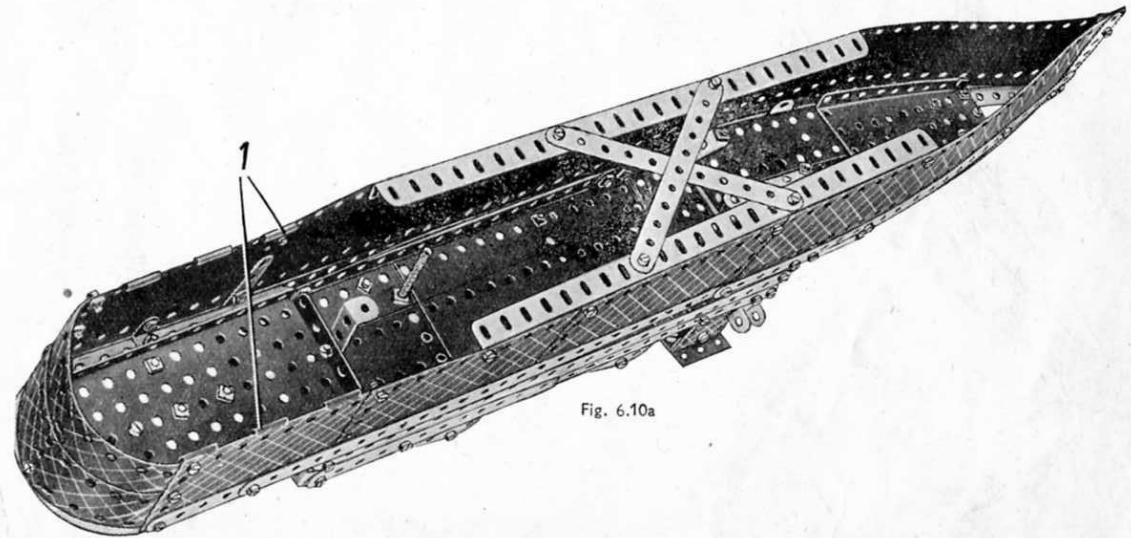
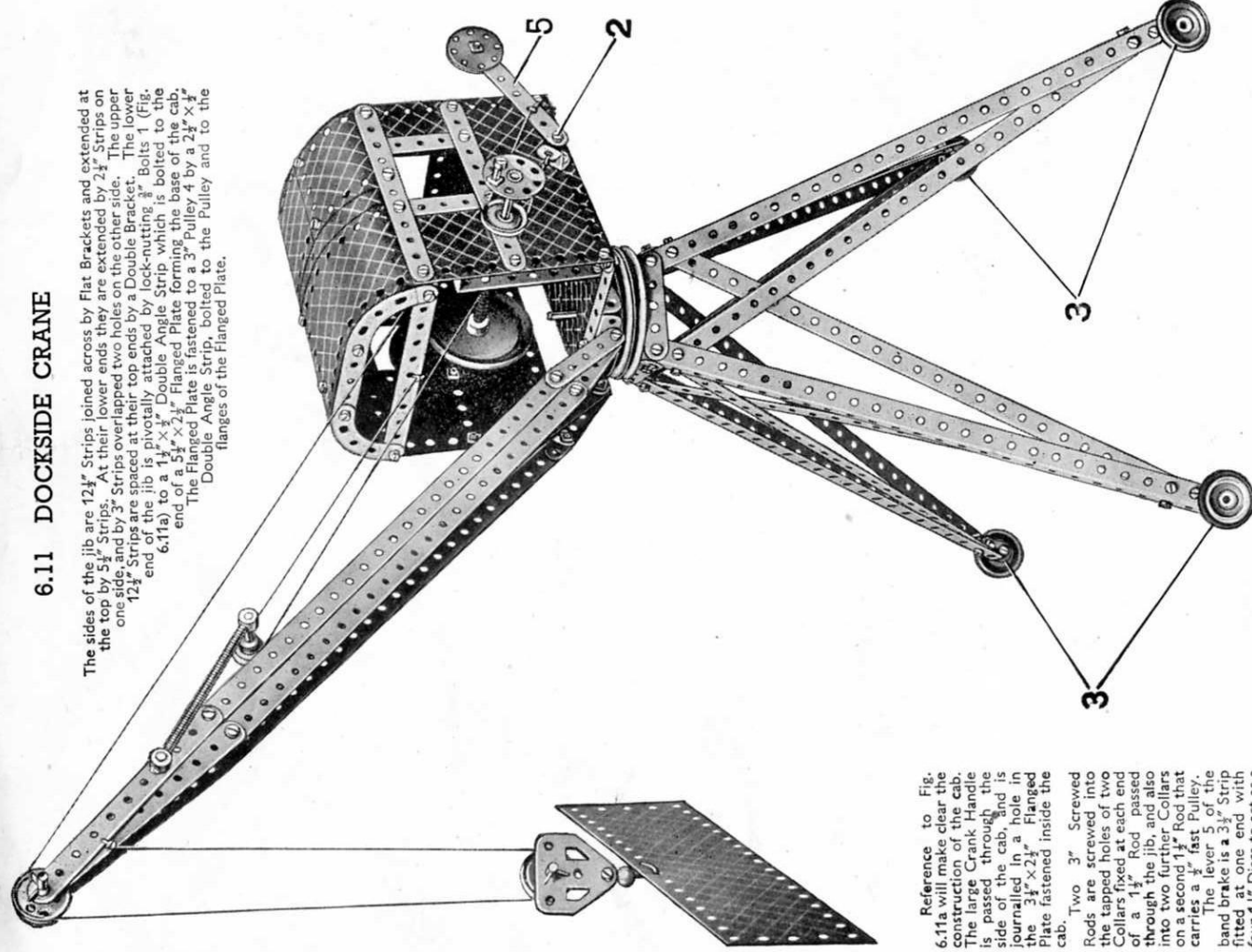


Fig. 6.10a

6.11 DOCKSIDE CRANE

The sides of the jib are 12 1/2" Strips joined across by Flat Brackets and extended at the top by 5 1/2" Strips. At their lower ends they are extended by 2 1/2" Strips on one side, and by 3" Strips overlapping two holes on the other side. The upper 12 1/2" Strips are spaced at their top ends by a Double Bracket. The lower end of the jib is divided by a 1 1/2" Double Angle Strip which is bolted to the end of a 5 1/2" x 2 1/2" Flanged Plate forming the base of the cab. The Flanged Plate is fastened to a 3" Pulley 4 by a 2 1/2" x 1 1/2" Double Angle Strip, bolted to the Pulley and to the flanges of the Flanged Plate.



Reference to Fig. 6.11a will make clear the construction of the cab. The large Crank Handle is passed through the side of the cab, and is journaled in a hole in the 3 1/2" x 2 1/2" Flanged Plate fastened inside the cab.

Two 3" Screwed Rods are screwed into the tapped holes of two Collars fixed at each end of a 1 1/2" Rod passed through the jib, and also into two further Collars on a second 1 1/2" Rod that carries a 3/4" fast Pulley. The lever 5 of the band brake is a 3 1/2" Strip fitted at one end with four 1 1/2" Discs to act as a counterweight. The other end of the Strip is pivoted on a lock-nutted 1/2" Bolt 2, which carries two Washers on its shank for spacing purposes. Cord is tied to Strip 5, led around a 1" Pulley on a Rod passed through the side of the cab, and finally tied to a Reversed Angle Bracket. The super-structure is free to swivel on a 2" Rod, which is locked in the boss of the lower 3" Pulley but is free in the boss of 3" Pulley 4. The 1" Angle Brackets at the base of the legs. The Bolts carry two Washers on their shanks for spacing purposes.

Luffing is controlled by a Cord that is first wound around the 5" Rod carrying the Bush Wheel, then passed around the 3/4" fast Pulley in the jib, and finally tied to the 5 1/2" Strip at the front of the cab. The hoisting movement is controlled by a second Cord that is wound around the Crank Handle, then passed over the 5 1/2" Strip previously mentioned, and over a 1" loose Pulley on a 2" Rod at the jib-head. It is then led over a 1" loose Pulley in the pulley block and finally tied to the jib.

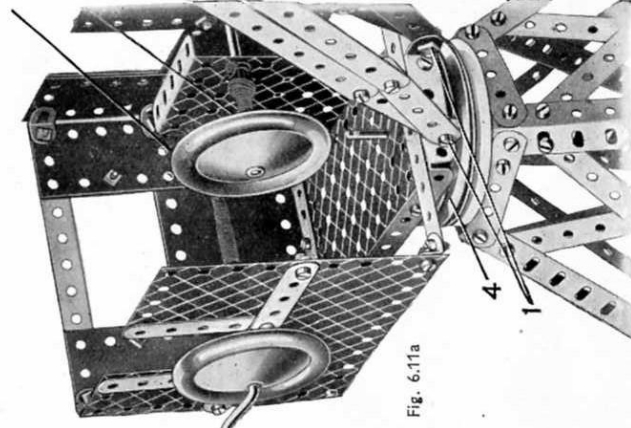
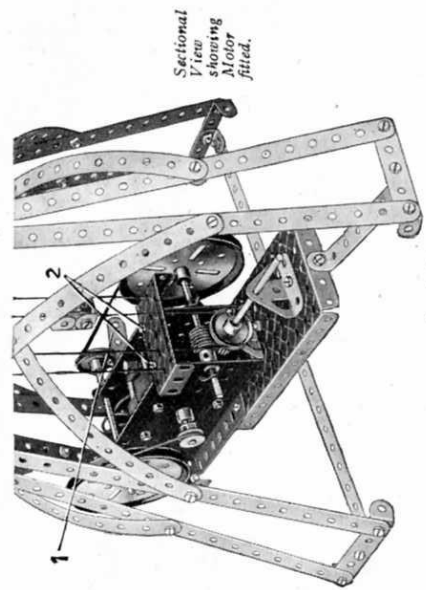
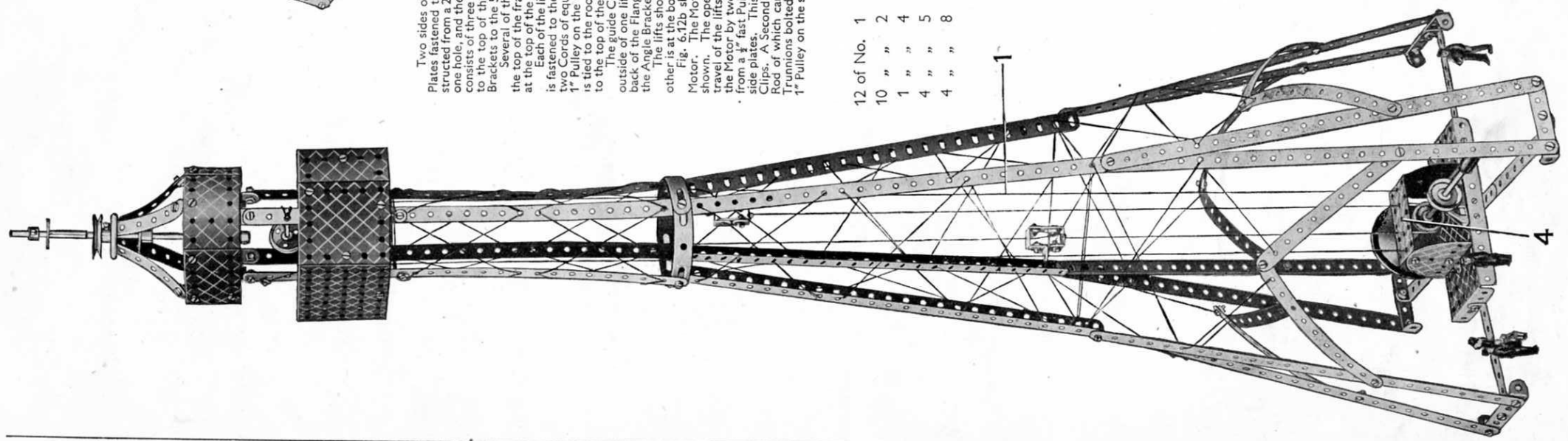


Fig. 6.11a

Parts required

12 of No.	1	1 of No. 19h	2 of No. 80c
13	2	5 " 22	2 " 90a
1	3	2 " 22a	2 " 111a
2	4	1 " 23a	6 " 111c
12	5	1 " 24	1 " 125
4	8	7 " 35	2 " 126a
4	10	91 " 37	1 " 147b
1	11	7 " 37a	4 " 155a
12	12	14 " 38	2 " 187
6	12c	1 " 48	4 " 188
1	15	1 " 48a	2 " 189
2	17	1 " 52	3 " 190
2	18a	1 " 53	2 " 191
1	18b	1 " 57c	4 " 192
2	19b	4 " 59	4 " 217a
		1 of No. 217b	

6.12 EIFFEL TOWER



Sectional View showing Motor fitted.

Fig. 6.12b

Two sides of the lower platform at the top of the tower are formed by $3\frac{1}{2}'' \times 2\frac{1}{4}''$ Flanged Plates fastened to the frame by Reversed Angle Brackets. The other two sides are each constructed from a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate bolted together overlapping one hole, and they also are secured to the frame by Reversed Angle Brackets. The top platform consists of three $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates bolted together and attached by $1'' \times 1''$ Angle Brackets to the top of the frame. Four $2\frac{1}{2}''$ Strips are curved slightly and fastened by Obtuse Angle Brackets to the $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates.

Several of the Flexible Plates have been removed in Fig. 6.12a to show the construction of the top of the frame and the arrangement of the Pulleys and Bush Wheel on the compound rod at the top of the tower.

Each of the lifts consists of two Double Brackets joined by Flat Brackets, and an Angle Bracket is fastened to the side of each lift to receive the guide Cord 1. The operating cable consists of two Cords of equal length. The first of these is tied to the bottom of one lift, taken around the $1''$ Pulley on the Crank Handle and then tied to the bottom of the other lift. The second Cord is tied to the roof of the other lift, taken over the $1''$ Pulley at the top of the tower and then tied to the top of the first lift.

The guide Cord is anchored to a Washer 2, and is pushed through the Angle Bracket on the outside of one lift, then taken through the end holes of the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate 4, across the back of the Flanged Plate, to similar holes on the other side. It then passes upwards through the Angle Bracket of the second lift to the top of the model, where it is secured to Bolt 3.

The lifts should be spaced on the Cord so that when one reaches the top of the tower the other is at the bottom.

Fig. 6.12b shows the model Eiffel Tower arranged for operation with an E208 Electric Motor. The Motor is bolted to the $5\frac{1}{2}'' \times 2\frac{1}{4}''$ Flanged Plate at the foot of the tower in the manner shown. The operating switch of the Motor is extended by a $2\frac{1}{2}''$ Strip 1 so that the direction of travel of the lifts may easily be reversed. The $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate is attached to the top of the Motor by two Angle Brackets, which are bolted at 2. The drive is taken by a Driving Band from a $\frac{1}{2}''$ fast Pulley on the Motor shaft to a $3''$ Pulley fastened on a Rod journaled in the Motor side plates. This Rod carries also a $1''$ fast Pulley at its other end and is held in place by Spring Clips. A Second Driving Band transmits the drive from the $1''$ Pulley to another $3''$ Pulley. The Rod of which carries a Worm that meshes with a $\frac{1}{2}''$ Pinion on a Rod journaled in holes in Trunnions bolted to the baseplate. The Cord to which the lifts are fastened is passed around a $1''$ Pulley on the same Rod as the $\frac{1}{2}''$ Pinion.

Parts required	
4 of No. 10	4 of No. 11
4 " " 12	6 " " 12a
2 " " 12c	4 " " 15
1 " " 15b	1 " " 15b
1 " " 16	2 " " 19b
1 " " 17	*1 " " 32
1 " " 19g	1 " " 186a
3 " " 22	*1 E208 Electric Motor.
2 " " 22a	Parts not required:
1 " " 24	1 of No. 187
4 " " 35	2 " " 214
92 " " 37	*Not included in Outfit.
1 " " 37a	
5 " " 38	
2 " " 40	
8 " " 48a	
2 " " 48b	
1 " " 51	
1 " " 52	
2 " " 53	
2 " " 59	
1 " " 111	
4 " " 125	
2 " " 126	
1 " " 155a	
1 " " 187	
1 " " 188	
3 " " 189	
3 " " 190	
1 " " 213	
2 " " 214	
4 " " 215	
1 " " 217a	
1 " " 217b	

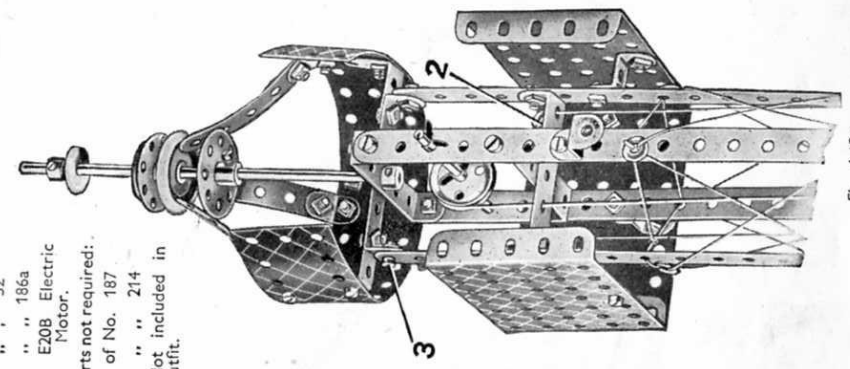


Fig. 6.12a

6.13 MECHANICAL HORSE AND TRAILER

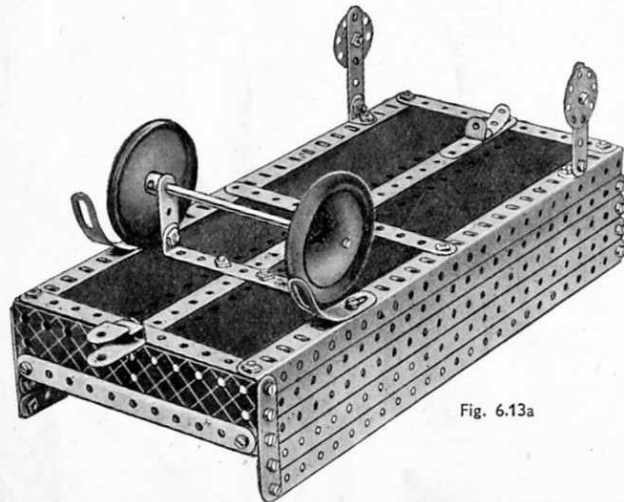
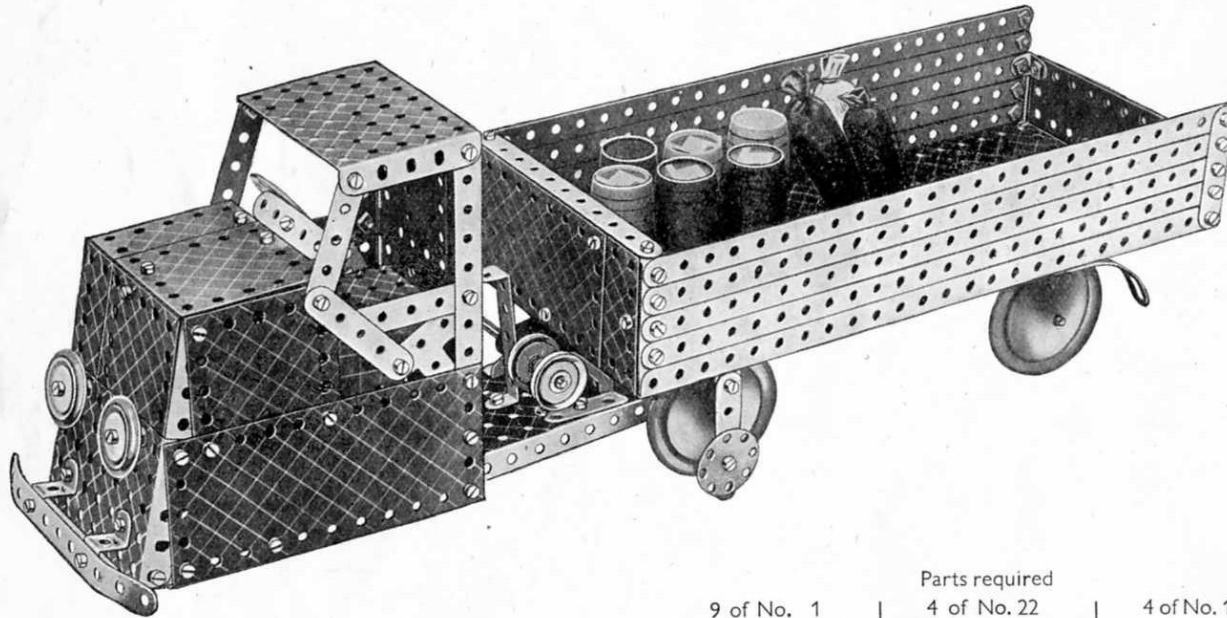


Fig. 6.13a

Parts required		
9 of No. 1	4 of No. 22	4 of No. 111c
10 " " 2	1 " " 24	4 " " 125
3 " " 3	5 " " 35	2 " " 126
2 " " 4	105 " " 37	3 " " 126a
12 " " 5	6 " " 37a	1 " " 147b
2 " " 6a	4 " " 38	2 " " 155a
2 " " 8	1 " " 44	4 " " 187
2 " " 10	1 " " 48	4 " " 188
16 " " 12	5 " " 48a	4 " " 189
2 " " 12a	2 " " 48b	6 " " 190
3 " " 12c	1 " " 51	2 " " 191
2 " " 15	1 " " 52	2 " " 192
1 " " 15a	2 " " 53	2 " " 197
1 " " 16	2 " " 90	2 " " 215
1 " " 19b	2 " " 111	2 " " 217a
1 " " 19g	2 " " 111a	2 " " 217b

The cab and bonnet of the mechanical horse are first constructed, and are built up on a base consisting of two $5\frac{1}{2}" \times 2\frac{1}{2}"$ Strips bolted to the flanges of a $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate. Two $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates are bolted to the $5\frac{1}{2}"$ Strips so that the Strips are extended one hole beyond the edge of the Flexible Plates, thus allowing the $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate representing the radiator to be sloped backwards and bolted to the Flexible Plates. Two $3"$ Strips are bolted inside the flanges of the $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate and they overlap the flanges two holes. Two $5\frac{1}{2}"$ Strips overlap the rear ends of the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates by three holes, and $1" \times 1"$ Angle Brackets are bolted to the lower rear corners of the two Flexible Plates for the purpose of holding the back in position.

Each side of the bonnet is completed by bolting a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate to the $3"$ Strip and also to the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate. The upper rear corners of the $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates are joined across by a $3\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip, each Bolt holding also a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate and two $2\frac{1}{2}"$ Strips. One of the $2\frac{1}{2}"$ Strips is bolted to a Flat Trunnion and the $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate, and the other is used to support the $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate that represents the roof of the cab.

The upper part of the radiator is completed by two $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates overlapped three holes. They are attached to the $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate by the $\frac{1}{2}"$ Bolts that hold in place the $1"$ Pulleys and $\frac{1}{2}"$ Discs representing the headlamps. Two further $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates are attached by an Angle Bracket to those previously mentioned, and are bolted also to the $3\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip spacing the sides of the bonnet.

The back of the cab consists of two $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates overlapped three holes and bolted to the $1" \times 1"$ Angle Brackets. The upper portion of the back is completed by overlapping three $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates along their long edges and bolting them at their top ends to a $3\frac{1}{2}"$ Strip and to Angle Brackets.

The driving seat is a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate attached to the back of the cab by an Angle Bracket.

The steering wheel is a Bush Wheel held on a $4\frac{1}{2}"$ Rod. The Rod is passed through the hole of an Obtuse Angle Bracket bolted to the $3\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip. It is held by a Spring Clip in the hole of a Flat Bracket, which is bolted to an Angle Bracket fastened to the side of the bonnet.

The single front wheel is a $3"$ Pulley, which is free to turn on a $3\frac{1}{2}"$ Rod, and is retained in position by two Spring Clips. The Rod is journaled in holes in two Reversed Angle Brackets bolted to the sides of the bonnet.

The rear part of the chassis is a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate, and it carries a ramp built as follows. Two Trunnions are bolted to the Flanged Plate, and a $3\frac{1}{2}"$ Strip and a $2\frac{1}{2}"$ Strip are bolted to each Trunnion as shown in Fig. 6.13c. The $2\frac{1}{2}"$ Strips are extended by $2\frac{1}{2}"$ large radius Curved Strips, which are bolted also to 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. A Flat Trunnion is attached to an Obtuse Angle Bracket held by the same Bolt as the $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip. The Crank Handle is passed through holes in the $2\frac{1}{2}"$ Strips forming the ramp, and two $1"$ Pulleys are secured to it, one on each side of the rear $2\frac{1}{2}"$ Strip. The $1"$ Pulleys are fitted with $\frac{1}{2}"$ Bolts, which are used to allow the trailer to be unhitched from the power unit. The $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip at the end of the ramp acts as a stop for the trailer.

(Continued on next page)

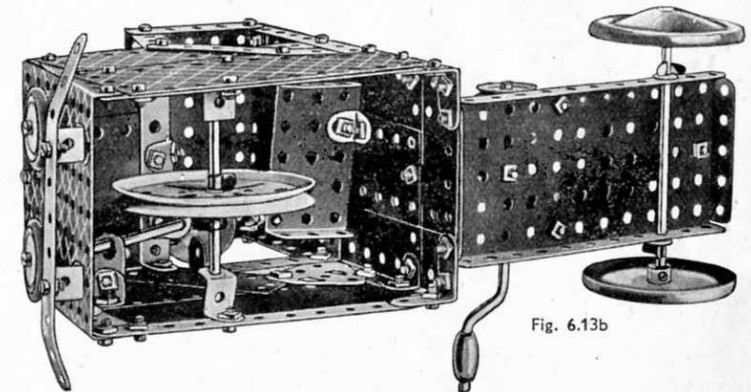


Fig. 6.13b

(Continued from previous page)

An underneath view of the trailer is shown in Fig. 6.13a. Its main members are $12\frac{1}{2}$ " Angle Girders, joined across by a $5\frac{1}{2}$ " Strip at each end. At the centre a $12\frac{1}{2}$ " Strip is bolted across the $5\frac{1}{2}$ " Strips, and the floor is filled in with two $12\frac{1}{2}$ " Strip Plates. Each of the sides is built up from four $12\frac{1}{2}$ " Strips, bolted at the rear end to a $2\frac{1}{2}$ " Strip and at the front end to a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip. The front end of the trailer consists of two $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates overlapped seven holes, and attached by Angle Brackets to the bottom and sides. The rear end is a $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate fixed to a $5\frac{1}{2}$ " Strip and attached to the sides by Angle Brackets, and the rear coupling hook is a Cranked Bent Strip bolted to a Flat Bracket.

The rear Road Wheels are carried on a $4\frac{1}{2}$ " Rod journalled in $1\frac{1}{2}$ " Strips bolted to a $3\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip. The front wheels are $1\frac{1}{2}$ " Discs bolted to $2\frac{1}{2}$ " Strips attached by Angle Brackets to the Angle Girders.

The $2\frac{1}{2}$ " Strip seen underneath the trailer in Fig. 6.13a, is fitted with an Angle Bracket, which engages with the Flat Trunnion forming part of the ramp on the mechanical horse.

When the Crank Handle is turned the $\frac{3}{8}$ " Bolt in the boss of the Pulley lifts the front of the trailer and releases the Angle Bracket from behind the Flat Trunnion.

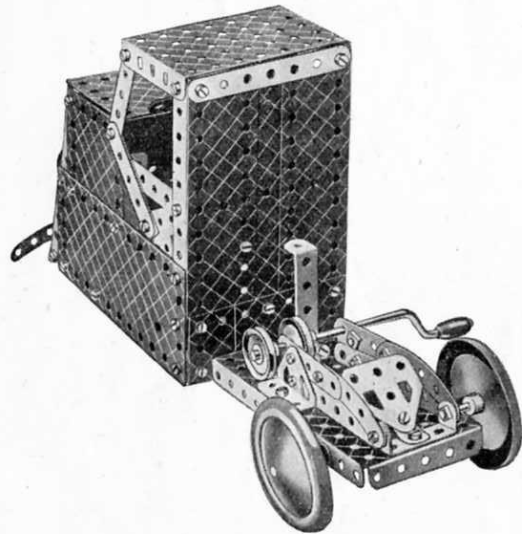
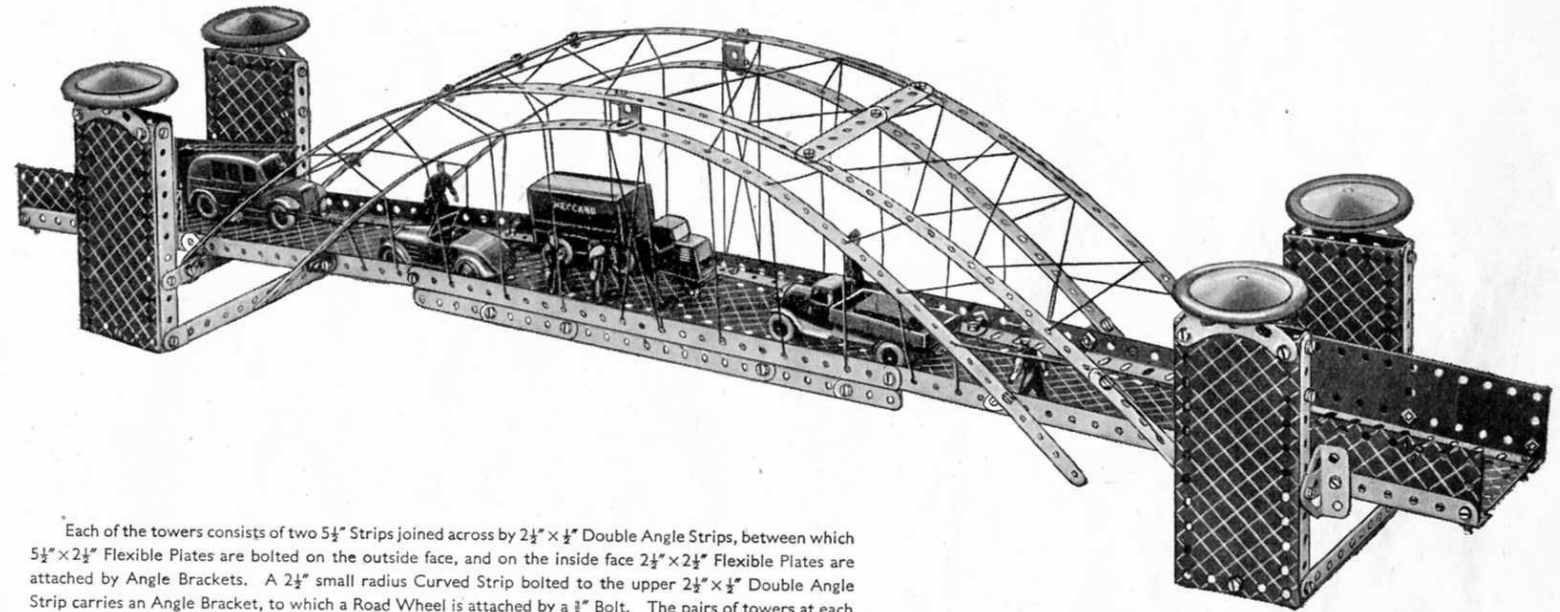


Fig. 6.13c

6.14 SYDNEY HARBOUR BRIDGE



Each of the towers consists of two $5\frac{1}{2}$ " Strips joined across by $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips, between which $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates are bolted on the outside face, and on the inside face $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates are attached by Angle Brackets. A $2\frac{1}{2}$ " small radius Curved Strip bolted to the upper $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip carries an Angle Bracket, to which a Road Wheel is attached by a $\frac{1}{8}$ " Bolt. The pairs of towers at each end of the bridge are joined across by three $5\frac{1}{2}$ " Strips.

Each side of the span consists of two Angle Girders joined together by two $12\frac{1}{2}$ " Strips arranged in the form of an angle girder. The two sides are connected by $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plates held by the same Bolts as the $12\frac{1}{2}$ " Strips, and also by a $3\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip at the centre. The roadway at the centre of the span is represented by two $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates overlapped one hole and bolted between the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plates. The remainder of the roadway consists of $12\frac{1}{2}$ " \times $2\frac{1}{2}$ " Strip Plates, attached to the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plates at one end and clamped between Flat Brackets and the Angle Girders at the other end. The sides of the approach roadways are $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates bolted to the Angle Girders of the span. The completed span is attached to each pair of towers by a Trunnion bolted in the position shown in the illustration.

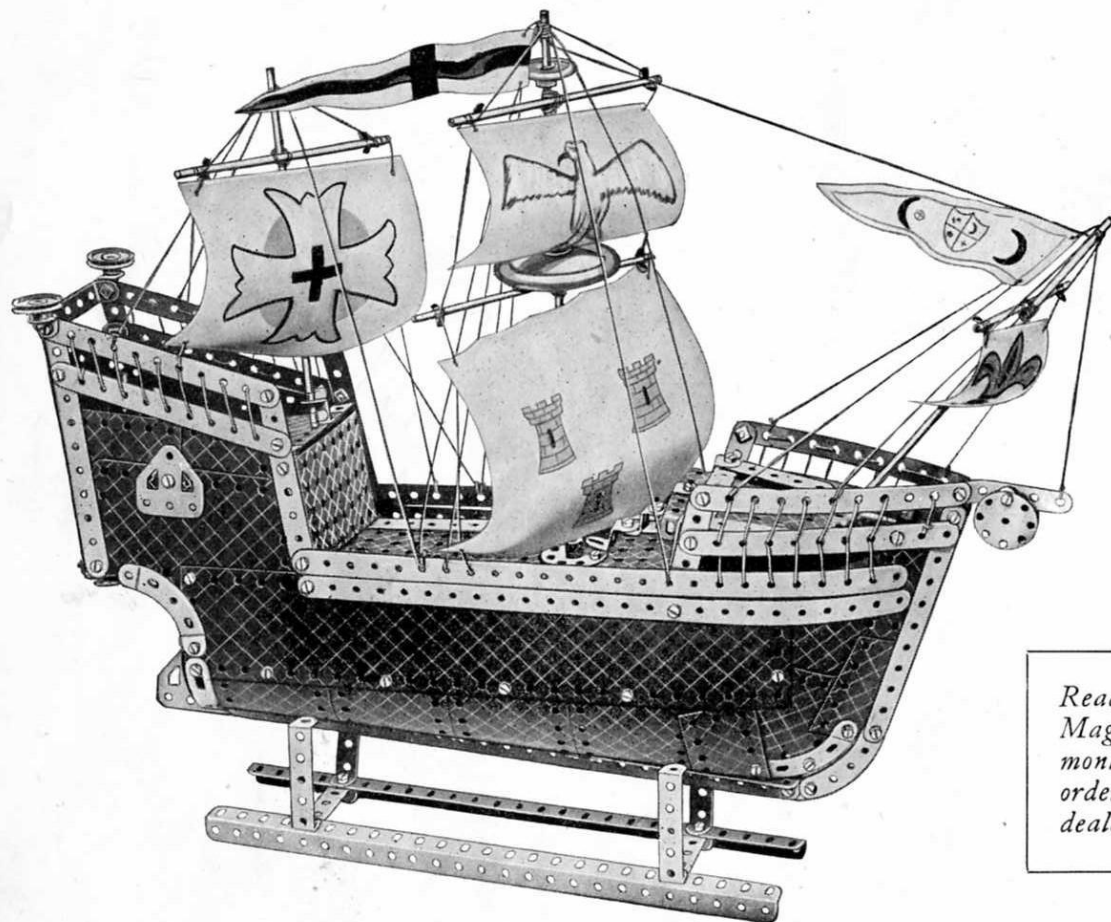
The top of the suspension arch on each side consists of two $12\frac{1}{2}$ " Strips, bolted together and extended at each end by a $2\frac{1}{2}$ " Strip. An Obtuse Angle Bracket and an Angle Bracket are bolted to the end of the $2\frac{1}{2}$ " Strip, the Angle Bracket being attached to the span and the Obtuse Angle Bracket to the upper $5\frac{1}{2}$ " Strip spacing the towers. The inside of the arch is made of two $12\frac{1}{2}$ " Strips fixed by Angle Brackets to the sides of the roadway and connected by a Double Bracket to the other arch at its centre.

The arches on each side are braced across by compound strips, each of which consists of a $3\frac{1}{2}$ " Strip and a $3"$ Strip overlapped three holes. The model is completed by adding the roadway suspension cables, which are represented by Cord and are arranged as shown in the illustration.

Parts required

12 of No. 1	16 of No. 12	2 of No. 111a
14 " " 2	4 " " 12c	6 " " 111c
2 " " 3	103 " " 37	2 " " 126
2 " " 4	6 " " 37a	4 " " 187
10 " " 5	8 " " 48a	4 " " 189
2 " " 6a	1 " " 48b	4 " " 190
4 " " 8	2 " " 53	2 " " 191
4 " " 10	4 " " 90a	4 " " 192
2 " " 11	2 " " 111	2 " " 197

6.15 GALLEON



Read the "Meccano Magazine," published monthly. Place a regular order with your Meccano dealer or newsagent.

Parts required

6 of No. 1	13 of No. 12	3 of No. 22	2 of No. 48	2 of No. 90	4 of No. 188	2 of No. 199
14 " " 2	1 " " 12c	1 " " 24	7 " " 48a	4 " " 9Ca	3 " " 189	2 " " 200
3 " " 3	1 " " 13	13 " " 35	2 " " 48b	3 " " 111c	4 " " 190	1 " " 212
2 " " 4	1 " " 14	104 " " 37	1 " " 51	4 " " 125	2 " " 191	2 " " 213
12 " " 5	2 " " 15	1 " " 37a	1 " " 52	3 " " 126a	4 " " 192	2 " " 214
2 " " 6a	1 " " 15a	4 " " 38	2 " " 53	1 " " 155a	2 " " 197	2 " " 215
4 " " 8	1 " " 15b	2 " " 40	1 " " 54a	1 " " 187	1 " " 198	2 " " 217a
5 " " 10	3 " " 16					

Construction is commenced by bolting four $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates and one $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate to one of the two Angle Girders forming the keel of the vessel, as shown in Fig. 6.15b. Two Formed Slotted Strips also are bolted to the Angle Girders at the stern. The $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates are extended on the rear side of the model by two $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates overlapping each other one hole. Two $12\frac{1}{2}" \times 2\frac{1}{2}"$ Strip Plates are then bolted to each side of the model in the positions shown, and the sides are curved up and joined across at the stern by two $2\frac{1}{2}"$ Strips overlapped one hole, and by Angle Brackets.

The keel is extended at the bows by $2\frac{1}{2}"$ large radius Curved Strips and by two $5\frac{1}{2}"$ Strips fastened together by Angle Brackets. The stern is filled in by two Semi-Circular Plates, which are bolted to a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate and attached by a Flat Bracket to the $2\frac{1}{2}"$ Strips spacing the sides, the Bolt holding also two $1\frac{1}{2}"$ radius Curved Plates.

One half of a Hinged Flat Plate is used for one side of the poop, and the other half is used for the poop deck, and is bolted to a $3\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip.

The main deck consists of a $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate bolted across the ship just in front of the forecastle, and to it two $12\frac{1}{2}"$ Strips are bolted one on each side. These Strips support a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate by means of Angle Brackets.

The forecastle is spaced across by a $3\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip, to which is bolted a Flanged Sector Plate forming the deck, and two $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips. The $5\frac{1}{2}"$ Strips forming the rails of the forward deck are bolted to the ends of $1\frac{1}{2}"$ Strips extending the bows. The bows are completed by bolting one U-Section Curved Plate to the $5\frac{1}{2}"$ Strips forming the sides of the upper deck, and another U-Section Curved Plate to the $2\frac{1}{2}"$ small radius Curved Strips near the keel.

The mainmast is an $11\frac{1}{2}"$ Rod held in the boss of a Bush Wheel bolted to the $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate forming part of the deck, and it carries a $5"$ Rod and a $4\frac{1}{2}"$ Rod, which represent spars. The mast on the poop is a $5"$ Rod joined to a $3\frac{1}{2}"$ Rod by a Rod Connector. It is passed through a hole in a Reversed Angle Bracket bolted to the poop, and through a hole in the deck, and is held in position by Spring Clips. This mast carries a $3\frac{1}{2}"$ Rod as a spar.

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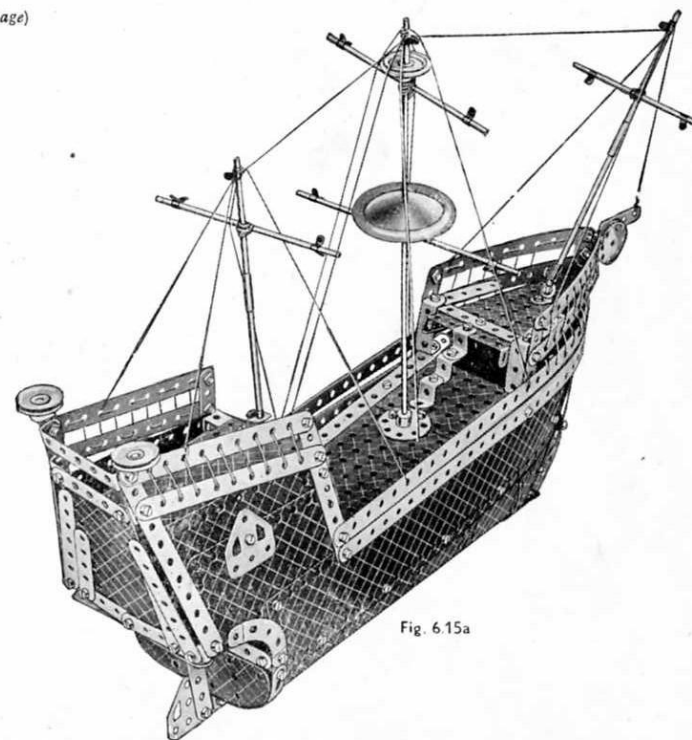


Fig. 6.15a

(Continued from previous page)

The forward mast also is a 5" Rod joined to a 3½" Rod by a Rod Connector, and it is mounted in a Rod and Strip Connector attached to the Flanged Sector Plate by an Obtuse Angle Bracket. The spars are fastened to the mast by Cord, and the method of rigging the model is shown in Fig. 6.15a.

The sails and pennant can be cut from white cardboard or stiff paper. The topsail is 5" long at its upper edge, 5½" long at its lower edge, and 3½" wide. The mainsail is 5½" long, broadening to 6½" at its lower edge, and 5" in width. The foresail is 3½" long, broadening to 4", and 2½" wide, and the sail on the after mast is 5" in length broadening to 5½", and is 4½" in width. The pennant is 6" long and 1" wide.

The model is carried on a stand made by joining two 12½" Angle Girders across by 2½" x ½" Double Angle Strips. Four 2½" x ½" Double Angle Strips are bolted to the Angle Girders in an upright position, and they are bent inward slightly so that the keel of the galleon can rest on their ends.

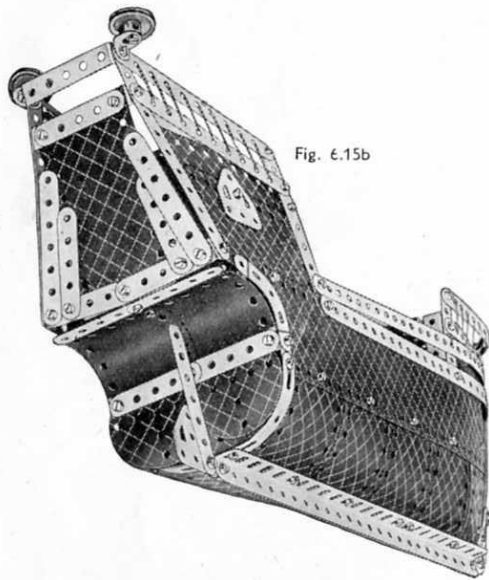
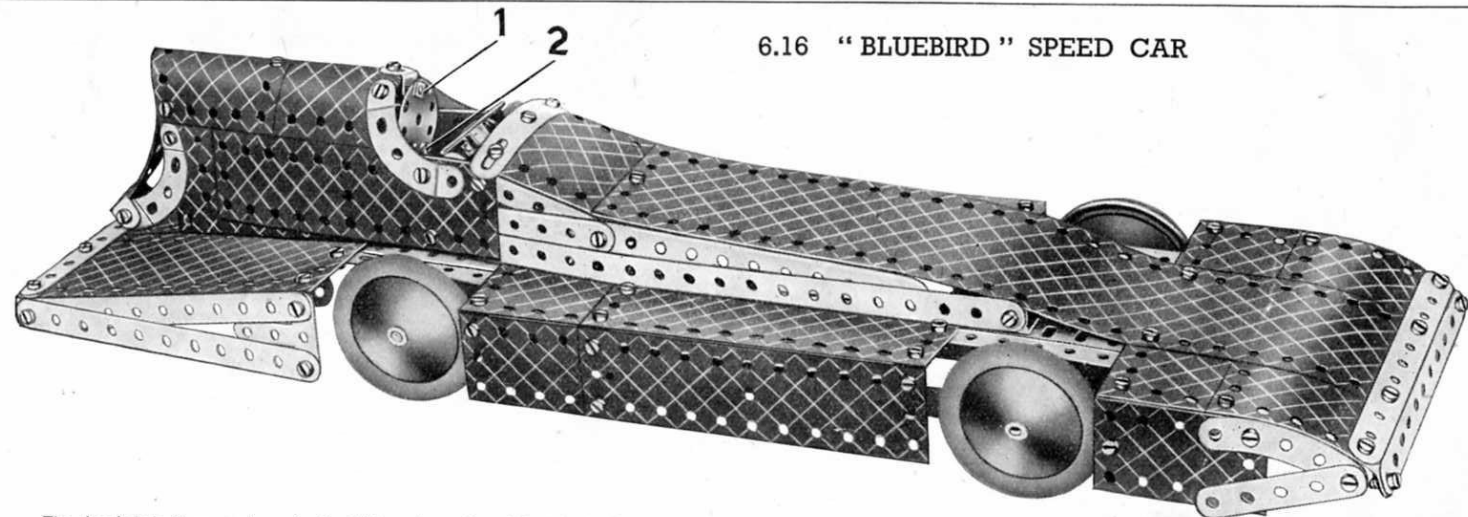


Fig. 6.15b



6.16 "BLUEBIRD" SPEED CAR

The chassis is built up as shown in Fig. 6.16a. It consists of four Angle Girders, pairs of which are joined across at the rear end by Flat Trunnions, and at the front by 1½" Strips bolted in the fourth holes from the front ends of the Angle Girders. These form bearings for the axles. The lower Angle Girders or side members are joined together at the rear by a 2½" Strip, and at the front by a 3½" x 2½" Flanged Plate. The upper Angle Girders are joined across by three 5½" Strips, two of which are bolted five holes from the rear ends and seven holes from the front ends of the Angle Girders respectively, to form supports for the streamlined casing between the wheels.

Two 12½" Strips overlapping the chassis 13 holes extend the tail of the car, which consists of two Flanged Sector Plates bolted by the flanges of their broad ends to a 2½" x ½" Double Angle Strip on one edge, and to an Angle Bracket on the other edge. The narrow ends of the two Flanged Sector Plates are spaced one hole apart, and are bolted in the second hole in their flanges to a 5½" Strip. Two 2½" small radius Curved Strips and a 2½" Strip are bolted to a Double Bracket and fixed as shown. Two U-Section Curved Plates overlapped one hole also are bolted to the Flanged Sector Plates, and are joined to the 5½" x 1½" Flexible Plates by 2½" small radius Curved Strips.

Two 5½" x 2½" Flexible Plates are bolted between the two 5½" Strips to form the rear wheel fairings, and the 5½" Strips forming the sides are bolted to a Flat Trunnion and a Double Bracket. The engine and cockpit fairing consists of a 12½" x 2½" Strip Plate and a 2½" x 2½" Flexible Plate, bolted at the join to a 2½" x ½" Double Angle Strip. The last named is joined in turn to two 5½" Strips that fill in the side of the fairing. The method of building up the streamlined radiator will be clear from the general view of the model.

The front and rear axles are 5" Rods held in place by Collars. They carry a 1" Pulley, fitted with Rubber Ring, and a Road Wheel at each end. The headrest is a 1½" Disc lock-nutted to Bolt 1. Bolt 2 holds in place a second 1½" Disc, which in turn is bolted at right angles to a third Disc 3 by means of a Reversed Angle Bracket.

Parts required

4 of No. 1	1 of No. 24	4 of No. 126a
12 " " 2	95 " " 37	4 " " 155a
4 " " 3	1 " " 37a	4 " " 187
2 " " 4	2 " " 48	4 " " 188
6 " " 5	5 " " 48a	4 " " 189
2 " " 6a	1 " " 53	5 " " 190
4 " " 8	2 " " 54a	4 " " 192
3 " " 11	4 " " 59	1 " " 197
14 " " 12	2 " " 90	2 " " 199
1 " " 12a	4 " " 90a	2 " " 200
2 " " 12c	1 " " 111c	1 " " 215
2 " " 15	1 " " 125	3 " " 217a
4 " " 22	2 " " 126	

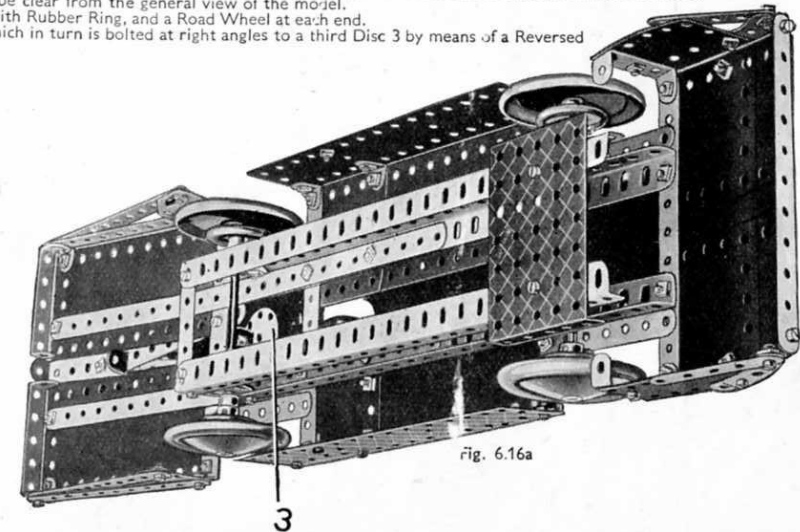


Fig. 6.16a

6.17 WINDMILL

The corners of the main frame are four Angle Girders, connected at their lower ends by $5\frac{1}{2}$ " Strips and at their upper ends by $2\frac{1}{2}$ " Strips. The sides are filled in with $12\frac{1}{2}$ " x $2\frac{1}{2}$ " Strip Plates, and at the front Flexible Plates are used in order to leave a space for the doorway. A $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate fastened to the front $5\frac{1}{2}$ " Strip by Angle Brackets forms a platform in front of the doorway.

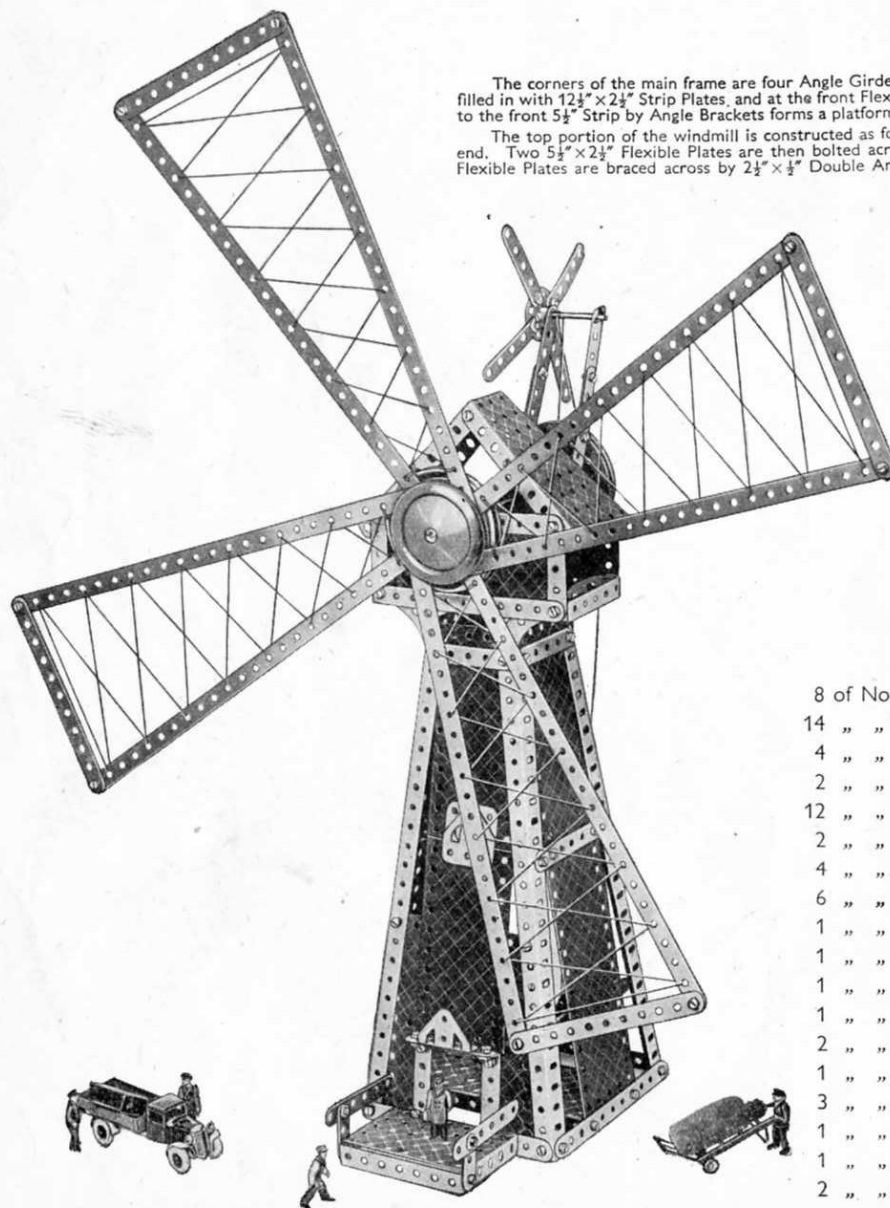
The top portion of the windmill is constructed as follows. Two Flanged Sector Plates are bolted together at right angles by their flanges at the narrow end. Two $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plates are then bolted across the flanges at the wide ends of the Flanged Sector Plates. The lower corners of the $4\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plates are braced across by $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strips, the Bolts holding also $2\frac{1}{2}$ " small radius Curved Strips, which in turn are bolted to the upper ends of the Angle Girders forming the corners of the main frame.

A superstructure (Fig. 6.17a) is erected at the rear to hold the directional vanes. It is constructed by fastening two compound strips, each consisting of a $5\frac{1}{2}$ " and a $2\frac{1}{2}$ " Strip, to the back $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plate by a $1\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip. The compound strips are braced by two $2\frac{1}{2}$ " large radius Curved Strips, also fastened to the $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plate by a $1\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip. A 2" Rod, journaled in the end holes of the compound strips, carries at its end a Bush Wheel, to which are bolted $2\frac{1}{2}$ " Strips representing the vanes.

The construction of the sails, and the manner in which they are mounted, are clear from the illustration.

A Crank Handle journaled as shown in Fig. 6.17a carries on its shaft a 1" Pulley, that is connected by a Driving Band to another 1" Pulley on a 5" Rod midway up the frame. A $\frac{1}{2}$ " fast Pulley, also on the 5" Rod, is connected by Cord to the 3" Pulley on the shaft of the sails, and a 1" Pulley on this shaft is connected by a Driving Band with the 2" Rod carrying the directional vanes.

Fig. 6.17b shows the Windmill arranged for drive with an E120 Electric Motor. The Motor is bolted by one of its flanges to the $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate in the base of the model, and its other flange is attached by an Angle Bracket to the $5\frac{1}{2}$ " Strip bracing the sides. The drive is taken from the pinion of the Motor to a 57-teeth Gear on a Rod journaled in the Motor side plates. A $\frac{1}{2}$ " fast Pulley on this Rod transmits the drive through a belt of Cord to the 3" Pulley half-way up the mill.



Parts required

8 of No. 1	92 of No. 37	1 of No. 186a
14 " " 2	4 " " 37a	1 " " 187
4 " " 3	2 " " 38	2 " " 189
2 " " 4	1 " " 40	4 " " 192
12 " " 5	1 " " 48	2 " " 197
2 " " 6a	5 " " 48a	
4 " " 8	2 " " 48b	For model Windmill fitted with E120 Electric Motor:—
6 " " 12	1 " " 51	Additional parts required:—
1 " " 12a	1 " " 52	1 of No. 16
1 " " 13	1 " " 53	*1 " " 19b
1 " " 15	2 " " 54a	*1 " " 27a
1 " " 17	4 " " 59	*1 E120 Electric Motor
2 " " 19b	2 " " 90	Parts not required:
1 " " 19g	4 " " 90a	1 of No. 12a
3 " " 22	4 " " 111c	1 " " 19g
1 " " 23a	1 " " 126	1 " " 22
1 " " 24	2 " " 126a	1 " " 35
2 " " 35	1 " " 186	1 " " 51
		*Not included in Outfit

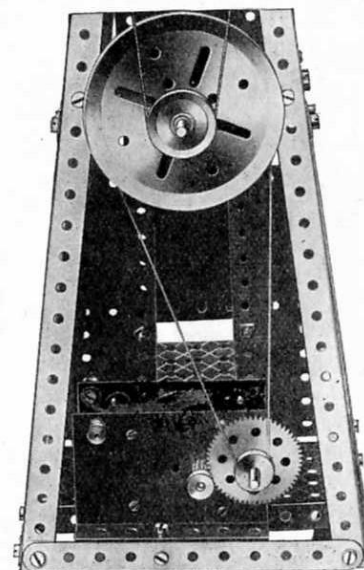


Fig. 6.17b

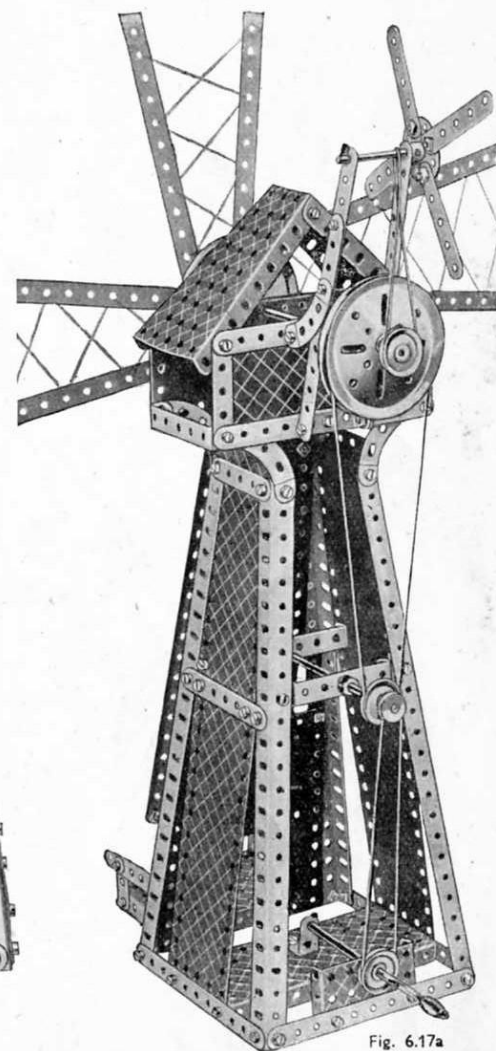


Fig. 6.17a

6.18 FLYBOATS

The base consists of two $12\frac{1}{2}'' \times 2\frac{1}{2}''$ Strip Plates, joined at each end by $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates and strengthened by $5\frac{1}{2}''$ Strips bolted to the ends of the base. Four Angle Girders are bolted to the base as shown in the illustration, and pairs of them are joined at the top by compound strips, each of which consists of two $5\frac{1}{2}''$ Strips overlapped five holes. The Angle Girders are braced across by $12\frac{1}{2}''$ Strips.

The centre pin is withdrawn from a Hinged Flat Plate and the halves are used as flat plates 3. The $12\frac{1}{2}''$ Strips 1 and 2 form the supports for the carriages. The Strips 2 are bolted across a Bush Wheel mounted on the $6\frac{1}{2}''$ Rod forming the main shaft. Strips 1 are bolted across a $3''$ Pulley also secured on the $6\frac{1}{2}''$ Rod.

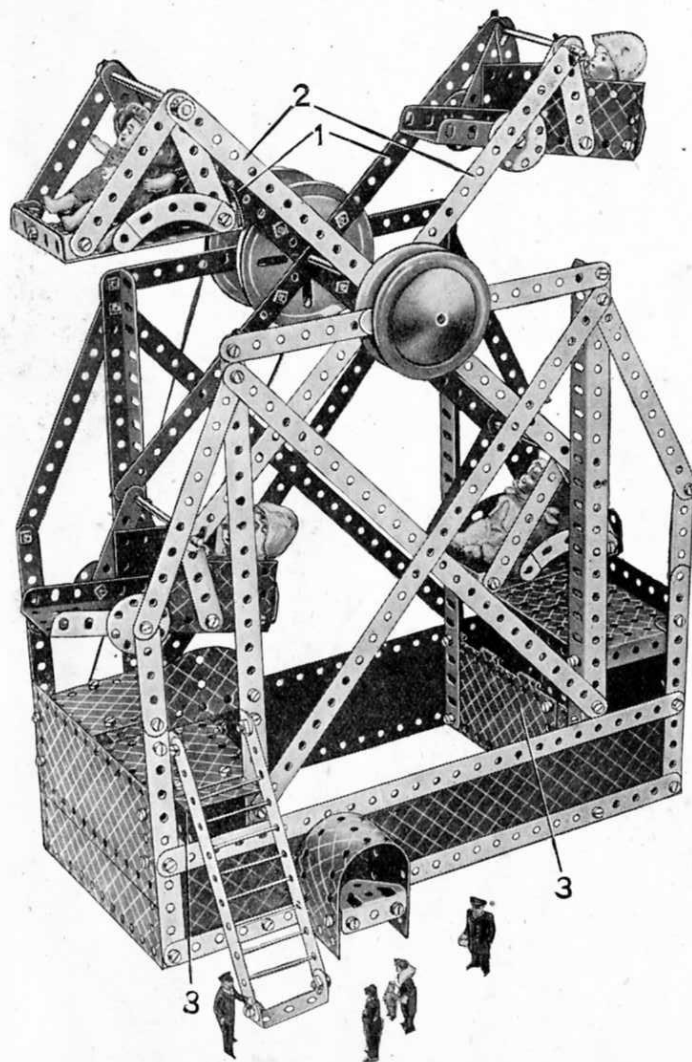
Two of the carriages are made by fastening $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips inside the flanges of a $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate. Two $3''$ Strips and two $3\frac{1}{2}''$ Strips are then bolted to the ends of the $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips. A $4''$ Rod passes through the holes in these Strips and through the end holes of the $12\frac{1}{2}''$ Strips 1 and 2. A back is provided by a U-Section Curved Plate bolted to the rear of the $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, and the sides are formed by $2\frac{1}{2}''$ small radius Curved Strips.

The base of each of the other two carriages is a Flanged Sector Plate. The sides consist of $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates, and bearings for the $3\frac{1}{2}''$ Rods on which the carriages are supported are provided by the end holes of $2\frac{1}{2}''$ Strips, bolted to the flanges of the Flanged Sector Plate. The back is formed by two Flat Trunnions fixed to a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip secured between the flanges of the Flanged Sector Plate.

The Crank Handle (Fig. 6.18a) by which the carriages are set in motion, is journaled in the $12\frac{1}{2}'' \times 2\frac{1}{2}''$ Strip Plate forming the rear side of the base, and also in a $1'' \times 1''$ Angle Bracket. The $1'' \times 1''$ Angle Bracket is bolted to the half of a Hinged Flat Plate used in the construction of the left-hand platform. The drive is taken by Cord from a $1''$ Pulley on the shaft of the Crank Handle to a $3''$ Pulley on the main shaft.

The pay-box consists of a $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate bent to shape, and is secured to the base by a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. The counter is formed by a Trunnion, and is fastened in position by Angle Brackets.

Fig. 6.18b shows the model fitted with a No. 1a or No. 2 Clockwork Motor. The Motor is bolted to the base of the model, and the drive is taken from a $\frac{1}{2}''$ Pinion on the Motor shaft through a 57-teeth Gear fastened on a Rod journaled in the Motor side-plates. The Rod carries also a $\frac{1}{2}''$ fast Pulley 1. A driving band connects the $\frac{1}{2}''$ fast Pulley 1 to the $3''$ Pulley.



Parts required

12 of No. 1	1 of No. 23a	6 of No. 111c
14 " " 2	1 " " 24	1 " " 126
4 " " 3	14 " " 35	4 " " 126a
2 " " 4	105 " " 37	2 " " 187
12 " " 5	6 " " 37a	4 " " 188
2 " " 6a	8 " " 38	2 " " 189
4 " " 8	1 " " 40	4 " " 190
8 " " 12	2 " " 48	4 " " 192
1 " " 12a	8 " " 48a	2 " " 197
1 " " 14	2 " " 48b	1 " " 198
2 " " 15b	1 " " 52	2 " " 199
2 " " 16	2 " " 53	1 " " 214
2 " " 19b	2 " " 54a	4 " " 217a
1 " " 19g	3 " " 59	
3 " " 22	4 " " 90a	

For Model Flyboats fitted with No. 1a or No. 2 Clockwork Motor

Additional parts required :-

*1 of No. 16a
*1 " " 26
*1 " " 27a
6 " " 38
1 " " 59

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

Parts not required :-

1 of No. 12a
1 " " 19g
2 " " 22

* Not included in Outfit

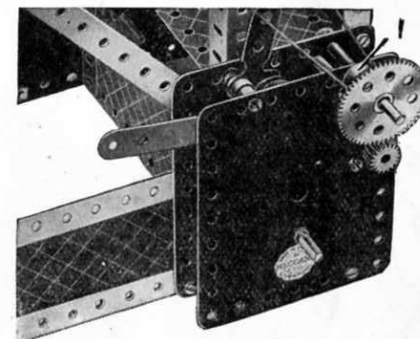


Fig. 6.18b Sectional view showing Motor fitted.

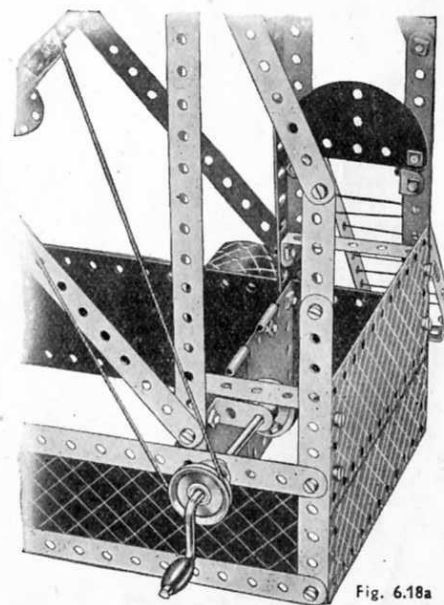


Fig. 6.18a

6.19 GIANT DRAGLINE

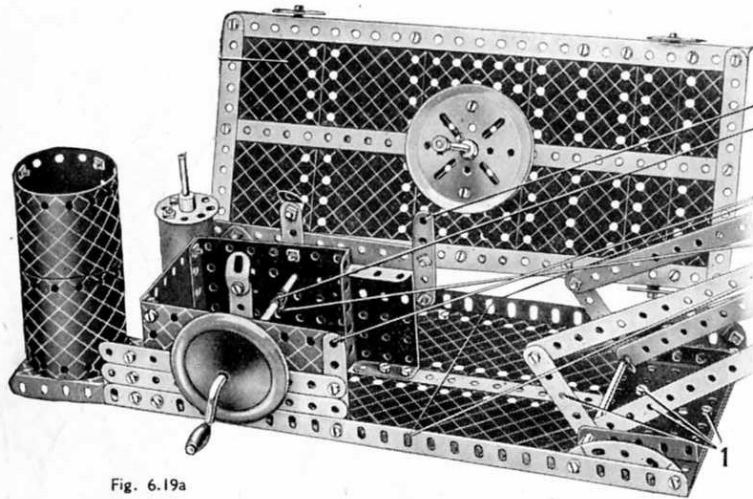


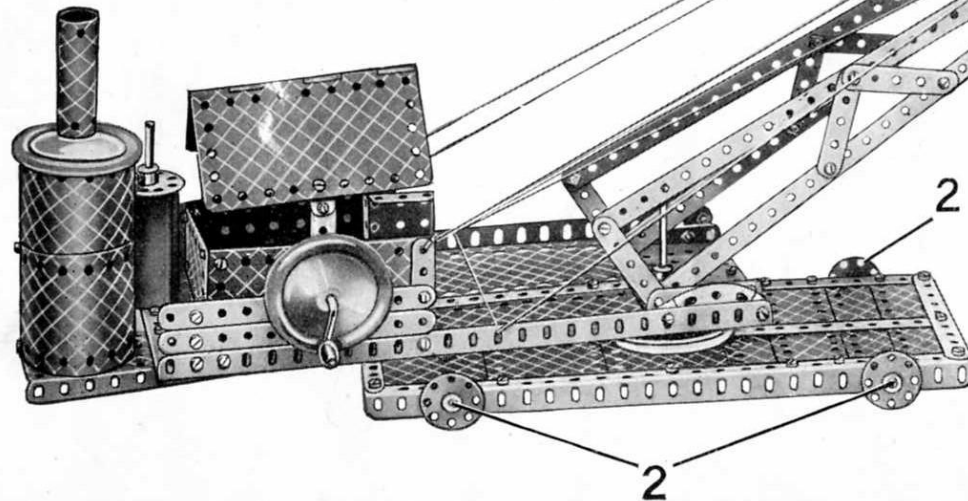
Fig. 6.19a

12 of No. 1	1 of No. 24
12 " " 2	5 " " 35
2 " " 3	97 " " 37
8 " " 5	14 " " 37a
2 " " 6a	7 " " 38
4 " " 8	1 " " 40
2 " " 10	2 " " 48
2 " " 11	3 " " 48a
3 " " 12	1 " " 48b
2 " " 12c	1 " " 51
1 " " 14	1 " " 52
1 " " 15	2 " " 53
2 " " 15b	2 " " 54a
2 " " 16	1 " " 57c
1 " " 17	
1 " " 18b	
2 " " 19b	
1 " " 19h	
4 " " 22	
2 " " 22a	

Parts required

3 of No. 59	4 of No. 189
1 " " 80c	4 " " 190
2 " " 90a	4 " " 192
2 " " 111a	2 " " 197
6 " " 111c	1 " " 198
4 " " 125	1 " " 199
4 " " 126a	
1 " " 147b	
2 " " 187	

2 of No. 200
1 " " 216
4 " " 217a



For Model Drag-line fitted with E20B Electric Motor.

Additional parts required :-

1 of No. 16
1 " " 23a
*1 " " 32
1 " " 126
1 " " 186a
*E20B Electric Motor

Parts not required :-

2 of No. 12
2 " " 12c
1 " " 19h
4 " " 37
1 " " 48b
1 " " 53
4 " " 190
1 " " 198
*Not included in Outfit

The base is constructed by joining two Angle Girders at each end by a $5\frac{1}{2}$ " Strip. It is then filled in by a $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate and different sized Flexible Plates. The Bolts 2 carrying the $1\frac{1}{2}$ " Discs are lock-nutted. A 3" Pulley Wheel is bolted to the centre of the $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate. The control platform is built up in a similar manner to the base, but is filled in by two $12\frac{1}{2}$ " Strip Plates. A 3" Pulley is secured under the forward end of the platform by four Reversed Angle Brackets, which are held by the Bolts shown at 1. A 4" Rod is passed through the upper 3" Pulley, and its lower end is gripped in the 3" Pulley bolted to the base. The platform, therefore, is free to swivel, but is retained in position on the Rod by a Collar.

The near side of the cab (Fig. 6.19a) consists of two $2\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plates, overlapped one hole and fastened to the Angle Girder at the edge of the platform. The rear side of the cab is formed by a $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate and a $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flanged Plate. The $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate is secured to the base by a $3\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip, and the $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flanged Plate is bolted in position by its flange. A Hinged Flat Plate is used for the roof, and it is attached by Obtuse Angle Brackets to two $1\frac{1}{2}$ " Strips bolted to the sides. The boiler consists of two $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plates and two $1\frac{1}{8}$ " radius Curved Plates.

The chimney is formed by bending a U-Section Curved Plate so that the two ends overlap. A Bolt is fastened through the overlapping portions, and carries also an Angle Bracket inside the chimney. A $6\frac{1}{2}$ " Rod, on the end of which is a Spring Clip, is slipped through the Angle Bracket and locked in the boss of a Road Wheel. The Wheel is placed over the boiler, and the lower end of the $6\frac{1}{2}$ " Rod passes through a Flanged Sector Plate, which is bolted at the rear of the base. The Rod is held in position by another Spring Clip.

(Continued on next page)

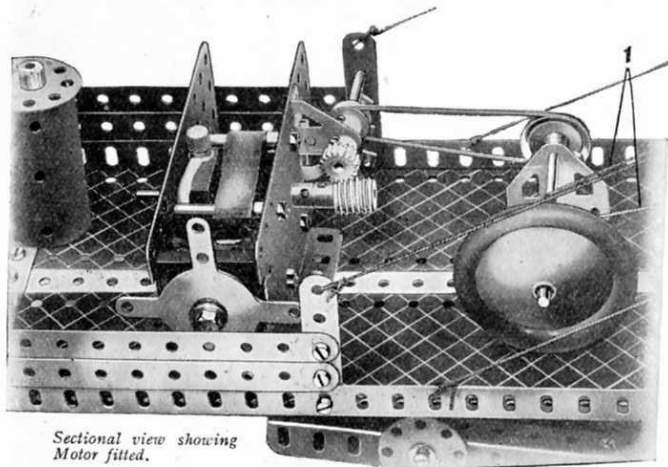


Fig. 6.19b

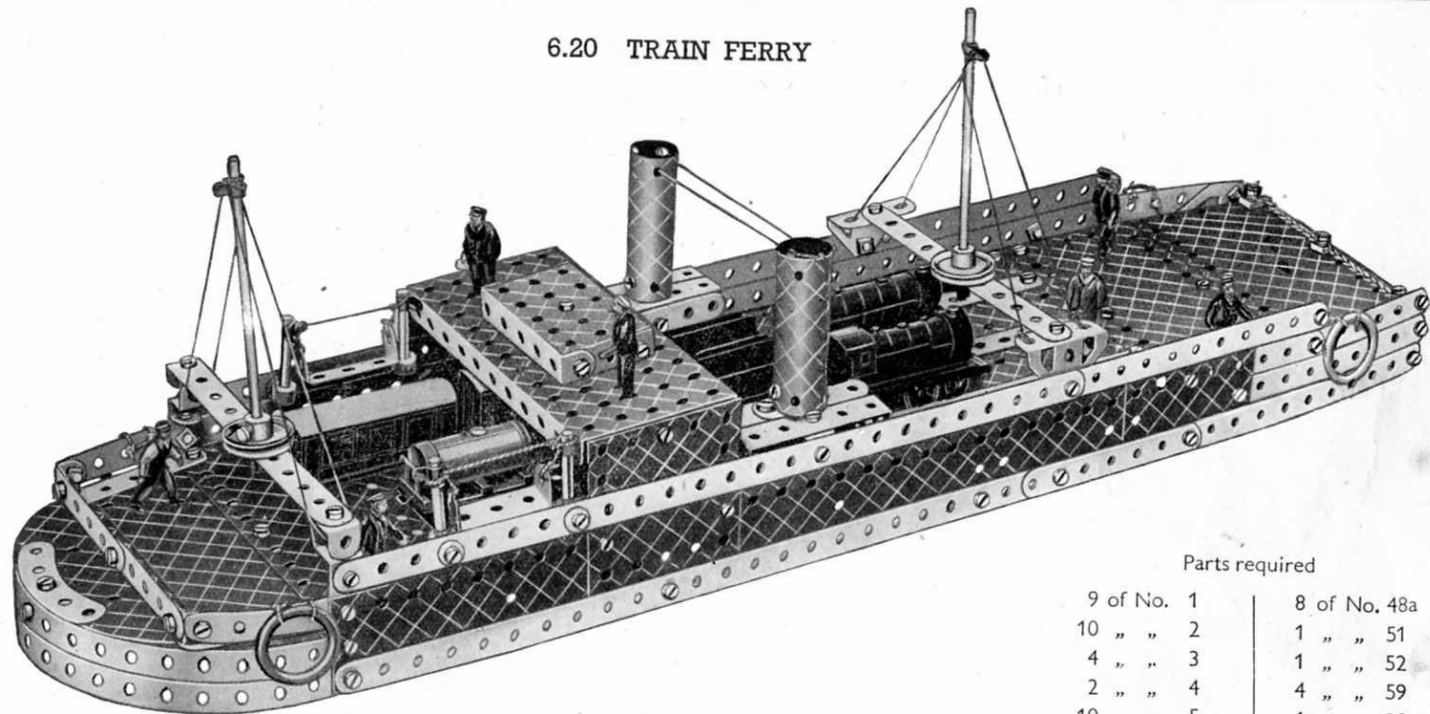
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The jib is constructed from $12\frac{1}{2}$ " Strips bolted end to end. It is pivoted at its lower end on a 4" Rod journalled in the flanges of a $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate held by Bolts 1. The jib is held at an angle of about 30 degrees by Cord, which is tied to the cab and then taken over a 1" fast Pulley on a 2" Rod journalled in the jib. From there the Cord is led through holes in the Angle Girders forming the sides of the platform, over a 1" Pulley on the other end of the 2" Rod, and finally is tied to the cab.

The Crank Handle held in the sides of the cab controls the movement of the bucket. Cord is wound a few times round the shaft of the Crank Handle and then is taken over a $4\frac{1}{2}$ " Rod in the jib and tied to the front of the bucket. The other end of the Cord is led around a 1" fast Pulley on a Rod at the end of the jib, and through the pulley block at the back of the bucket. It is then tied to a Flat Bracket carried on the 2" Rod journalled in the jib.

Fig. 6.19b shows the Giant Dragline fitted with an E20B Electric Motor. The Motor is bolted by its flanges to the $12\frac{1}{2}$ " Strip running the length of the control platform, and is fixed to one of the sides by an Angle Bracket. The Flat Trunnions used as bearings for the Rod controlling the bucket are taken from the sides of the platform and are replaced by $1\frac{1}{2}$ " Strips. The drive is taken through a Worm on the driving shaft of the Motor to a $\frac{1}{2}$ " Pinion fastened on a $2\frac{1}{2}$ " Rod. Bearings for this Rod are provided by a $2\frac{1}{2}$ " Strip fixed to the side of the platform, and by a Trunnion bolted to the sideplate of the Motor. The Rod carries also a $\frac{1}{2}$ " fast Pulley, which is connected by a Driving Band to a 1" Pulley on the $3\frac{1}{2}$ " Rod, journalled in the Flat Trunnions. The Cord 1 controls the movement of the bucket.

6.20 TRAIN FERRY



Construction is commenced by bolting $12\frac{1}{2}$ " Angle Girders together to make two $17\frac{1}{2}$ " compound angle girders, and then connecting them by two $5\frac{1}{2}$ " Strips. The sides of the ship consist mainly of $5\frac{1}{2}$ " x $1\frac{1}{2}$ " and $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plates, and are bolted to the framework and strengthened at the bottom by $12\frac{1}{2}$ " Strips. The bows are formed by bending $12\frac{1}{2}$ " Strips to shape and bolting them to the sides of the ship. At the stern the sides are extended by means of Strips, and are joined across by $2\frac{1}{2}$ " Strips to form a square end. Fig. 6.20a shows the layout of the Flexible Plates and Strip Plates forming the deck. A $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate is used for the bridge, and is supported by two $2\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plates bolted to the sides. The twin funnels are made from U-Section Curved Plates. The supports to which the funnels are bolted are built up from $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strips and $2\frac{1}{2}$ " Strips attached to a 1" x 1" Angle Bracket, the complete assembly being attached to the sides of the vessel by Double Brackets.

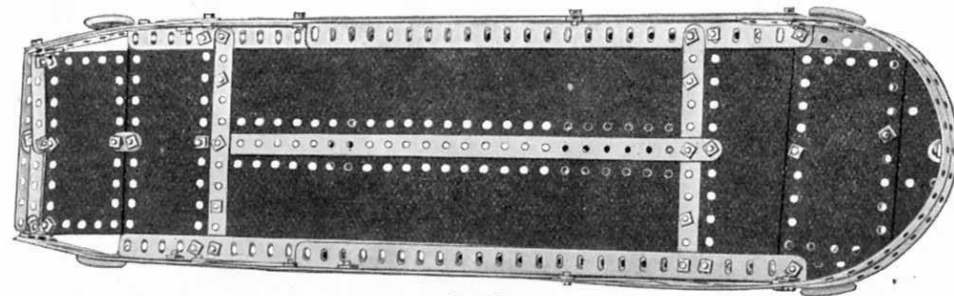


Fig. 6.20a

Parts required

9 of No. 1	8 of No. 48a
10 " " 2	1 " " 51
4 " " 3	1 " " 52
2 " " 4	4 " " 59
10 " " 5	1 " " 90
4 " " 8	1 " " 111
7 " " 10	3 " " 111c
4 " " 11	2 " " 125
9 " " 12	2 " " 126
2 " " 12a	2 " " 126a
2 " " 15	4 " " 155a
4 " " 18a	4 " " 188
2 " " 22	4 " " 189
8 " " 35	2 " " 190
93 " " 37	2 " " 191
7 " " 37a	2 " " 192
9 " " 38	2 " " 197
1 " " 40	2 " " 199
2 " " 48	2 " " 214

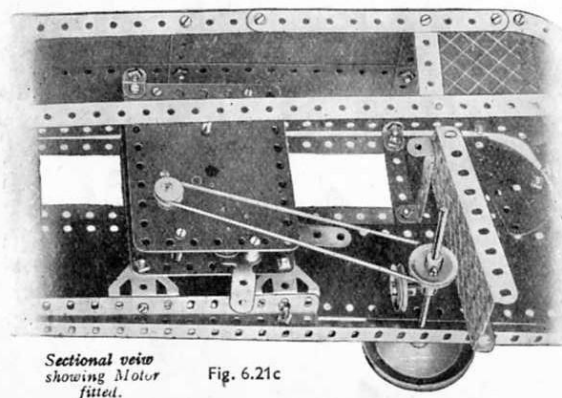
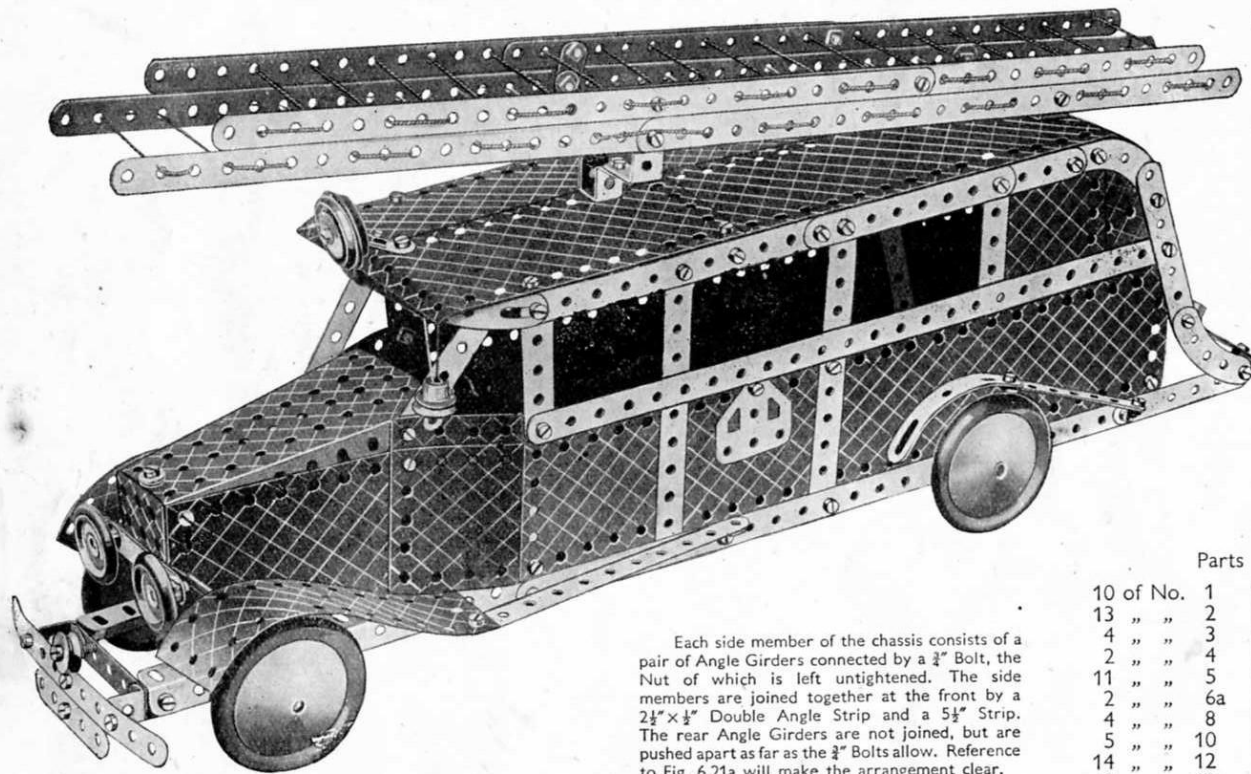


Fig. 6.21c

Each side member of the chassis consists of a pair of Angle Girders connected by a $\frac{3}{4}$ " Bolt, the Nut of which is left untightened. The side members are joined together at the front by a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip and a $5\frac{1}{2}$ " Strip. The rear Angle Girders are not joined, but are pushed apart as far as the $\frac{3}{4}$ " Bolts allow. Reference to Fig. 6.21a will make the arrangement clear.

The sides of the body consist of $12\frac{1}{2}$ " \times $2\frac{1}{2}$ " Strip Plates, and are attached by Flat Brackets to the rear Angle Girders. The roof is formed by four $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates, and is secured by Angle Brackets to the compound strips forming the top of the windows. The curved back is obtained by bending Flexible Plates to the correct shape and fastening them to a framework of Strips.

The sides of the bonnet are each represented by a $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate, and are secured to the body of the fire-engine by $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates and $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates. The last named are bolted to the $12\frac{1}{2}$ " \times $2\frac{1}{2}$ " Strip Plates forming the sides of the body. A Flanged Sector Plate forms the top of the bonnet, and is secured by the flanges of its narrow end to the two

6.21 STREAMLINED FIRE ENGINE

$4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates. At its wide end it is fastened to the $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates secured to the body. The radiator is represented by a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate bolted to the front end of the Flanged Sector Plate. The Bolt carries two Washers above the Flanged Sector Plate to represent the radiator cap.

Two 1" fast Pulleys are used for the headlights, and they are secured to a $2\frac{1}{2}$ " Strip fixed by $\frac{1}{2}$ " Bolts to the $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate forming the radiator. The $\frac{1}{2}$ " Bolts pass through the end holes of the $2\frac{1}{2}$ " Strip, and are locked in the bosses of the 1" Pulleys. The front bumper is represented by a $5\frac{1}{2}$ " Strip extended downward by a $2\frac{1}{2}$ " Strip. It is fastened in position to the $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip at the front of the chassis by two Reversed Angle Brackets.

The Road Wheels are held on 5" Rods journaled in the sides of the chassis. The front mudguards are each formed by a $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate bolted to the $5\frac{1}{2}$ " Strip joining the side members of the chassis. A $3\frac{1}{2}$ " Strip extended by a Formed Slotted Strip and secured by an Angle Bracket to the side of the body, is used for each of the rear mudguards.

The rear 5" Rod carries a Collar between the side members of the chassis. A Pivot Bolt, which carries a 1" fast Pulley 2 against its head, is screwed into the tapped hole of the Collar, thus holding it in position on the Rod. A Flanged Sector Plate 1 is loosely suspended from a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip 3 by a lock-nutted $\frac{1}{2}$ " Bolt. When the rear Road Wheels revolve, the Pulley 2 strikes the Flanged Sector Plate 1, and thus provides an automatic gong.

(Continued on next page)

Parts required

10 of No. 1	1 of No. 51
13 " " 2	1 " " 53
4 " " 3	2 " " 54a
2 " " 4	4 " " 59
11 " " 5	2 " " 90
2 " " 6a	4 " " 90a
4 " " 8	2 " " 111
5 " " 10	2 " " 111a
14 " " 12	6 " " 111c
2 " " 12a	1 " " 115
4 " " 12c	2 " " 125
2 " " 15	2 " " 126a
1 " " 15b	1 " " 147b
2 " " 17	3 " " 155a
1 " " 19g	4 " " 187
3 " " 22	3 " " 188
2 " " 22a	4 " " 189
1 " " 23	6 " " 190
1 " " 23a	2 " " 191
6 " " 35	4 " " 192
105 " " 37	2 " " 197
4 " " 37a	2 " " 200
7 " " 38	2 " " 214
2 " " 40	4 " " 215
1 " " 45	2 " " 217a
3 " " 48a	2 " " 217b

For Model Fire-Engine fitted with No. 2 Clockwork Motor.

Additional parts required:—

- 1 of No. 12
- 1 " " 22
- *1 " " 23a
- *6 " " 37
- 2 " " 126
- 1 " " 186b
- *1 No. 2 Clockwork Motor.

* Not included in Outfit.

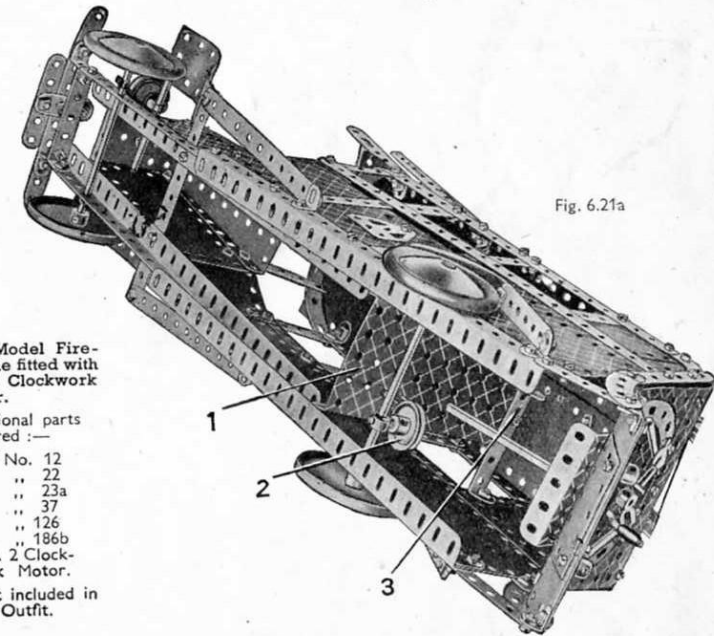


Fig. 6.21a

(Continued from previous page)

The fixed escape ladder consists of two pairs of compound strips, each built up from two $12\frac{1}{2}$ " Strips bolted together overlapping eight holes. The escape is attached to the roof of the car at the rear by a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip, and at the front by a compound bracket, which is built up by attaching $1"$ \times $1"$ Angle Brackets to the ends of a Double Bent Strip. The extension escape is built up from two pairs of compound strips each consisting of two $12\frac{1}{2}$ " Strips overlapping 13 holes. The extension ladder is fastened to the fixed part of the escape by Flat Brackets. The rungs of the ladders are represented by Cord threaded through the holes in the Strips.

The searchlight at the front of the fire-engine is made by placing a $\frac{3}{4}"$ Disc, a $1"$ loose Pulley fitted with a Rubber Ring, a $1\frac{1}{4}"$ Disc, and a second $1"$ loose Pulley on the shank of a $\frac{3}{4}"$ Bolt. The complete unit is then fastened to the roof by a compound bracket consisting of two Obtuse Angle Brackets bolted together.

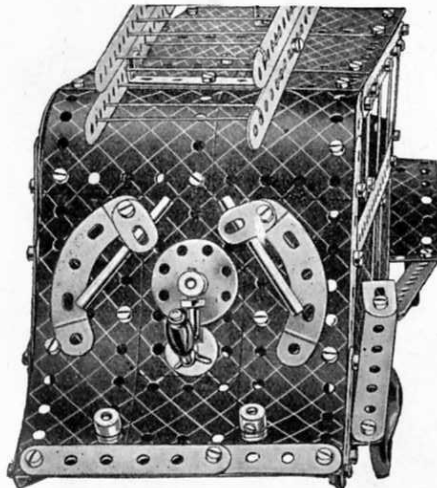
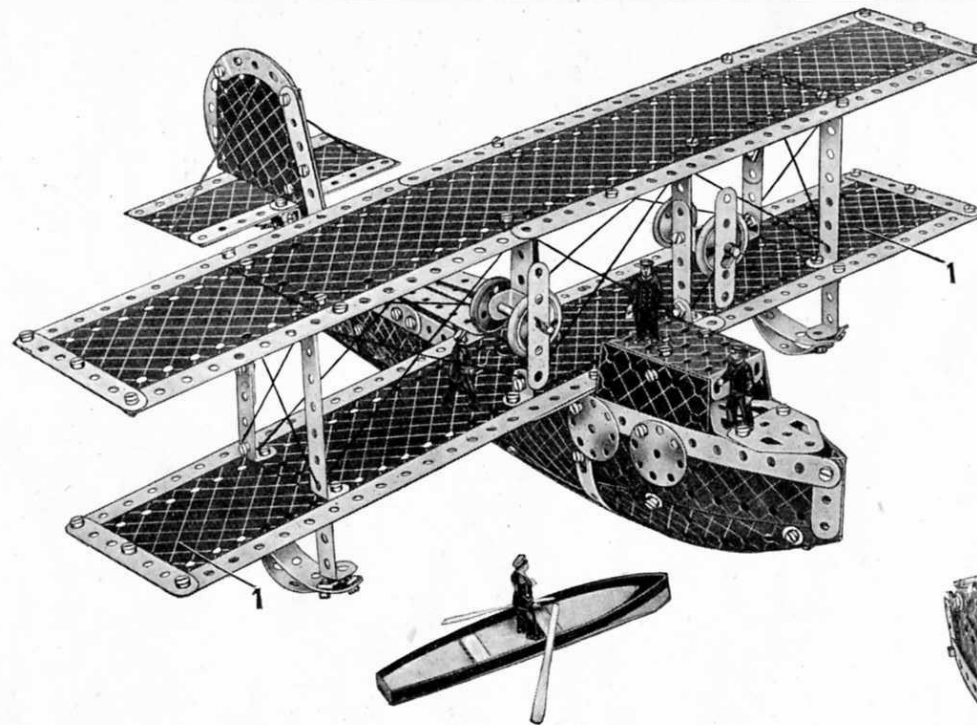


Fig. 6.21b



Parts required

11 of No. 1	4 of No. 35	1 of No. 125
11 " " 2	102 " " 37	2 " " 126a
4 " " 3	9 " " 37a	2 " " 155a
2 " " 4	14 " " 38	4 " " 188
12 " " 5	1 " " 40	4 " " 189
2 " " 6a	2 " " 48	2 " " 190
10 " " 10	3 " " 48a	2 " " 191
4 " " 11	2 " " 48b	3 " " 192
14 " " 12	1 " " 51	2 " " 197
1 " " 12a	2 " " 90	1 " " 198
3 " " 12c	4 " " 90a	2 " " 199
2 " " 17	2 " " 111	2 " " 200
2 " " 22	1 " " 111a	4 " " 215
2 " " 22a	6 " " 111c	4 " " 217a

6.22 TWIN-ENGINE FLYING BOAT

The fuselage is built up from Flexible Plates, and as each side is identical, reference to the illustrations will make the construction clear.

The lower wing consists of a $12\frac{1}{2}"$ \times $2\frac{1}{2}"$ Strip Plate, extended at each end by the flat plates 1, and it is framed by $12\frac{1}{2}"$ and $3\frac{1}{2}"$ Strips. The flat plates 1 are obtained by removing the centre pin from a Hinged Flat Plate. The wing is attached by Angle Brackets to the sides of the fuselage. The top wing is constructed in a similar manner, except that the $12\frac{1}{2}"$ \times $2\frac{1}{2}"$ Strip Plate is extended by $4\frac{1}{2}"$ \times $2\frac{1}{2}"$ Flexible Plates and not by the halves of a Hinged Flat Plate. It is braced from the lower wing by $3\frac{1}{2}"$ \times $\frac{1}{2}"$ Double Angle Strips, and by double angle strips built up from Strips and Angle Brackets. The propellers are supported on $2"$ Rods journaled in Double Brackets bolted to the inner wing supports.

The control cabin is constructed by bolting two $2\frac{1}{2}"$ \times $1\frac{1}{2}"$ Flexible Plates to the sides of the fuselage in front of the wings, and then joining them across at the top by a $2\frac{1}{2}"$ \times $1\frac{1}{2}"$ Flanged Plate.

A $5\frac{1}{2}"$ \times $2\frac{1}{2}"$ Flexible Plate is used for the tailplane and is secured by Angle Brackets to two $2\frac{1}{2}"$ large radius Curved Strips bolted to the end of the fuselage. The rudder is formed by two $2\frac{1}{2}"$ \times $2\frac{1}{2}"$ Flexible Plates, which are attached to the tailplane by an Angle Bracket. The rudder is given a curved outline by bolting to it $2\frac{1}{2}"$ small radius Curved Strips.

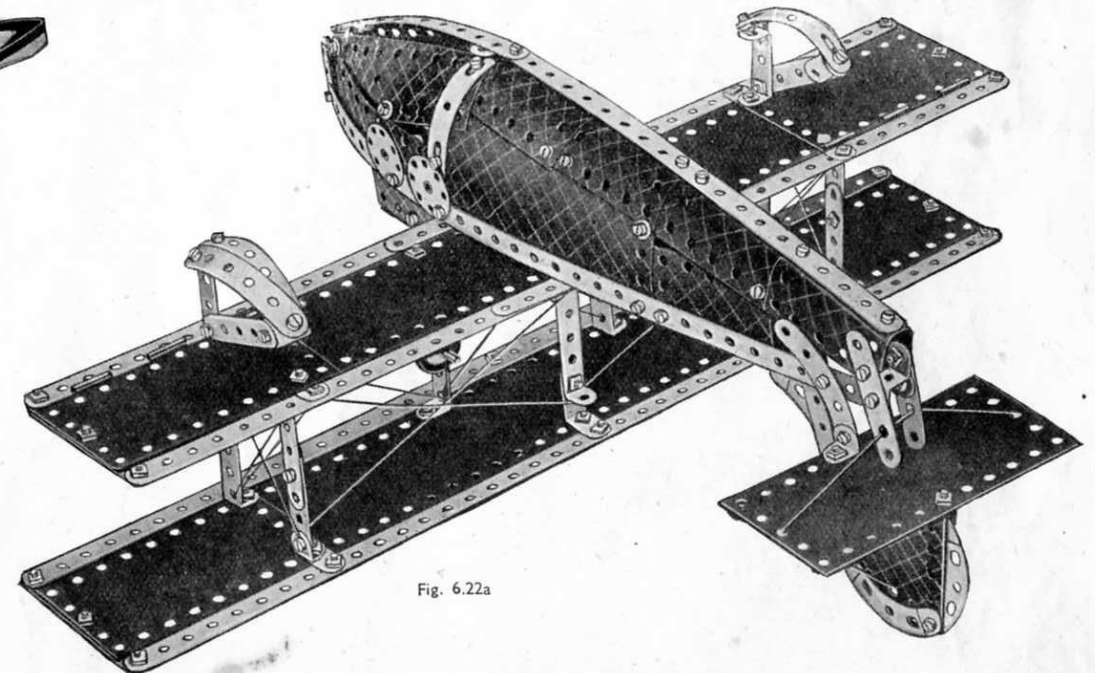
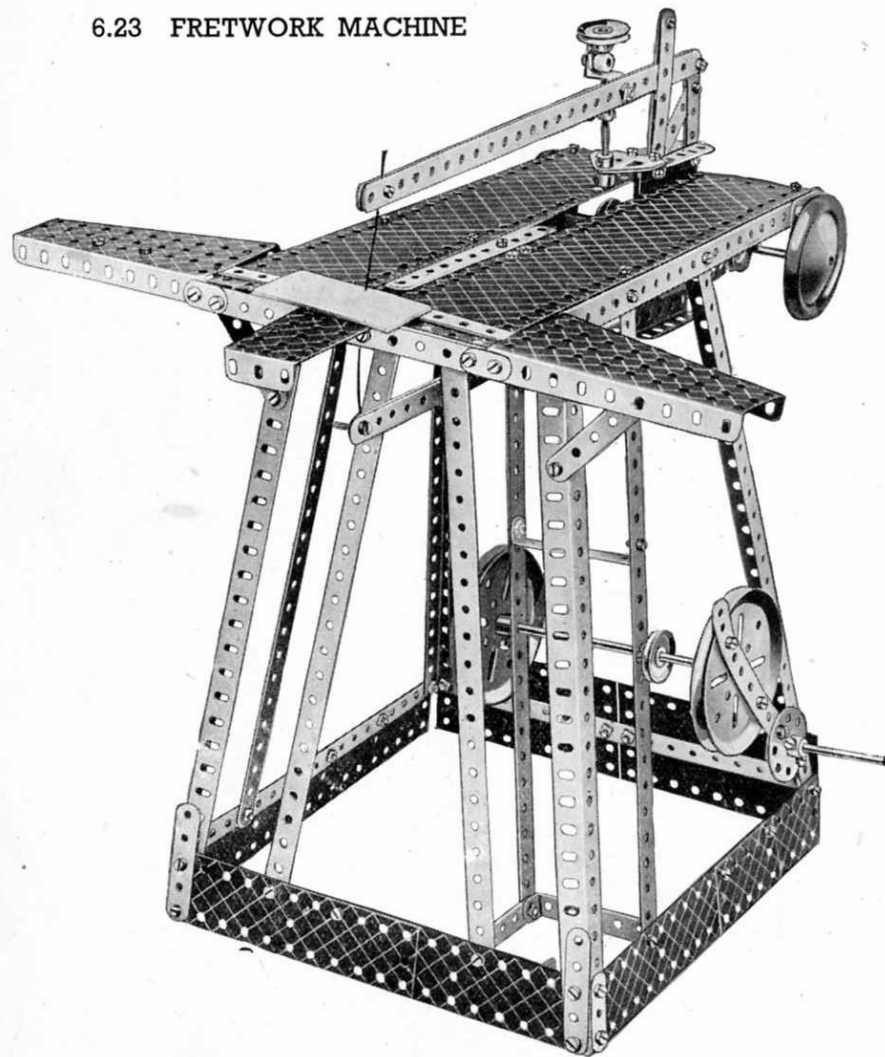


Fig. 6.22a

This Model can be built with MECCANO No. 6 Outfit (or No. 5 and No. 5a Outfits)

6.23 FRETWORK MACHINE



Parts required

12 of No.	1
14 " "	2
4 " "	3
8 " "	5
2 " "	6a
4 " "	8
2 " "	10
7 " "	12
2 " "	12a
1 " "	14
1 " "	15a
1 " "	17
2 " "	19b
4 " "	22
1 " "	24
1 " "	35
83 " "	37
8 " "	37a
13 " "	38
1 " "	45
1 " "	48
6 " "	48a
1 " "	51
1 " "	52
2 " "	53
2 " "	54a
4 " "	59
1 " "	80c
2 " "	111a
6 " "	111c
1 " "	115
2 " "	126
4 " "	126a
1 " "	147b

2 of No. 187

4 " "	188
4 " "	189
2 " "	191
2 " "	197

For Model Fret
Machine fitted
with E120 Electric
Motor :—

Additional parts
required :—

2 of No.	10
1 " "	15
*1 " "	27
*1 " "	32
1 " "	186a
*1 E120 Electric Motor	

Parts not
required :—

1 of No.	2
1 " "	17
1 " "	24
2 " "	37a
2 " "	38
2 " "	111a

*Not included in
Outfit

The main framework of the model consists of four 12½" Angle Girders joined across at their lower ends by compound strips consisting of two 5½" Strips. The Strips spacing the sides are overlapped two holes, and those spacing the front and rear are overlapped four holes.

The base is extended downwards by 5½"×1½" and 2½"×1½" Flexible Plates, which are joined at the corners by Angle Brackets bolted at the rear of the model. At the top the Angle Girders are spaced at the front and rear by 5½" Strips, and at the sides by 12½" Strips, which are bolted so that they extend five holes to the front of the table. Four 12½" Strips are bolted to the frame of the base and to the upper 5½" and 12½" Strips, and a supplementary framework to support the operating handle is also added (see Fig. 6.23a).

The table is shown complete in the front view of the model, and in Fig. 6.23a one of the 12½"×2½" Strip Plates has been removed. A 5½"×2½" Flanged Plate is bolted across the 12½" Strips at the sides of the table. The two 12½"×2½" Strip Plates are bolted to the Flanged Plate and joined by Angle Brackets to the ends of the 12½" Strips, the Bolts carrying also two Flat Trunnions. The table is extended to the front by a 2½"×1½" Flanged Plate, which is bolted to a 5½" Strip and to the ends of two 2½"×½" Double Angle Strips. The side extensions are Flanged Sector Plates, each of which is attached to the frame by a Flat Bracket, a 3½" Strip and a 12½" Strip. A 2½"×½" Double Angle Strip provides additional support underneath.

The saw frame consists of two long arms, each consisting of two 12½" Strips bolted together. One of the arms is bolted between two 3½"×2½" Flanged Plates, and the other is lock-nutted at its end to an N-shaped piece, consisting of two 2½" Strips and two 3½" Strips braced across by a 2½" Strip in the manner shown. A tensioning device for the saw blade consists of a Double Bent Strip lock-nutted to the upper arm. A 3" Screwed Rod is passed through holes in the Double Bent Strip and a Collar is screwed on each of its ends.

(Continued on next page)

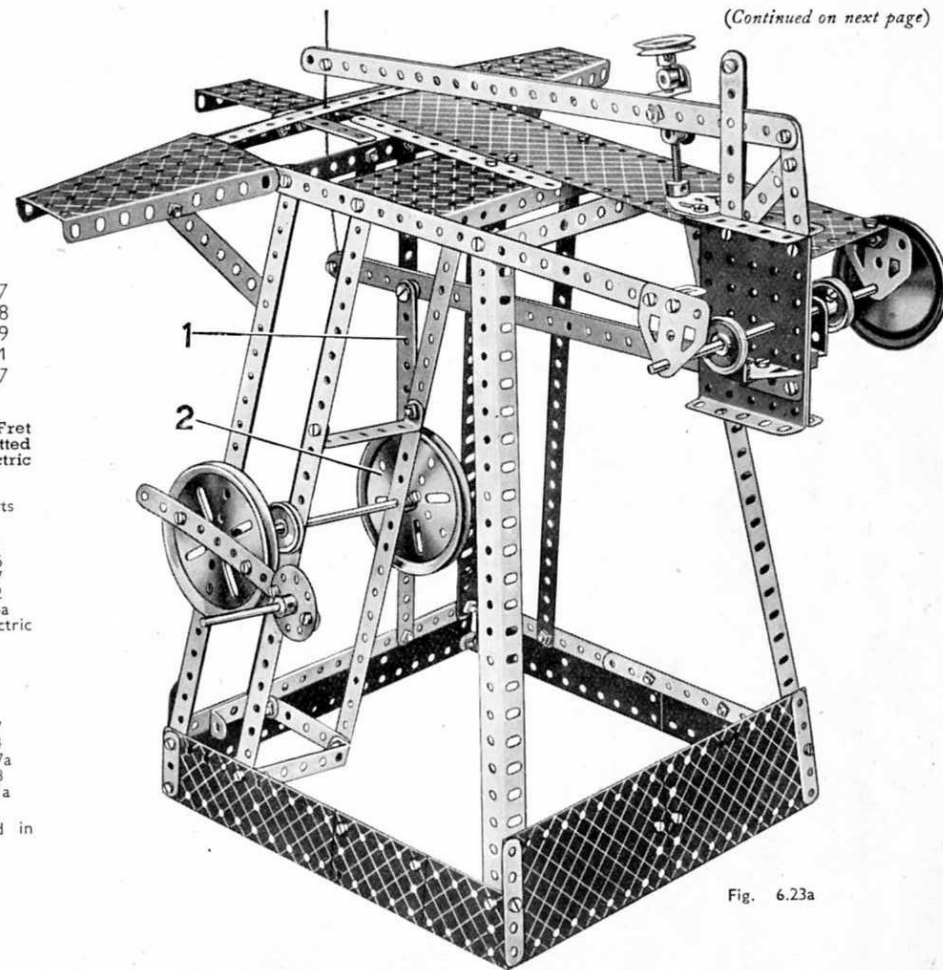


Fig. 6.23a

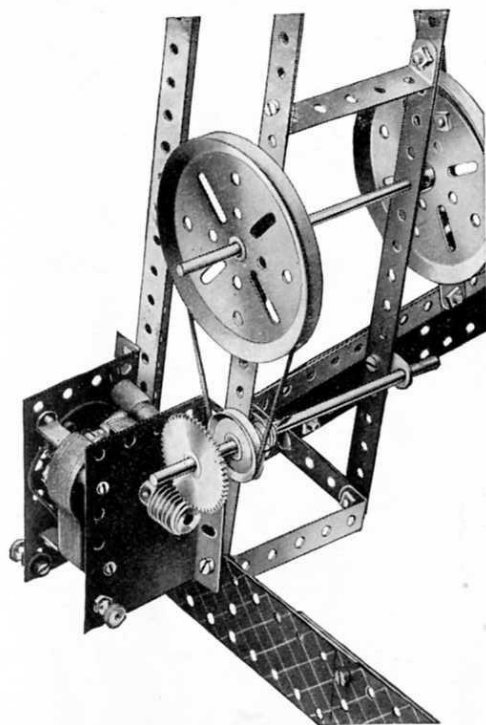
(Continued from previous page)

The shanks of two Bolts in the end holes of the Double Bent Strip engage in the plain holes of the Collars. The Screwed Rod passes also through a hole in two Flat Trunnions bolted to the flanges of the $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plates, and two Collars are held by their grub screws on the Screwed Rod on each side of the Flat Trunnions.

A $6\frac{1}{2}"$ Rod is passed through the end holes of $1" \times 1"$ Angle Brackets attached to Trunnions bolted to the $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plates, and is journalled in the two Flat Trunnions as shown.

The handle for operating the machine is constructed by fastening a $2"$ Rod in the boss of a Bush Wheel that is attached to a $5\frac{1}{2}"$ Strip. The Strip in turn is bolted across a $3"$ Pulley held on the end of a $4\frac{1}{2}"$ Rod journalled in two $12\frac{1}{2}"$ Strips. On its other end the $4\frac{1}{2}"$ Rod carries another $3"$ Pulley 2, which is pivotally connected by a $5\frac{1}{2}"$ Strip 1 to the lower arm of the frame. The lower end of the $5\frac{1}{2}"$ Strip is pivoted on a Threaded Pin and is held in place by a Spring Clip; its upper end being pivoted on a Pivot Bolt lock-nutted to the lower arm of the saw frame. The Pivot Bolt carries six Washers on its shank.

Fig. 6.23b shows the model fitted with an E120 Electric Motor. The Motor is bolted to the framework of the model by two Bolts, and the drive is taken from a Worm on the Motor shaft through a 50-teeth Gear. The 50-teeth Gear is secured on a Rod journalled in holes in two Flat Brackets. A Driving Band connects the $1"$ fast Pulley on this Rod to the $3"$ Pulley above.



Sectional
View
Showing
Motor
Fitted.

Fig. 6.23b

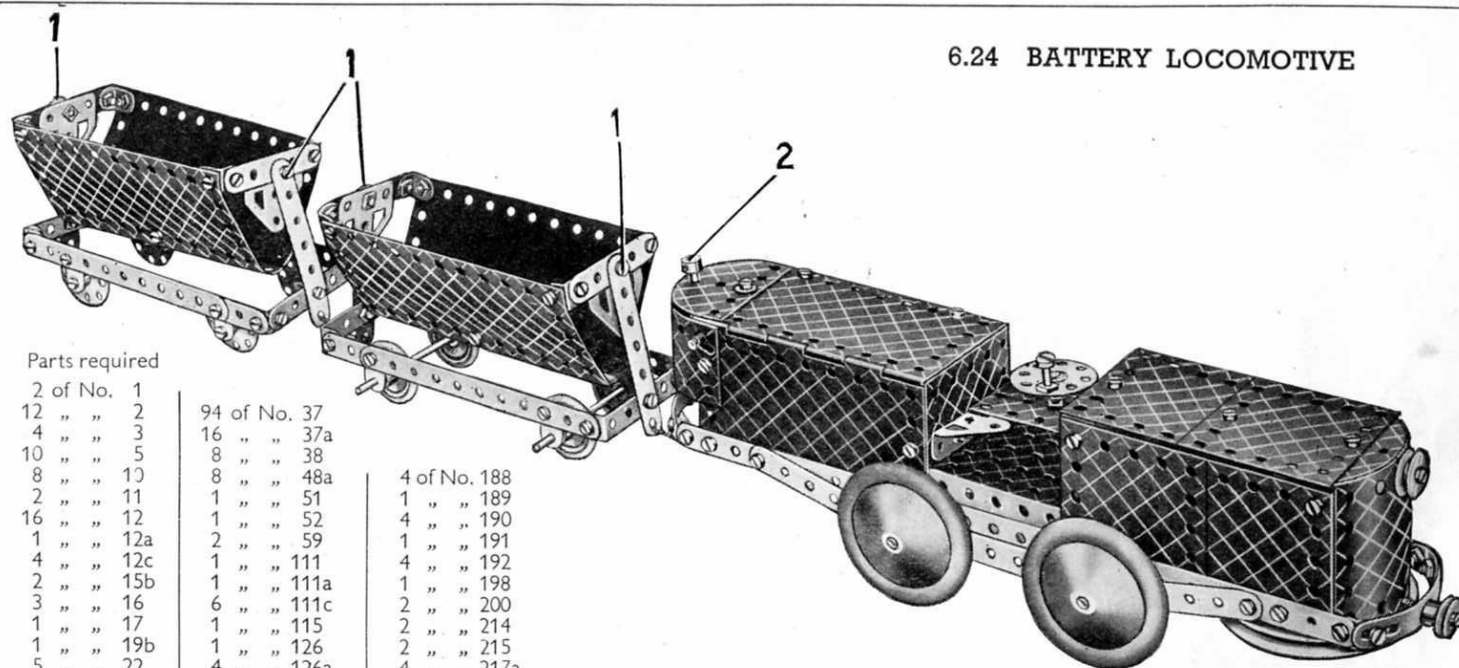


Fig. 6.24a

Parts required

2 of No. 1	94 of No. 37	4 of No. 188
12 " " 2	16 " " 37a	1 " " 189
4 " " 3	8 " " 38	4 " " 190
10 " " 5	8 " " 48a	1 " " 191
8 " " 10	1 " " 51	4 " " 192
2 " " 11	1 " " 52	1 " " 198
16 " " 12	2 " " 59	2 " " 200
1 " " 12a	1 " " 111	2 " " 214
4 " " 12c	1 " " 111a	2 " " 215
2 " " 15b	6 " " 111c	4 " " 217a
3 " " 16	1 " " 115	1 " " 217b
1 " " 17	1 " " 126	1 No. 1
1 " " 19b	4 " " 126a	Clockwork
5 " " 22	1 " " 147b	Motor
1 " " 23	4 " " 155a	
1 " " 23a	1 " " 186	
1 " " 24	4 " " 187	
2 " " 35		

The construction of the chassis of the locomotive will be clear from Fig. 6.24a. The $12\frac{1}{2}"$ Strips are spaced at each end by $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips, the one at the front having a $3"$ Pulley bolted to it by a $\frac{1}{2}"$ Bolt passed through its boss.

The top and side of the rear part of the locomotive are completed by bolting a Hinged Flat Plate to one of the $12\frac{1}{2}"$ Strips forming the chassis and then attaching the Plate by Angle Brackets to the side shown in Fig. 6.24a.

A $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate forms the floor of the centre portion of the locomotive, and a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate, bolted to two $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips that space the sides, carries a Threaded Pin in its centre hole. A Bush Wheel carrying a Pivot Bolt is fastened to the Threaded Pin to form a control handle. The top of the front of the locomotive is fastened to $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips, and the curved front and rear portions are then added.

The method of fixing the Clockwork Motor in position is shown in Fig. 6.24a. It is attached to the chassis by two Angle Brackets, and is supported also by a $3\frac{1}{2}"$ Rod pushed through the side plates of the locomotive and through the corner holes of the Clockwork Motor.

Collar 2 is fastened on a $2"$ Rod, which is connected to the brake lever of the Motor. The connection is made by a Bolt passed through the hole in the brake lever and lock-nutted in the tapped hole of a Collar, which also is fastened on the Rod.

The sides of the chassis of each truck consist of two $5\frac{1}{2}"$ Strips overlapped nine holes, and in the front truck the two sides are joined across by $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips at each end. In the rear truck the sides of the chassis are joined by $2\frac{1}{2}"$ Strips and Angle Brackets. The two $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates forming the sides of the container of each truck are joined together at the bottom by a Double Bracket bolted to a $5\frac{1}{2}"$ Strip.

The Bolts 1 are lock-nutted to the $2\frac{1}{2}"$ Strips, and the $1\frac{1}{2}"$ Discs forming the wheels of the rear truck are lock-nutted to $\frac{3}{8}"$ Bolts, which have two Washers on their shanks for spacing purposes.

This Model can be built with MECCANO No. 6 Outfit (or No. 5 and No. 5a Outfits)

6.25 TOWER WAGON

Parts required

10 of No. 1	1 of No. 48
8 " " 2	8 " " 48a
2 " " 3	1 " " 48b
2 " " 4	1 " " 51
12 " " 5	1 " " 52
1 " " 6a	2 " " 53
4 " " 8	2 " " 54a
6 " " 10	4 " " 59
2 " " 11	2 " " 111c
9 " " 12	4 " " 125
2 " " 12a	4 " " 126a
1 " " 12c	1 " " 176
1 " " 15	1 " " 186b
4 " " 16	4 " " 187
1 " " 19g	4 " " 188
3 " " 22	2 " " 189
1 " " 23	1 " " 190
1 " " 24	2 " " 191
6 " " 35	3 " " 192
105 " " 37	1 " " 199
2 " " 37a	2 " " 200
16 " " 38	4 " " 215
1 " " 40	

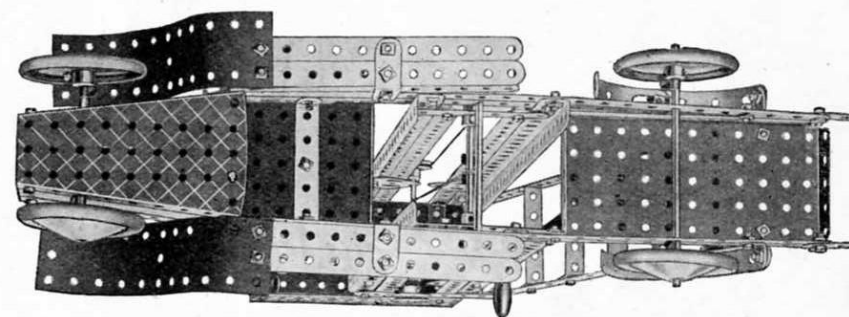
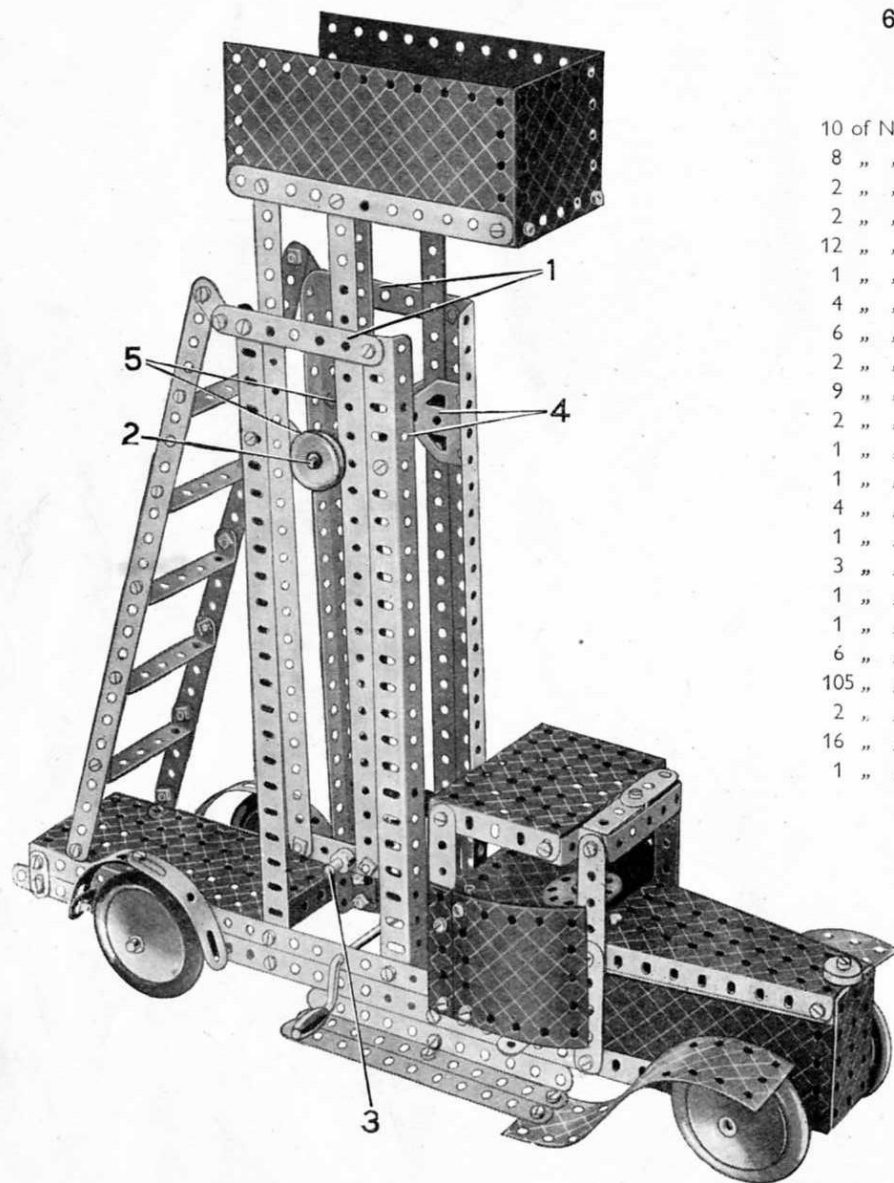


Fig. 6.25a

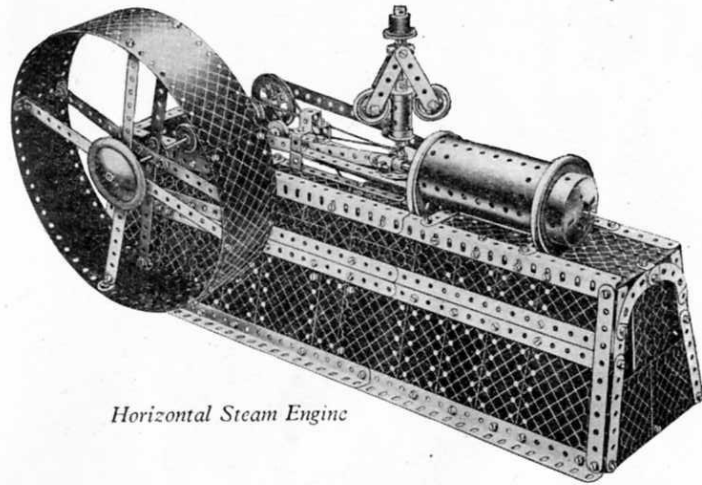
Each side member of the chassis consists of two $12\frac{1}{2}$ " Strips secured together by Flat Brackets. The side members are joined at the rear by a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, and at the front by a Flanged Sector Plate. The bonnet is built up by bolting $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates to the flanges of the Flanged Sector Plate and then fastening another Flanged Sector Plate to their upper ends. The radiator, a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate, is bolted in position between the ends of the Flanged Sector Plates, the upper Bolt being $\frac{3}{4}$ " long and carrying a $\frac{1}{2}$ " loose Pulley to represent the radiator cap.

A $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate forms the base for the cab, and is secured to the chassis by a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip (Fig. 6.25a). The back of the cab consists of two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates, overlapped three holes and supported by Angle Brackets between two $5\frac{1}{2}$ " Strips bolted to the flanges of the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate. Each of the doors is constructed by bolting a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate to the lower end of one of the $5\frac{1}{2}$ " Strips fastened to the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate. A $1\frac{1}{8}$ " radius Curved Plate is then bolted to the $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate, overlapping it two holes, each Bolt carrying two Washers between the Flexible and Curved Plates. A second $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate is fixed to the upper ends of the $5\frac{1}{2}$ " Strips, and is secured by Reversed Angle Brackets to two more $5\frac{1}{2}$ " Strips bolted to the chassis.

The front Road Wheels are fixed on a $3\frac{1}{2}$ " Rod journalled in the flanges of the lower Flanged Sector Plate, and the 5" Rod carrying the rear Road Wheels passes through the lower $12\frac{1}{2}$ " Strips.

The framework inside which the tower slides consists of four Angle Girders, which are bolted to the chassis as shown in the illustration and are joined at the top by the Strips 1. Each side of the tower is built up from $12\frac{1}{2}$ " Strips connected at the bottom by a 3" Strip, and bolted at their upper ends to the stand. To prevent the $12\frac{1}{2}$ " Strips from sliding too freely, Flat Trunnions are fastened to the Angle Girders at 4. The Crank Handle for raising and lowering the tower is journalled in the upper $12\frac{1}{2}$ " Strips of the chassis. It carries at its end a 1" Pulley, which is connected by a Driving Band to one of the Pulleys 5 on the $3\frac{1}{2}$ " Rod 2. Cord is fastened to a Cord Anchoring Spring on Rod 2, and its other end is tied to the centre of the $3\frac{1}{2}$ " Rod 3.

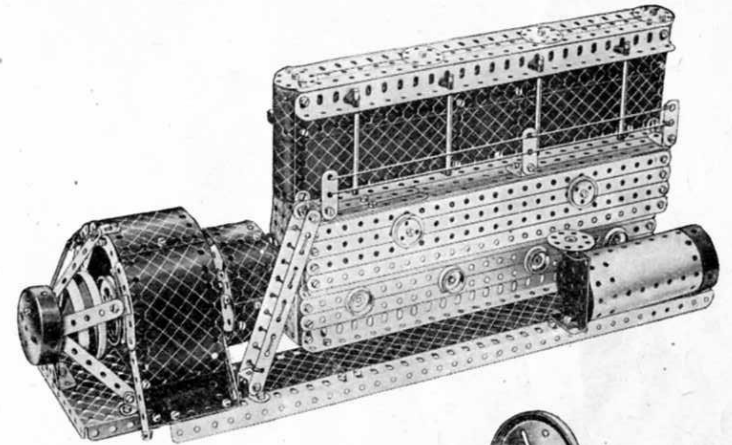
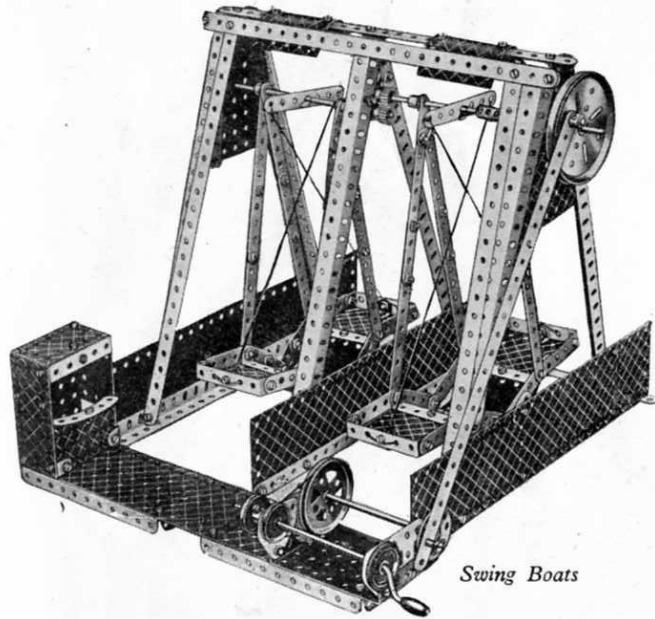
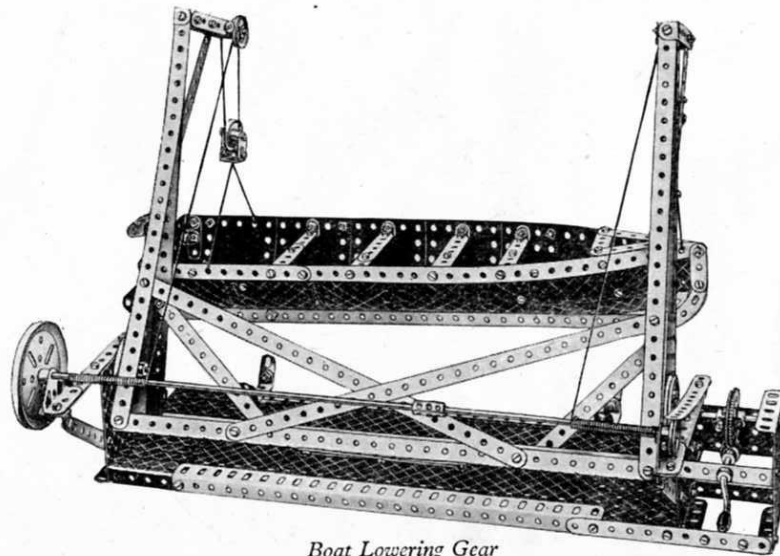
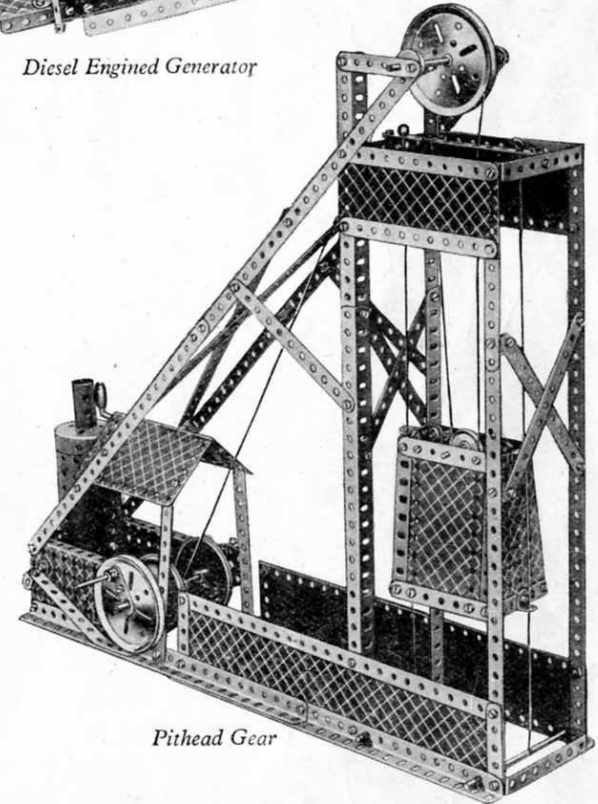
The ladder is constructed by bolting $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips between two $12\frac{1}{2}$ " Strips. The latter are fastened at their lower ends to the $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate by Angle Brackets, and at their upper ends they are attached to two Flat Brackets bolted to Strips 1.

*Horizontal Steam Engine***BUILD BIGGER AND BETTER MODELS.**

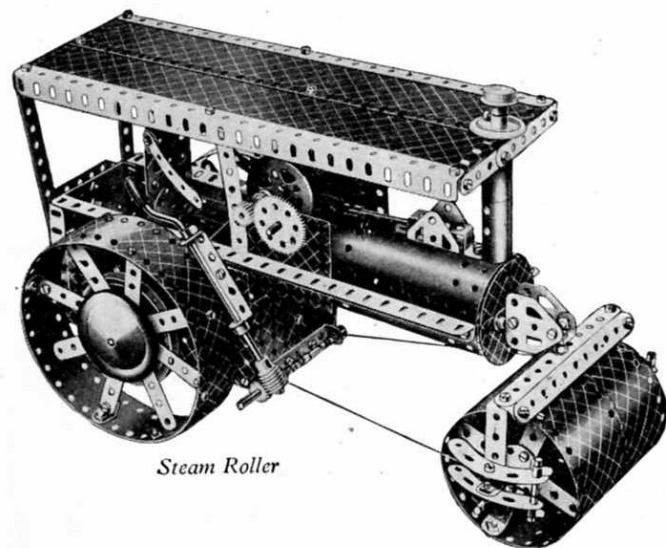
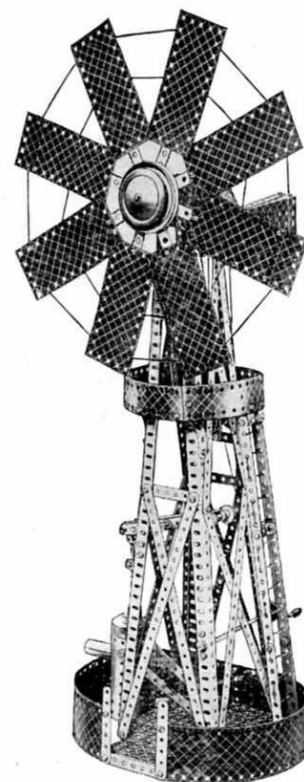
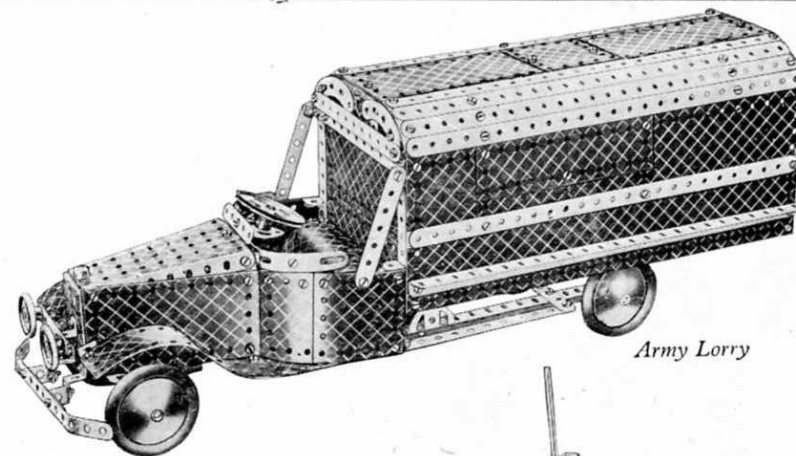
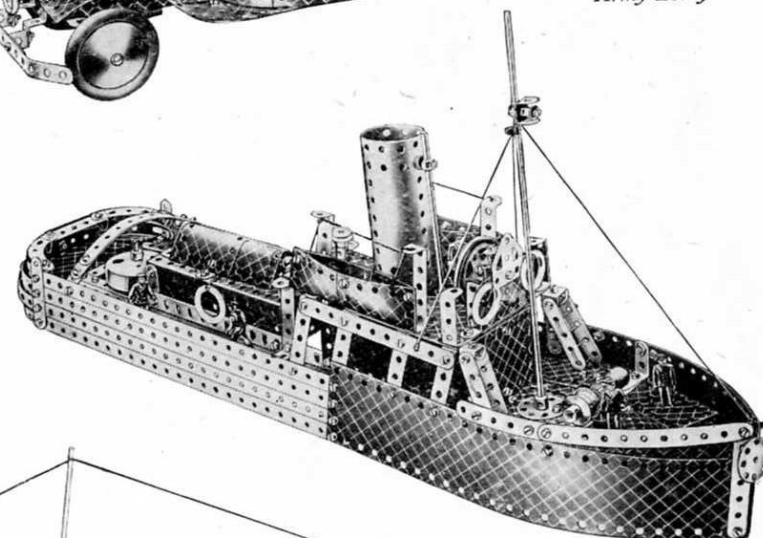
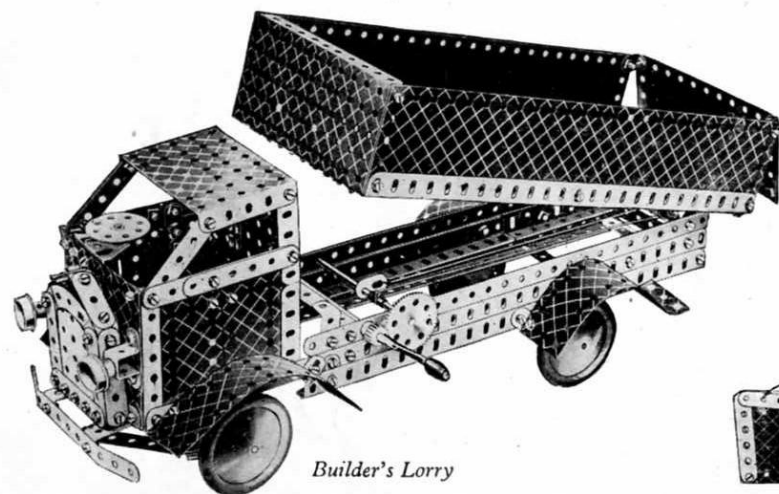
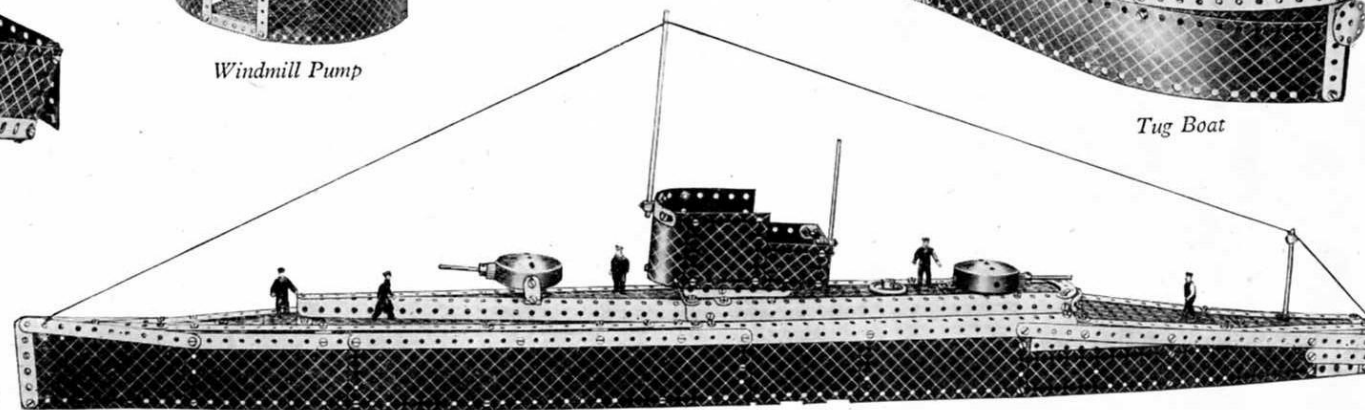
When you have built all the models shown in this Manual you will be keen to build bigger and more elaborate models. Your next step is to purchase a Meccano No. 6a Accessory Outfit containing all the parts required to convert your No. 6 into a No. 7 Outfit. You will thus be able to build the full range of No. 7 Outfit models, a selection of which is illustrated on this and the next page.

If you prefer to do so, you can build up and develop your Outfit quite easily by adding various parts to it from time to time. The model-building possibilities of the Meccano System are limitless, and the more Meccano parts you have, the bigger and better the models you will be able to build.

Ask your dealer to post to you regularly the latest Meccano parts lists and other Meccano literature.

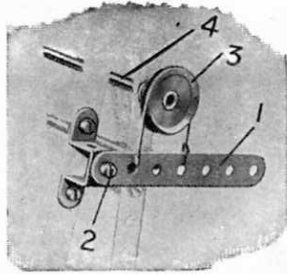
*Diesel Engine Generator**Swing Boat**Boat Lowering Gear**Pithead Gear*

A selection of Models built with Meccano No. 7 Outfit

*Steam Roller**Windmill Pump**Army Lorry**Tug Boat**Builder's Lorry**Submarine*

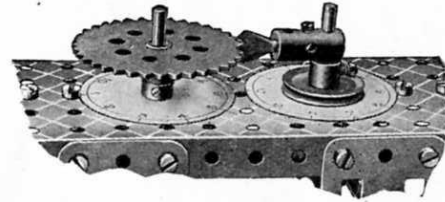
Here are a few simple and interesting movements showing how easily real mechanisms can be reproduced with Meccano.

STRAP AND LEVER BRAKE



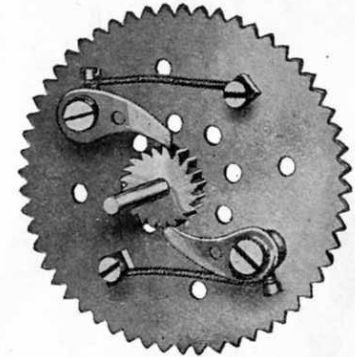
This device will be found very useful as a quick emergency hand-brake. Although it is the simplest of such devices, it is also one of the most valuable and can be used in a great variety of models.

INTERMITTENT ROTARY MOTION



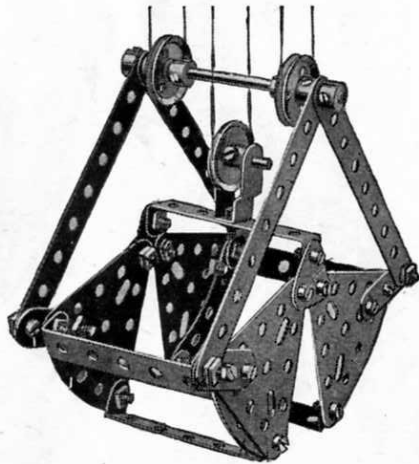
Intermittent rotary motion can be obtained by means of the above device. Such an arrangement is useful in revolution counters, measuring machines, etc. In addition to mechanisms that give true intermittent motion, different types of cams that convert a regular rotary motion into a constant or intermittent reciprocating motion can be constructed.

PAWL AND RATCHET MOVEMENT



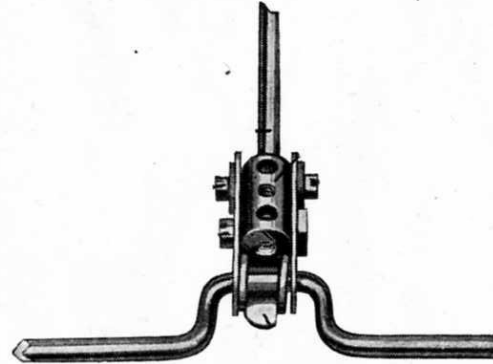
By means of this device it is possible to construct certain types of automatic brakes and free wheels. The illustration shows the method of building up a free-wheel unit.

GRABS



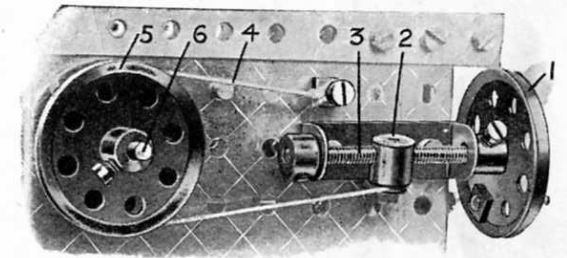
Here is a typical example of the many kinds of grab that can be constructed from Meccano. If the grab is fitted to a model crane or ship-coaler, all its movements can be controlled from an operating box built into the frame of the model. The outer sides of the jaws may be filled in with cardboard and the grab can then be used to pick up loads of sand, grain, marbles, etc.

BIG END FOR MECCANO CRANKSHAFT



A Spring Clip is first clipped on to the centre of the cranked portion of the Crankshaft, and on each side of this is carried a Washer. On the outside of each of the Washers is placed a $1\frac{1}{2}$ " Strip, and these are connected together by means of a Coupling. A $\frac{1}{2}$ " Bolt passes completely through the two $1\frac{1}{2}$ " Strips at their centre holes and also through the inner transverse tapped hole of the Coupling. The outer tapped holes are fitted with Set-Screws, under the heads of which a Washer is placed.

STRAP AND SCREW BRAKE



The type of brake shown above is used to apply a constant retarding effect to a rotating shaft. It can thus be utilised in a crane to prevent the load from falling back when the winding spindle is released. An advantage of the brake is that the speed of the shaft to which it is applied can be varied as required; the retarding action of the brake cannot vary when once set unless the hand wheel is turned.

Here are a few simple and interesting movements showing how easily real mechanisms can be reproduced with Meccano.

WORM AND PINION BEARING

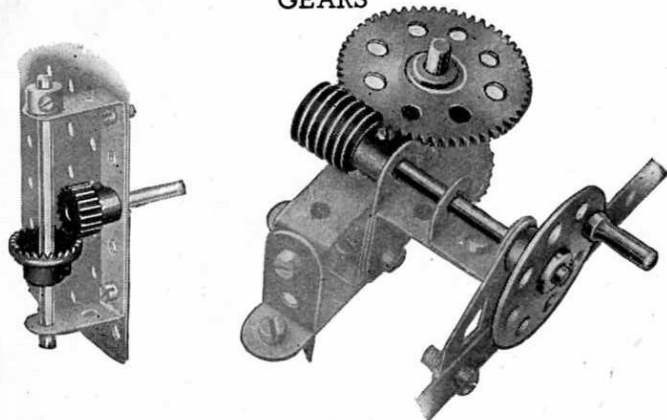


The compact rear axle drive unit illustrated above is intended chiefly for use in small models of motor cars. Two Corner Angle Brackets are secured by Bolts passing through their elongated holes to a $1\frac{1}{2}$ " Strip, to which a Double Bent Strip also is secured. The Rod carrying the Worm is passed through the centre hole of the Strips and held in position by a Collar.

The driven Rod is journaled in the Corner Angle Brackets and carries a Pinion that engages with the Worm.

A feature of this bearing that should not be overlooked is that the useful gear ratio of 25:1 is provided by employing a $\frac{3}{4}$ " Pinion.

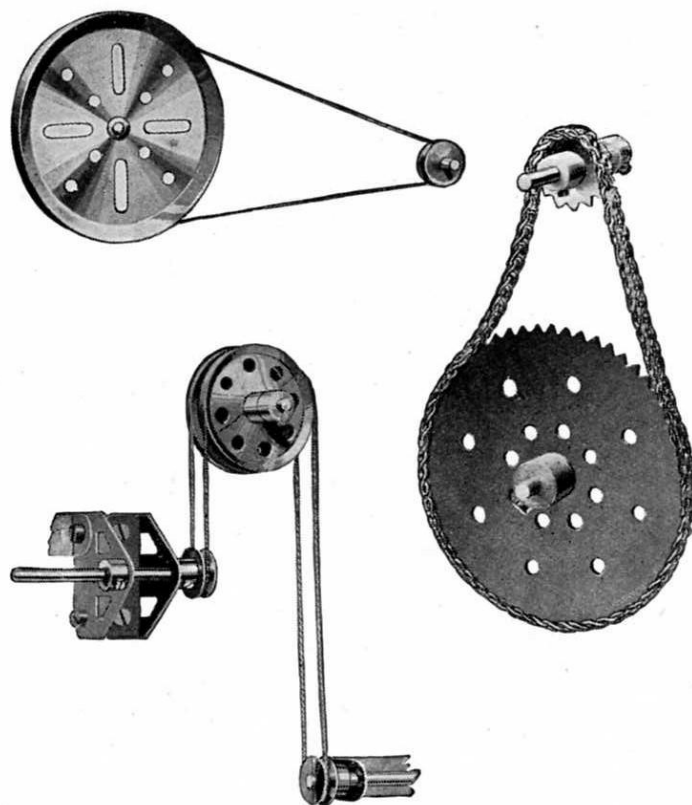
GEARS



The Meccano system includes a wide range of Gear Wheels, Bevel Gears, Pinion Wheels, Contrate Wheels and Worms in various sizes. All manner of interesting movements can be obtained by the use of these gears.

How a drive can be transmitted from a vertical to a horizontal shaft or vice versa, is shown on the left. On the right the Worm engaged with a Gear Wheel, gives a very great reduction in shaft speed.

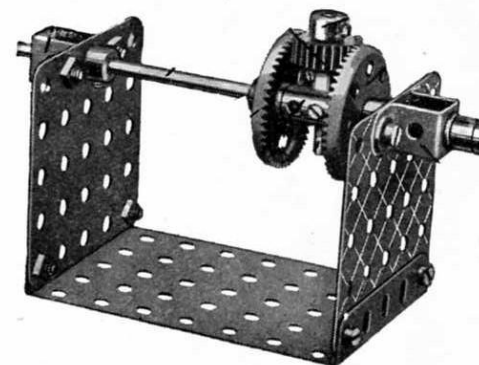
BELT AND CHAIN DRIVES



Above we show examples of belt and chain drive. The movements illustrated require no explanation excepting, perhaps, the lower belt drive, which shows a simple method for transmitting the drive from one shaft to another when the shafts are not in line.

Cords usually take the place of belts in Meccano models but miniature belting can be made from strips of canvas, indiarubber, etc., in which case Flanged Wheels should be used instead of grooved Pulleys.

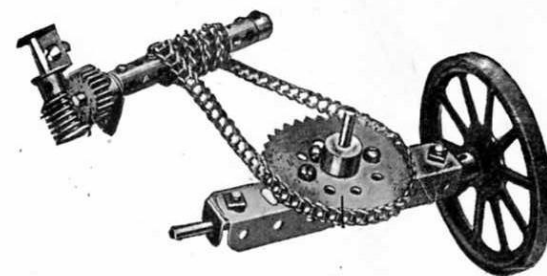
EPICYCLIC TRANSMISSION GEAR



Practically every type of mechanical power transmission gear can be reproduced with Meccano

The device illustrated is designed to provide a gear ratio between two shafts mounted in direct line with one another. Its chief merit lies in the compactness of its construction and lack of external bearings.

STEERING GEARS



The various types of steering mechanism commonly in use on vehicles of all descriptions can readily be reproduced with Meccano.

In the example illustrated, the road wheels are controlled by an endless Sprocket Chain operated by a Worm and Pinion mechanism.

MECCANO PARTS

<p>3 Perforated Strips</p> <p>No. 1. 12 1/2" 3. 3 1/2" 1a. 9 1/2" 4. 3 1/2" 1b. 7 1/2" 5. 2 1/2" 2. 5 1/2" 6. 2 1/2" 2a. 4 1/2" 6a. 1 1/2"</p> <p>9b Angle Girders</p> <p>7. 24 1/2" 9a. 4 1/2" 7a. 18 1/2" 9b. 3 1/2" 8. 12 1/2" 9c. 3 1/2" 8a. 9 1/2" 9d. 2 1/2" 8b. 7 1/2" 9e. 2 1/2" 9. 5 1/2" 9f. 1 1/2"</p> <p>10 Flat Brackets 11 Double Brackets 12 Angle Brackets, 1/2" x 1/2" 12a. " " 1" x 1" 12b. " " 1 1/2" x 1 1/2" 12c. Obtuse Angle Brackets, 1/2" x 1/2"</p> <p>13 11 1/2" 16. 3 1/2" 13a. 8 1/2" 16a. 2 1/2" 14. 6 1/2" 16b. 3 1/2" 15. 5 1/2" 17. 2" 15a. 4 1/2" 18a. 1 1/2" 15b. 4 1/2" 18b. 1"</p> <p>19h 19g. Crank Handles, 3 1/2" with Erinoid grip 19h. " " 3 1/2" without " 19s. " " 3 1/2" without "</p> <p>20 19a. Wheels, 3" diam., with set-screws 20b. Flanged Wheels, 1 1/2" diam.</p> <p>20a 19c. Pulley Wheels 19b. 3" diam. with centre boss & set-screw 19c. 6" " " " " 20a. 2 1/2" " " " " 21. 1 1/2" " " " " 22. 1 1/2" " " " " 23a. 1 1/2" " " and grub-screw 23b. 1 1/2" " without " " 23. 1 1/2" " " " "</p> <p>24 Bush Wheels</p>	<p>26b 25. Pinion Wheels, 1 1/2" diam., 1/2" face 25a. " " " " " 25b. " " " " " 26. " " " " " 26a. " " " " " 26b. " " " " "</p> <p>27 27. 50 teeth, to gear with pinion 27a. 57 " " " (3 1/2" diam.) 27b. 133 " " " (2 1/2" diam.) 27c. 95 " " " "</p> <p>28 28. Constrate Wheels, 1 1/2" diam. 29. " " " "</p> <p>30 30. Bevel Gears, 2 1/2", 26 teeth 30a. " " 1 1/2", 16 " { Can only be used together 30c. " " 1 1/2", 48 " "</p> <p>31 31. Gear Wheels, 1", 38 teeth 32. Worms.</p> <p>34 34. Spanners 34b. Box Spanners</p> <p>35 35. Spring Clips ... box of 20 35s. " " " box of 60 36. Screwdrivers ... box of 60 36a. " Extra Long 36b. " Special 37. Nuts and Bolts, 3/8" box of 12 37af. Nuts " " box of 50 37bf. Bolts, 1/4" " box of 50 37f. Nuts and Bolts, 1/4" box of 50 37g. " " 1/2" box of 144 38. Washers " " pkt. of 20 38s. " " " box of 60 40. Hanks of Cord</p> <p>41 Propeller Blades</p>	<p>43 Springs</p> <p>44 44. Cranked Bent Strips 45. Double 46. Double Angle Strips, 2 1/2" x 1" 47. " " " 2 1/2" x 1 1/2" 47a. " " " 3" x 1 1/2" 48. " " " 1 1/2" x 1 1/2" 48a. " " " 2 1/2" x 1 1/2" 48b. " " " 3 1/2" x 1 1/2" 48c. " " " 4 1/2" x 1 1/2" 48d. " " " 5 1/2" x 1 1/2"</p> <p>50a 50a. Eye Pieces, with boss</p> <p>51 51. Flanged Plates, 2 1/2" x 1 1/2" 52. " " 5 1/2" x 2 1/2" 52a. Flat Plates, " 5 1/2" x 3 1/2" 53. Flanged Plates, 3 1/2" x 2 1/2" 53a. Flat Plates, 4 1/2" x 2 1/2"</p> <p>54a 54a. Flanged Sector Plates, 4 1/2" long</p> <p>55 55. Perforated Strips, slotted, 5 1/2" long 55a. " " " 2 1/2" long</p> <p>57 57. Hooks 57a. " Scientific 57b. " Loaded, Large 57c. " Loaded, Small</p> <p>58 58. Spring Cord, 40" Length 58a. Coupling Screws for Spring Cord 58b. Hooks for Spring Cord</p> <p>59 59. Collars, with grub-screws</p> <p>61 Windmill Sails</p>	<p>62 62. Cranks 62a. Threaded Cranks 62b. Double Arm Cranks</p> <p>63 63. Couplings 63a. Octagonal Couplings 63b. Strip Couplings 63c. Threaded Couplings</p> <p>64 64. Threaded Bosses 65. Centre Forks</p> <p>66 66. Weights, 50 grammes 67. " 25 " 68. Woodscrews, 1/2" " 69. Set Screws 69a. Grub Screws, " " 69b. " " " " 69c. " " " "</p> <p>70 70. Flat Plates, 5 1/2" x 2 1/2" 72. " " 2 1/2" x 2 1/2" 73. " " 3" x 1 1/2" 76. Triangular Plates, 2 1/2" " 77. " " 1"</p> <p>80 80. Screws 80a. 11 1/2" 80b. 4 1/2" 79. 8" 80c. 3" 79a. 6" 81. 2" 80. 5" 82. 1" 80a. 3 1/2"</p> <p>89 89. 5 1/2" Curved Strips, 10" radius 89a. 3" " " cranked, 1 1/2" radius 89b. 4" Curved Strips, cranked, 4 1/2" radius, 8 to circle 90. 2 1/2" Curved Strips, 2 1/2" radius 90a. 2 1/2" " cranked, 1 1/2" radius, 4 to circle</p> <p>94 94. Sprocket Chain, per 40" length 95. " Wheels, 36 teeth, 2" diam. 95a. " " 28 " 1 1/2" " 95b. " " 56 " 3 1/2" " 96. " " 18 " 1" " 96a. " " 14 " 3/4" "</p>	<p>99 99. Braced Girders 97. 3 1/2" long 99a. 9 1/2" long 97a. 3" " 99b. 7 1/2" " 98. 2 1/2" " 100. 5 1/2" " 99. 12 1/2" " 100a. 4 1/2" "</p> <p>101 101. Healds, for looms 102. Single Bent Strips</p> <p>103 103. Flat Girders 103a. 5 1/2" long 103e. 3" long 103a. 9 1/2" " 103f. 2 1/2" " 103b. 12 1/2" " 103g. 2 1/2" " 103c. 4 1/2" " 103h. 2 1/2" " 103d. 3 1/2" " 103k. 7 1/2" "</p> <p>104 104. Shuttles, for looms 105. Reed Hooks, for looms</p> <p>106 106. Wood Rollers 106a. Sand Rollers 107. Tables for designing machines</p> <p>108 108. Architraves 109. Face Plates, 2 1/2" diam.</p> <p>110 110. Rack Strips, 3 1/2" long 110a. " " 6 1/2" " 111. " " 111c. Bolts, 1 1/2" " 111a. " " 111d. " 1 1/2" "</p> <p>113 113. Girder Frames</p> <p>114 114. Hinges 115. Threaded Pins 116. Fork Pieces, Large 116a. " Small 117. Steel Balls, 3/8" diam.</p> <p>118 118. Hub Discs, 5 1/2" diam.</p>
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MECCANO PARTS

120. Buffers
120a. Spring Buffers
120b. Compression Springs
121. Train Couplings
122. Miniature Loaded Sacks
123. Cone Pulleys
124. Reversed Angle Brackets, 1"
125. " " " "
126. Trunnions
126a. Flat Trunnions
127. Simple Bell Cranks
128. Boss Bell Cranks
129. Rack Segments, 3" diam.
130. Eccentrics, Triple Throw
131. Dredger Buckets
132. Flywheels, 2½" diam.
133. Corner Brackets, 1½"
133a. " " " "
134. Crank Shafts, 1" stroke
135. Theodolite Protractors
136. Handrail Supports
136a. Handrail Couplings
137. Wheel Flanges

138. Ships' Funnels
138a-z. " " Raked
139. Flanged Brackets (right)
139a. " " (left)
140. Universal Couplings
141. Wire Lines (for clock weights)
142. Rubber Rings (to fit 3" diam. rims)
142a. Motor Tyres (to fit 2" diam. rims)
142b. " " " 3" " "
142c. " " " 1½" " "
142d. " " " 1½" " "
143. Circular Girders, 5½" diam.
144. Dog Clutches
145. Circular Strips, 7½" diam. overall
146. " Plates, 4" " "
146a. " " " "
147. Pawls, with Pivot Bolt and Nuts
147a. Pawls
147b. Pivot Bolts with 2 Nuts
147c. Pawls without boss
148. Ratchet Wheels
149. Collecting Shoes for Electric Locos
150. Crane Grabs

151. Pulley Blocks, Single Sheave
152. " " Two " "
153. " " Three " "
- 154a. Corner Angle Brackets, ½"
(right-hand)
154b. Corner Angle Brackets, ½"
(left-hand)
155. Rubber Rings (for 1" Pulleys) Black
155a. " " " White
156. Pointers (with boss) 2½" overall
157. Fans, 2" diam.
158a. Signal Arms, Home
158b. " " Distant
160. Channel Bearings, 1½" x 1" x ½"
161. Girder Brackets, 2" x 1" x ½"
162. Boilers, complete, with ends
162a. " Ends
162b. " without ends
163. Sleeve Pieces
164. Chimney Adaptors
165. Swivel Bearings
166. End " "
167. Geared Roller Bearings
167a. Roller Races, geared, 192 teeth
167b. Ring Frames for Rollers
167c. Pinions for Roller Bearings (16 teeth)

168. Ball Bearings, 4" diam.
168a. " Races, flanged discs
168b. " " toothed
168c. " Casings, complete with balls
169. Digger Buckets
170. Eccentrics, ½" throw
171. Socket Couplings
172. Pendulum Connections
173. Rail Adaptors
174. Grease Cups
175. Flexible Coupling Units
176. Anchoring Springs for Cord
177. Shafting Standards, Large
178. " " Small
179. Rod Sockets
180. Toothed Gear Rings, 3½" diam.
181. Bobbins
182. Insulating Bushes
182a. Insulating Washers
183. Lamp Holders
183a. 2½-volt Lamps
183b. 3½ " " "
184c. 6-volt Lamps
184d. 10 " " "
184e. 20 " " "

185. Steering Wheels, 1½" diam.
186. Driving Bands, 2½" (Light)
186a. " " 6" " "
186b. " " 10" " "
186c. " " 10" (Heavy)
186d. " " 15" " "
186e. " " 20" " "
187. Road Wheels
192. Flexible Plates.
192a. 2½" x 1½"
192b. 5½" x 1½"
192c. 9½" x 2½"
192d. 12½" x 2½"
191. 4½" x 2½"
192. 5½" x 2½"
Strip Plates.
196. 9½" x 2½"
197. 12½" x 2½"
198. Hinged Flat Plates, 4½" x 2½"
199. Curved Plates, U-Section 2½" x 2½" x ½"
200. " " 2½" x 2½", 1½" radius
- 207A. Lamps with Flex (3½ volts)
202. Angle Brackets (for Headlamps)
203. Headlamp Rims
203a. " Bodies
203b. " Nuts
204. " Glasses
205. Lampshades
206. Lamp Bases
207a. Lamp with Standard and Flex
208. Battery Tags and Studs
208a. Washers for Battery Studs
210. Nuts for Battery Studs
- 211a. Helical Gear ½" { Can only be
211b. " " 1½" { used together
212. Rod and Strip Connectors
213. Rod Connectors
215. Semi-Circular Plates 2½"
214. Formed Slotted Strips 3"
216. Cylinders, 2½"
- 217A. Discs, 1½"
217a. Wheel Discs
217B. Discs ¾"