

# MECCANO

## INSTRUCTIONS

FOR

### No. 2a ACCESSORY OUTFIT

Prices

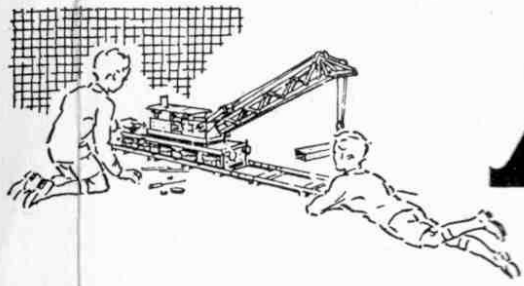
Great Britain 3d  
Australia 6d  
New Zealand 4d  
South Africa 5d  
Canada 10c

No.  
37.2a



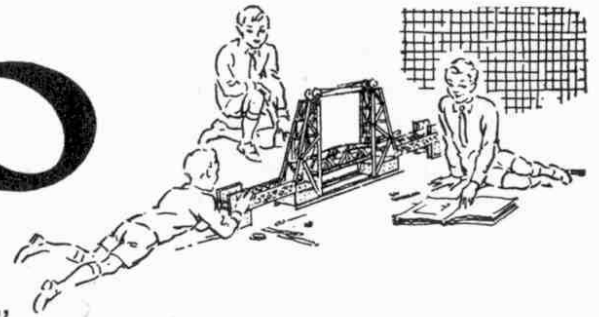
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# MECCANO

*Real Engineering in Miniature*



## MODEL-BUILDING WITH MECCANO

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

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

## HOW TO BUILD UP YOUR OUTFIT

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

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

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

## ELECTRIC LIGHTING OF MECCANO MODELS

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

## THE "MECCANO MAGAZINE"

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

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

## THE MECCANO GUILD

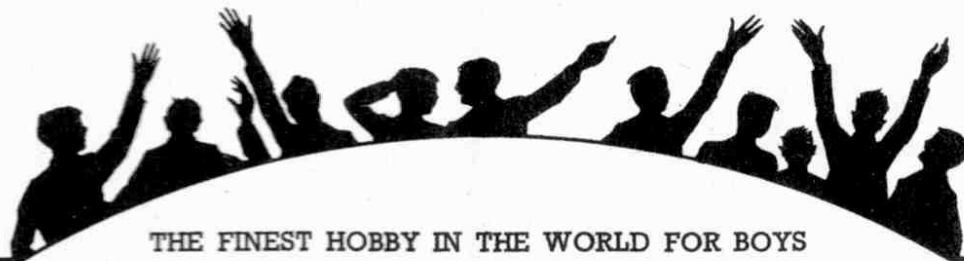
Every owner of a Meccano Outfit should join the Meccano Guild. This is a world-wide organisation, started at the request of Meccano boys. Its primary object is to bring boys together and to make them feel that they are all members of a great brotherhood, each trying to help others to get the very best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

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

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

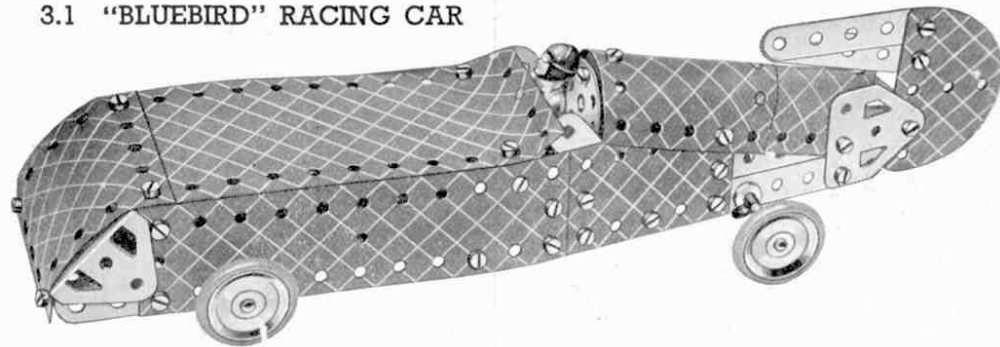
## MECCANO SERVICE

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



THE FINEST HOBBY IN THE WORLD FOR BOYS

## 3.1 "BLUEBIRD" RACING CAR



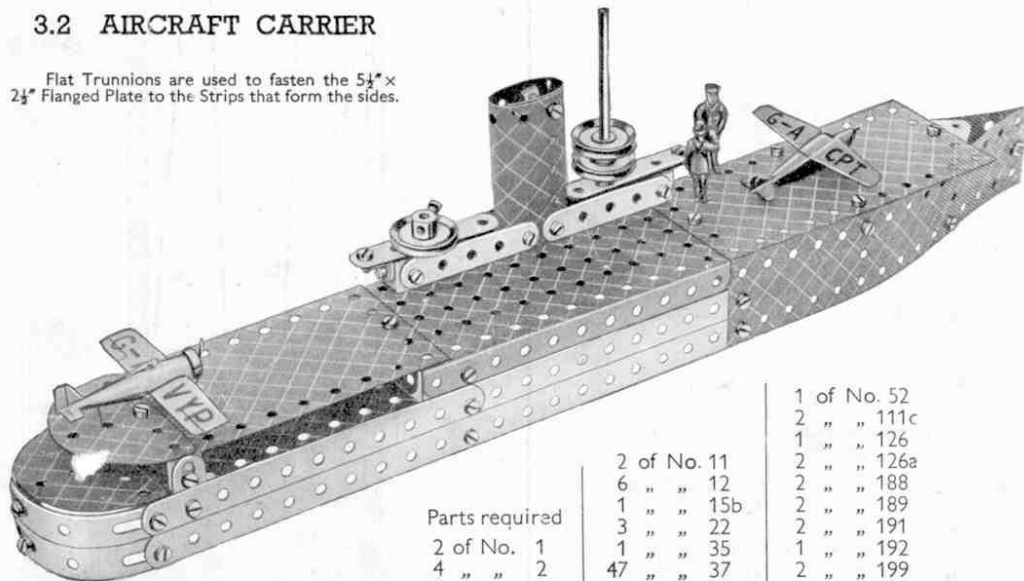
Parts required

The  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flanged Plate is used for the front end of the chassis, and the two  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flexible Plates are bolted one on each side in the third hole from the front end of the chassis. The two  $5\frac{1}{2}''$  Strips forming the rear end of the chassis overlap the  $5\frac{1}{2}'' \times 1\frac{1}{2}''$  Flexible Plates one hole.

2 of No. 2	2 of No. 35	2 of No. 126	1 of No. 192
6 " " 5	39 " " 37	2 " " 126a	2 " " 199
2 " " 10	4 " " 38	4 " " 155a	1 " " 200
3 " " 12	1 " " 48a	2 " " 188	2 " " 214
2 " " 16	1 " " 52	2 " " 189	1 " " 217a
4 " " 22			

## 3.2 AIRCRAFT CARRIER

Flat Trunnions are used to fasten the  $5\frac{1}{2}'' \times 2\frac{1}{2}''$  Flanged Plate to the Strips that form the sides.



Parts required

2 of No. 1	2 of No. 11	1 of No. 52
4 " " 2	6 " " 12	2 " " 111c
6 " " 5	1 " " 15b	1 " " 126
4 " " 10	3 " " 22	2 " " 126a
	1 " " 35	2 " " 188
	47 " " 37	2 " " 189
	2 " " 37a	2 " " 191
	1 " " 48a	1 " " 192
		2 " " 199
		2 " " 214
		4 " " 215

## 3.3 MARINE ENGINE

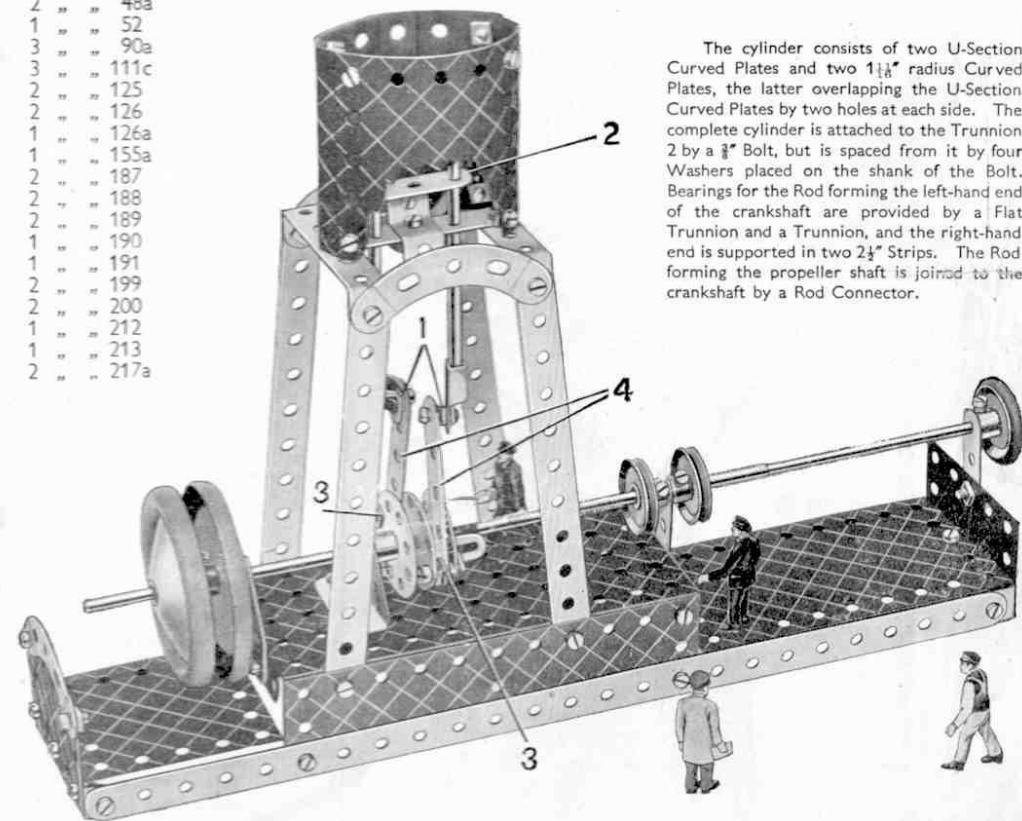
Parts required

2 of No. 1	
4 " " 2	
5 " " 5	
8 " " 12	
2 " " 15b	
3 " " 16	
3 " " 22	
1 " " 24	
4 " " 35	
50 " " 37	
6 " " 37a	
6 " " 38	
2 " " 48a	
1 " " 52	
3 " " 90a	
3 " " 111c	
2 " " 125	
2 " " 126	
1 " " 126a	
1 " " 155a	
2 " " 187	
2 " " 188	
2 " " 189	
1 " " 190	
1 " " 191	
2 " " 199	
2 " " 200	
1 " " 212	
1 " " 213	
2 " " 217a	

Bolts 1 are lock-nutted. The Bolts 3 are  $\frac{3}{8}''$  long and are lock-nutted twice as shown. The  $2\frac{1}{2}''$  Strips 4 must be quite free to move when the crankshaft is rotated.

The left-hand piston rod is held by two Spring Clips, one at each side of the Angle Bracket pivotally fastened by the Bolt 1. Inside the cylinder the Rods slide through holes in a  $2\frac{1}{2}''$  Strip and a Trunnion 2. In order to show the construction clearly part of the cylinder has been cut away in the illustration.

The Rod carrying two  $1''$  Pulleys passes through the centre hole in the outer  $1\frac{1}{2}''$  Disc. A  $\frac{1}{2}'' \times \frac{1}{2}''$  Angle Bracket is bolted to the Disc in such a position that when the Disc is turned the Angle Bracket engages with a Spring Clip on the Rod. It is important that all Nuts and Bolts are made quite secure with the Spanner and Screwdriver.



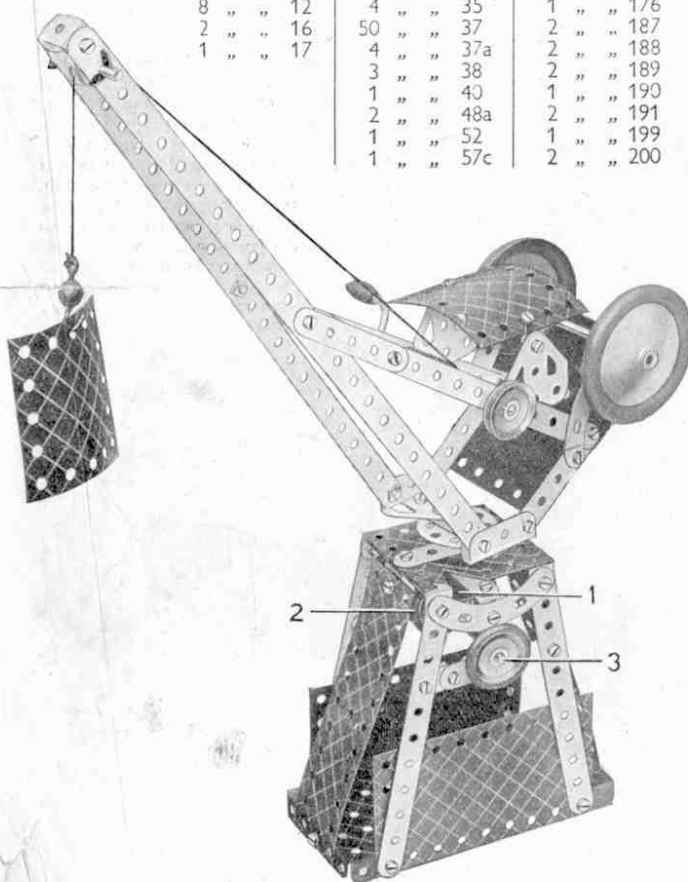
The cylinder consists of two U-Section Curved Plates and two  $1\frac{1}{8}''$  radius Curved Plates, the latter overlapping the U-Section Curved Plates by two holes at each side. The complete cylinder is attached to the Trunnion 2 by a  $\frac{3}{8}''$  Bolt, but is spaced from it by four Washers placed on the shank of the Bolt. Bearings for the Rod forming the left-hand end of the crankshaft are provided by a Flat Trunnion and a Trunnion, and the right-hand end is supported in two  $2\frac{1}{2}''$  Strips. The Rod forming the propeller shaft is joined to the crankshaft by a Rod Connector.

## 3.4 SWIVELLING JIB CRANE

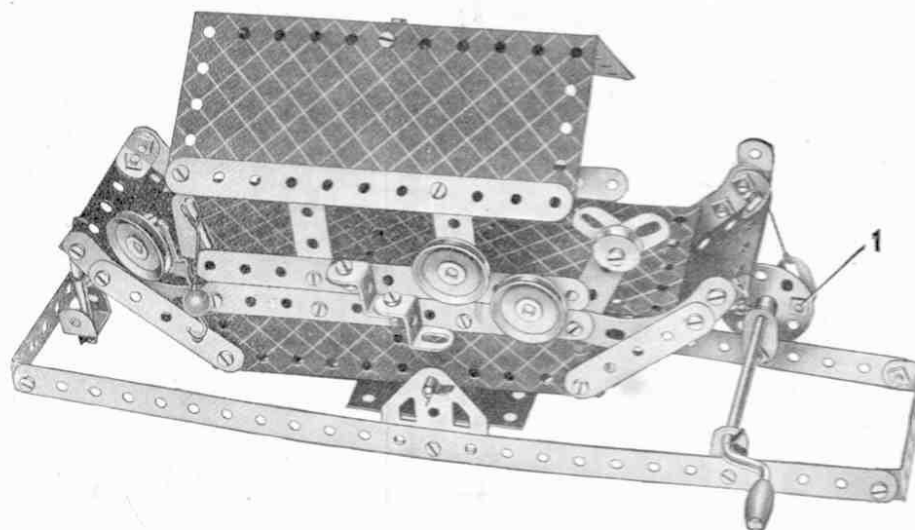
A 1" fast Pulley 1 is fastened to the lower end of a 2" Rod, which passes into and is held in the boss of the Bush Wheel. The Pulley rests on the tyre of Pulley Wheel 2, which is fastened on Rod 3. When the Rod 3 is rotated the jib is caused to swivel. Bearings for Rod 3 are formed by Flat Brackets, which are bolted through their elongated holes to the 2½" strips shown in the illustration. The roof of the cab is fastened by means of Obtuse Angle Brackets to two Flat Trunnions, and these in turn are bolted to the compound Strips bracing the jib.

## Parts required

2 of No. 1	1 of No. 18a	4 of No. 90a
6 " " 2	1 " " 19g	4 " " 111c
9 " " 5	4 " " 22	2 " " 126
4 " " 10	1 " " 23	2 " " 126a
1 " " 11	1 " " 24	2 " " 155a
8 " " 12	4 " " 35	1 " " 176
2 " " 16	50 " " 37	2 " " 187
1 " " 17	4 " " 37a	2 " " 188
	3 " " 38	2 " " 189
	1 " " 40	1 " " 190
	2 " " 48a	2 " " 191
	1 " " 52	1 " " 199
	1 " " 57c	2 " " 200



## 3.5 NOAH'S ARK



## Parts required

2 of No. 1	1 of No. 18a	1 of No. 40	2 of No. 126
6 " " 2	1 " " 19g	1 " " 44	2 " " 126a
9 " " 5	3 " " 22	2 " " 48a	1 " " 176
5 " " 10	1 " " 23	1 " " 52	2 " " 188
2 " " 11	1 " " 24	1 " " 57c	2 " " 189
8 " " 12	6 " " 35	4 " " 90a	2 " " 190
1 " " 16	50 " " 37	5 " " 111c	2 " " 191
1 " " 17	3 " " 37a	2 " " 125	2 " " 192

A 5½" x 2½" Flanged Plate is used for the base, and 5½" x 2½" Flexible Plates and 5½" Strips form the sides. The deck is fastened to the side-plates by ½" x ½" Angle Brackets.

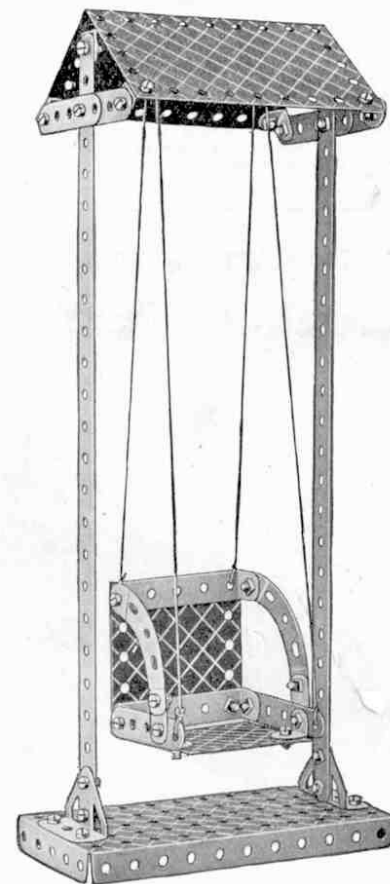
The ark is pivoted on a 3½" Rod journalled in Flat Trunnions, the Rod passing through the flanges of the baseplate at the fifth holes from the end near the Crank Handle. The Crank Handle carries a Bush Wheel, and to this a Flat Bracket is lock-nutted at 1. A length of Cord is attached to the free hole of the Flat Bracket and is then tied to a Double Bracket bolted to the side of the ark. When the crank is rotated, the downward motion of the Flat Bracket causes one end of the ark to be pulled down, but as the Flat Bracket rises again, the ark returns to its original position.

## 3.6 SWING

Two 2½" Strips overlapped one hole are bolted to the tops of the 12½" Strips by ½" x ½" Angle Brackets.

## Parts required

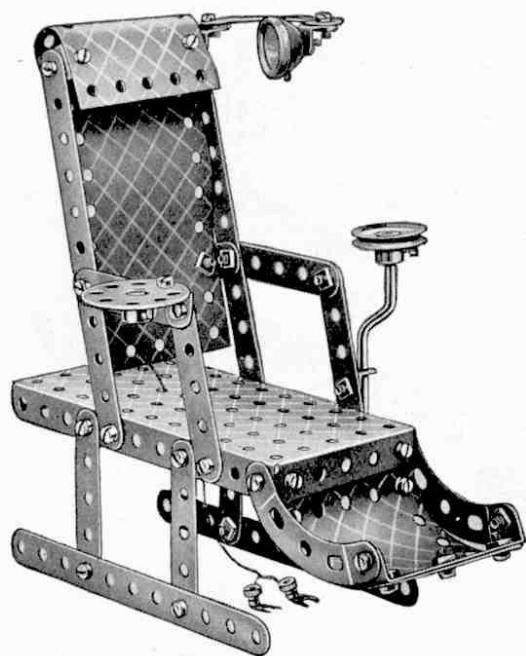
2 of No. 1	2 of No. 48a
6 " " 5	1 " " 52
2 " " 10	2 " " 90a
8 " " 12	2 " " 126
34 " " 37	2 " " 190
1 " " 40	2 " " 191



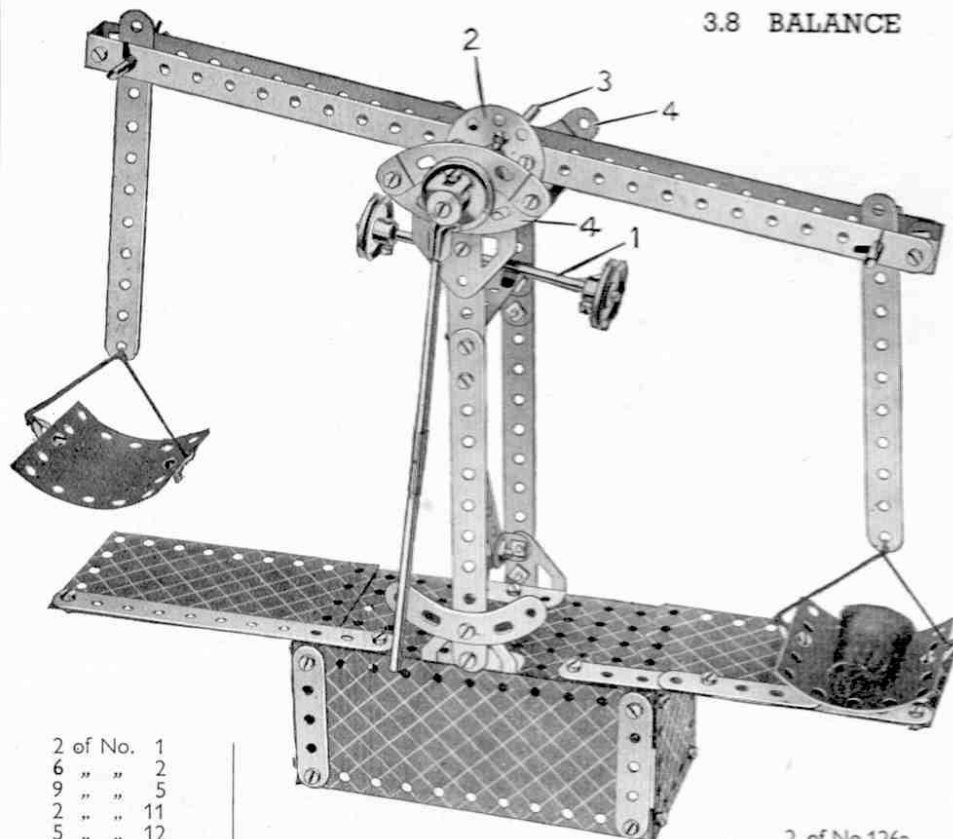
## 3.7 DENTIST'S CHAIR

## Parts required

4 of No. 2	1 of No. 37a
8 " " 5	1 " " 48a
2 " " 10	1 " " 52
8 " " 12	3 " " 90a
1 " " 19g	1 " " 190
1 " " 22	1 " " 191
1 " " 24	1 " " 200
2 " " 35	Lighting Set
40 " " 37	(Not included in Outfit)



This model is fitted with a Spotlight from the Meccano Lighting Set.



## 3.8 BALANCE

2 of No. 1
6 " " 2
9 " " 5
2 " " 11
5 " " 12
2 " " 15b
2 " " 16
2 " " 17
4 " " 22
1 " " 24
6 " " 35
50 " " 37

## Parts required

4 of No. 37a	1 of No. 52
5 " " 38	4 " " 90a
1 " " 40	4 " " 111c
1 " " 44	1 " " 125
2 " " 48a	2 " " 126

2 of No. 126a
2 " " 190
2 " " 191
2 " " 192
2 " " 200
1 " " 212
1 " " 213
2 " " 215

One of the  $12\frac{1}{2}$ " Strips that form the beam of the balance is bolted across a Bush Wheel. The  $3\frac{1}{2}$ " Rod 3 that is locked in the boss of the Bush Wheel rests on the two Curved Strips 4.

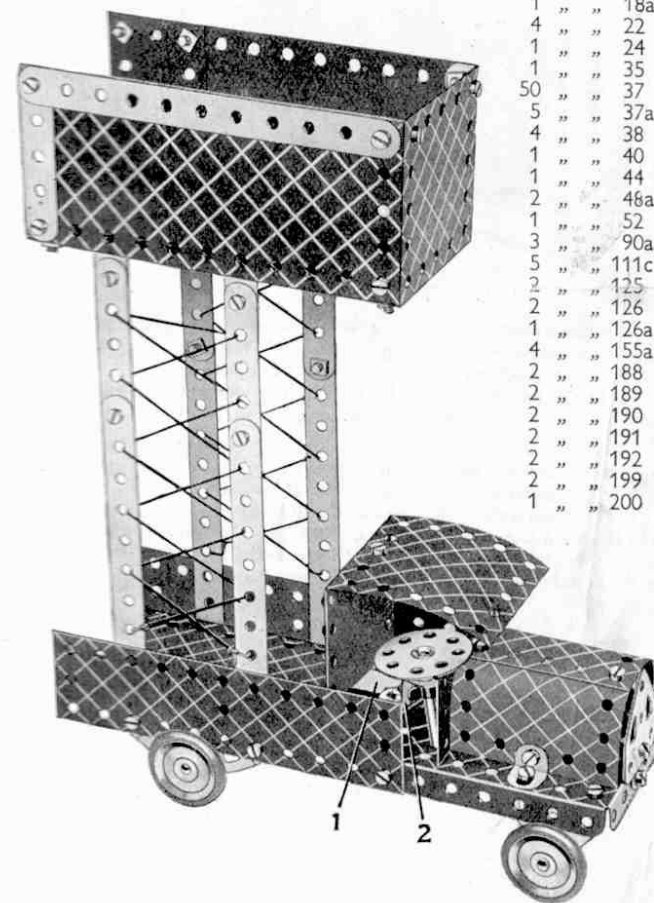
The Rod 1, by which the balance is adjusted, is pushed through the two holes of a Cranked Bent Strip fastened to the Bush Wheel 2 by a Reversed Angle Bracket. The  $5\frac{1}{2}$ " Strips from which the scale pans are suspended are pivoted at their upper ends on 2" Rods, which are passed through holes in the  $12\frac{1}{2}$ " Strips of the beam.

## 3.9 TOWER WAGON

A Cranked Bent Strip 1 is bolted in a horizontal position in the centre of the Flanged Plate, and a  $2\frac{1}{2}$ " Curved Strip is bolted on top of it by the centre hole, to form a seat. A Reversed Angle Bracket 2 is then bolted in one of the elongated holes of the Curved Strip to form a bearing for the Rod carrying the Bush Wheel.

## Parts required

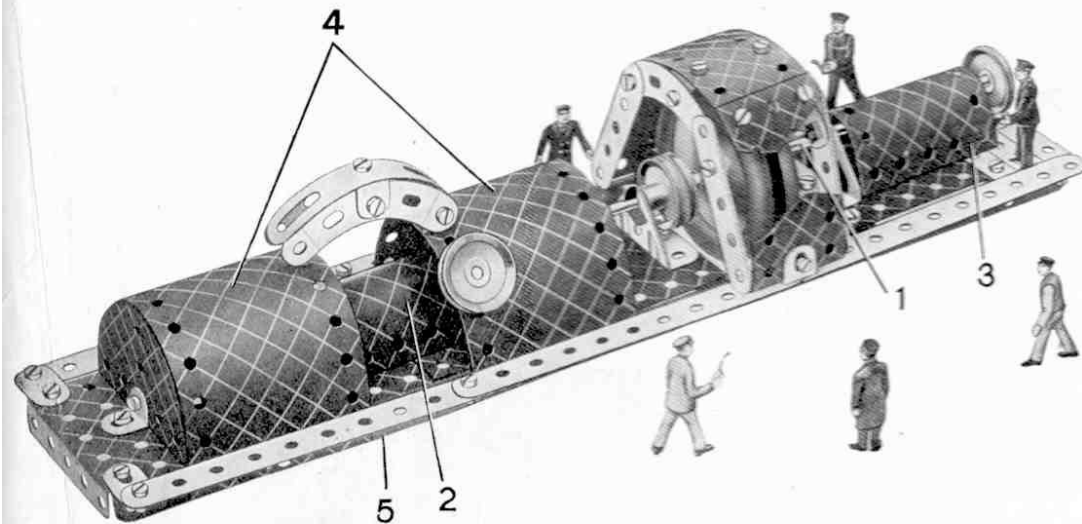
6 of No. 2
6 " " 5
1 " " 10
2 " " 11
8 " " 12
2 " " 16
1 " " 18a
4 " " 22
1 " " 24
1 " " 35
50 " " 37
5 " " 37a
4 " " 38
1 " " 40
1 " " 44
2 " " 48a
1 " " 52
3 " " 90a
5 " " 111c
2 " " 125
2 " " 126
1 " " 126a
4 " " 155a
2 " " 188
2 " " 189
2 " " 190
2 " " 191
2 " " 192
2 " " 199
1 " " 200





These Models can be built with MECCANO No. 3 Outfit (or No. 2 and No. 2a Outfits)

### 3.10 ELECTRIC GENERATING SET



The base is constructed by bolting two 12½" Strips to the flanges of a 5½" x 2½" Flanged Plate 5, and joining them at their free ends by a 2½" x ½" Double Angle Strip. The space between the 12½" Strips is then filled in by Flexible Plates and 2½" Strips. The Rods that form the shaft of the machine are joined together at 1 by a Rod Connector. The bearings for the shaft are formed by two Trunnions. In the illustration part of the Flexible Plate has been cut away to show the structure of the armature and the commutator. The commutator consists of two 1" Pulleys and the armature of two Road Wheels, the bosses of which are placed in contact with each other.

The connecting pipe is formed from two 2½" Curved Strips and one 3" Formed Slotted Strip joined together at their centre holes by a Double Bracket, and is fastened to the turbine by means of an Angle Bracket. The U-Section Curved Plate 2 is held by a Spring Clip slipped on the upper end of a 2" Rod. One end of the Rod is passed through the middle hole in the top of the Plate, and its other end is then pushed through the Flexible Plate forming the base. The Rod is held by a Spring Clip underneath the Plate. The U-Section Curved Plate 3 is fixed to the base by an Angle Bracket on the rear side of the model. The two Flexible Plates 4 are bolted to the flanges of the 5½" x 2½" Flanged Plate 5. The 1" Pulley representing the steam control is held by a ½" Bolt, which passes through a hole in one of the Flexible Plates 4 and is locked in the boss of the Pulley.

#### Parts required

2 of No. 1	1 of No. 16	1 of No. 52	1 of No. 189
6 " " 2	1 " " 18a	4 " " 90a	1 " " 190
8 " " 5	4 " " 22	1 " " 111c	1 " " 191
3 " " 10	4 " " 35	2 " " 125	2 " " 192
2 " " 11	50 " " 37	2 " " 126	2 " " 199
8 " " 12	1 " " 38	2 " " 187	1 " " 213
1 " " 15b	2 " " 48a	1 " " 188	2 " " 214
	1 of No. 215		

### 3.11 TROTTING CAR

The seat of the car consists of two 2½" x 1½" Flexible Plates overlapped two holes and it carries at each end a Trunnion. The 3" Formed Slotted Strips that form the mudguards are supported by Reversed Angle Brackets 2, which are spaced from the Flexible Plate by three Washers. The axle consists of two 2" Rods joined by a Rod Connector and is journaled in the Trunnions.

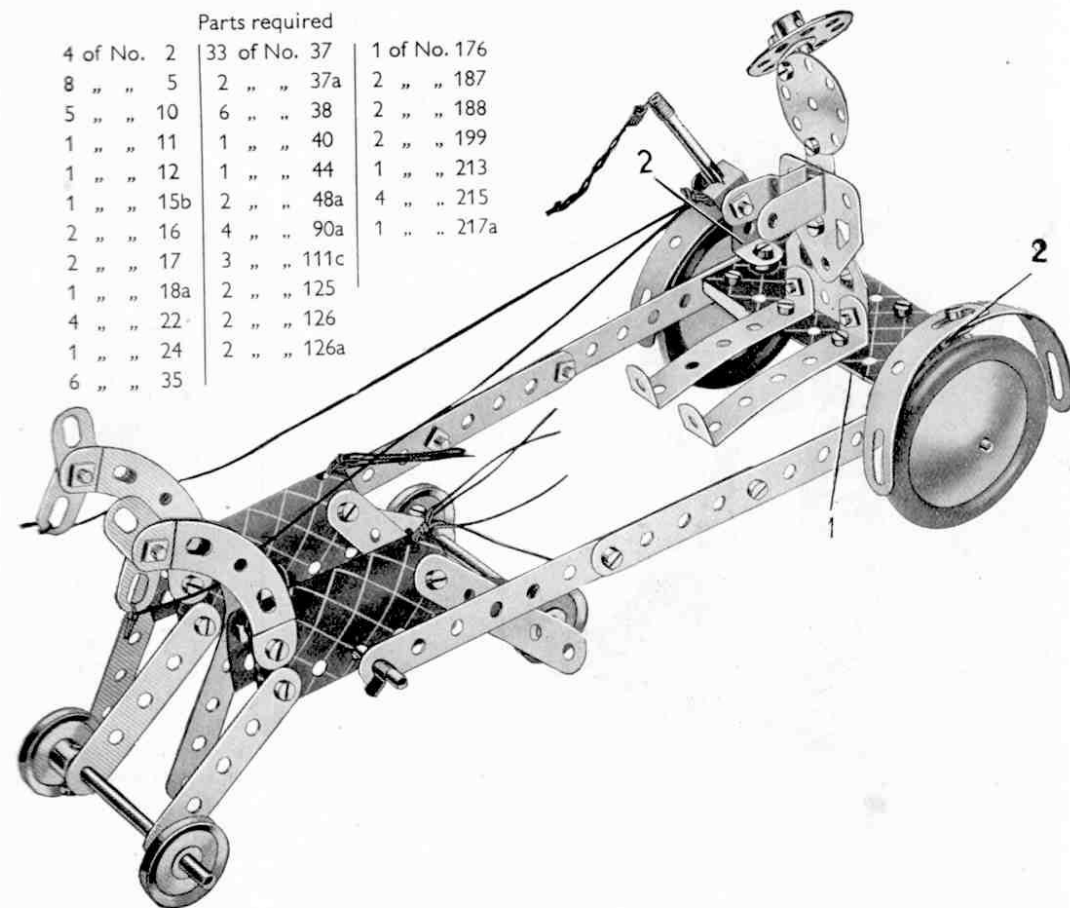
Each of the horses is built up as follows. Four 2½" Strips are bolted to a U-Section Curved Plate in the positions shown to form the legs, and two 2½" small radius Curved Strips represent the neck. A Rod is pushed through the centre holes of the U-Section Curved Plates and is supported in the end holes of the shafts. Two 3½" Rods carrying 1" Pulleys at each of their ends are journaled in the end holes of two of the forelegs, and two of the hind-legs of the horses, as shown.

The driver's body is made with two Flat Trunnions, which are bolted together and then fitted with 2½" x ½" Double Angle Strips to represent legs. The Bolt that fixes the Cranked Bent Strip to the body holds also a Flat Bracket that supports a 1½" Disc representing the head. An Angle Bracket bolted to the Disc secures a Bush Wheel that has a ½" Bolt fixed in its boss by the setscrew.

The whip is a 2" Rod held by Spring Clips in a Double Bracket, and the lash is attached to it by a Cord Anchoring Spring. The reins are fastened to the Flat Brackets that form the horses' heads, and also to the Double Bracket to which the whip is fixed. Short lengths of Cord fastened to the U-Section Curved Plates represent the horses' tails.

#### Parts required

4 of No. 2	33 of No. 37	1 of No. 176
8 " " 5	2 " " 37a	2 " " 187
5 " " 10	6 " " 38	2 " " 188
1 " " 11	1 " " 40	2 " " 199
1 " " 12	1 " " 44	1 " " 213
1 " " 15b	2 " " 48a	4 " " 215
2 " " 16	4 " " 90a	1 " " 217a
2 " " 17	3 " " 111c	
1 " " 18a	2 " " 125	
4 " " 22	2 " " 126	
1 " " 24	2 " " 126a	
6 " " 35		



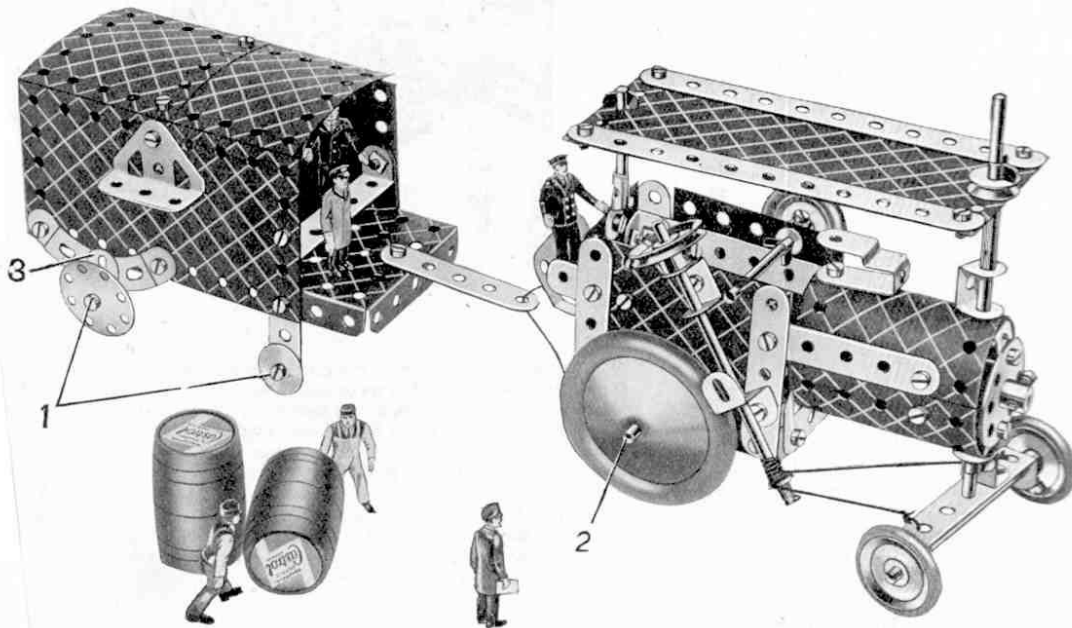
### 3.12 STEAM TRACTOR AND TRAILER

The steering column, a  $3\frac{1}{2}$ " Rod, is supported in the holes of a Double Bracket and a Reversed Angle Bracket bolted to the side of the cab. Cord is wound round the lower part of the Rod and its ends are tied to the  $2\frac{1}{2}$ " x  $\frac{1}{2}$ " Double Angle Strip that carries the front axle. Care must be taken that the Cord is wound tightly round the Rod, or it will slip when the steering wheel is rotated. The Rod 2 is supported in holes in the Flexible Plates that form the sides of the cab.

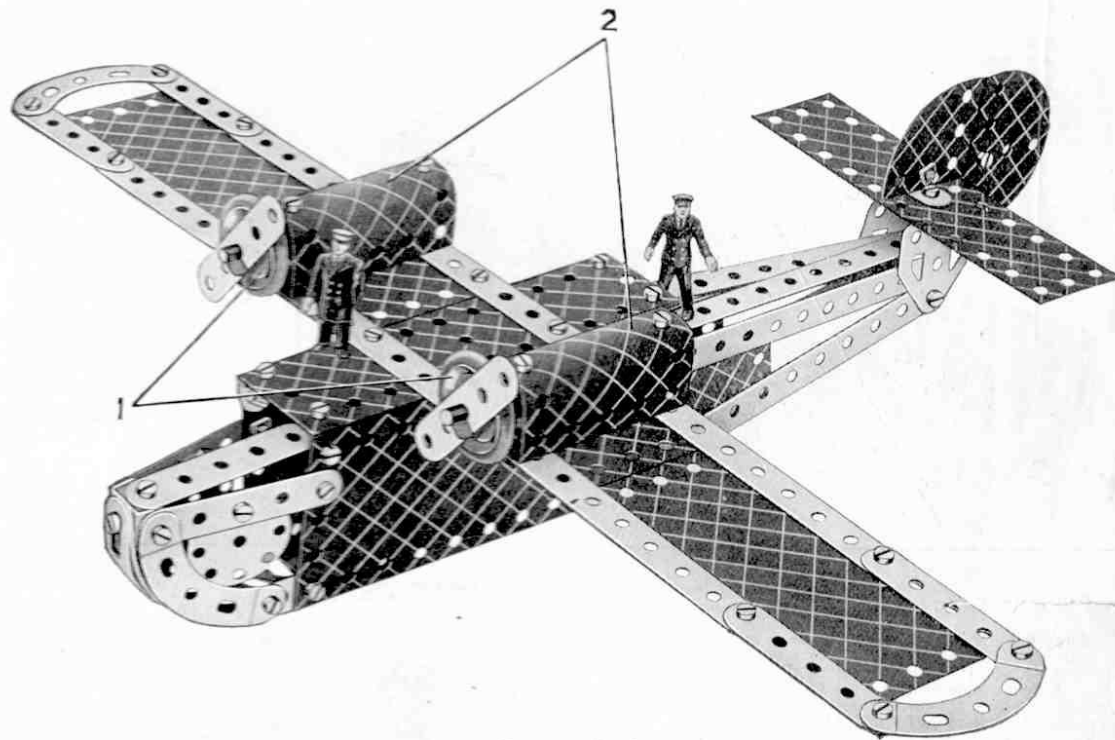
The Bush Wheel that forms the front of the boiler has two Angle Brackets bolted to it and a Rod passes through the free holes of these Brackets to hold the Bush Wheel in position. This Rod is joined by a Rod Connector to a 2" Rod that forms the chimney. The roof of the cab consists of a  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flexible Plate, and is held in position by Spring Clips placed on the two Rods that pass through it. The Flat Brackets 3 are bolted in the centre holes of the  $2\frac{1}{2}$ " Curved Strips. The Bolts 1 are lock-nutted in position and the wheels turn freely on them.

#### Parts required

4 of No. 2	1 of No. 23	2 of No. 90a	2 of No.191
9 " " 5	1 " " 24	4 " " 111c	1 " " 192
5 " " 10	4 " " 35	2 " " 125	2 " " 199
2 " " 11	45 " " 37	2 " " 126	2 " " 200
8 " " 12	6 " " 37a	2 " " 126a	1 " " 212
2 " " 15b	6 " " 38	3 " " 155a	1 " " 213
2 " " 16	1 " " 40	1 " " 176	1 " " 214
2 " " 17	1 " " 44	2 " " 187	2 " " 217a
1 " " 18a	2 " " 48a	2 " " 188	2 " " 217b
4 " " 22	1 " " 52	2 " " 190	



### 3.13 Do.X. FLYING BOAT



#### Parts required

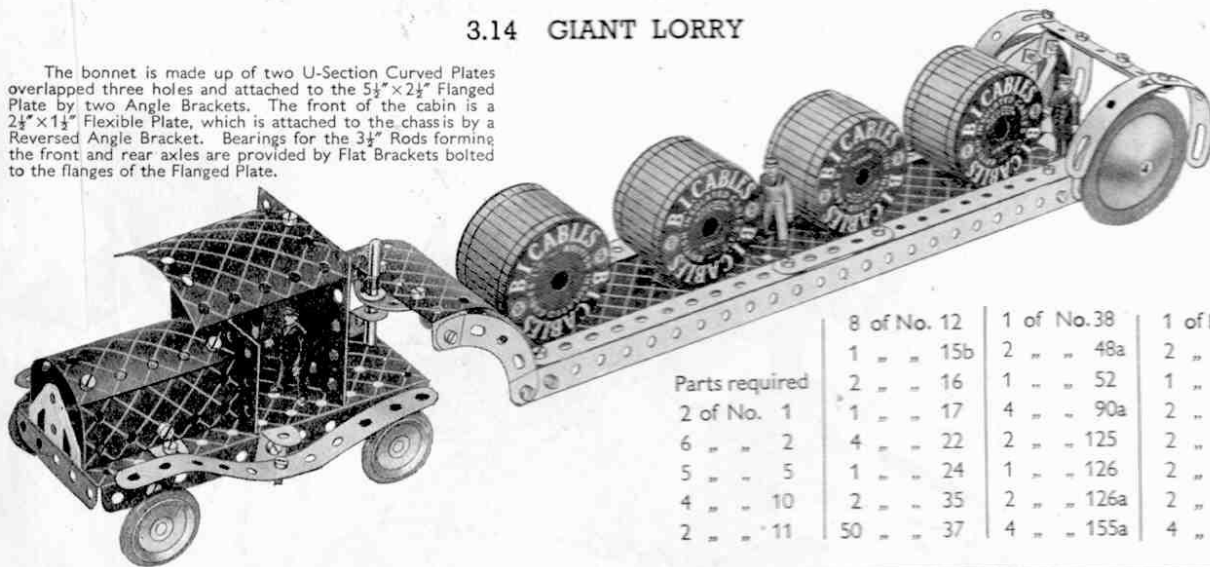
2 of No. 1	2 of No. 22	1 of No.125	2 of No.191
6 " " 2	4 " " 35	2 " " 126	2 " " 192
9 " " 5	50 " " 37	2 " " 126a	2 " " 199
2 " " 10	6 " " 37a	2 " " 155a	2 " " 214
2 " " 11	2 " " 48a	2 " " 188	2 " " 215
8 " " 12	4 " " 90a	2 " " 189	2 " " 217a
2 " " 16	6 " " 111c	2 " " 190	

The construction of the fuselage is clear from the illustration. The Strips and Curved Strips forming the nose of the machine are all fastened at their free ends to a Double Bracket. The engines 1 are 1" fast Pulleys and the engine nacelles 2 are U-section Curved Plates, which are fastened to the wings by  $\frac{1}{2}$ " x  $\frac{1}{4}$ " Angle Brackets. Bearings for the propeller shafts, which are  $3\frac{1}{2}$ " Rods are formed by the holes in the turned-up ends of  $2\frac{1}{2}$ " Double Angle Strips. These Double Angle Strips are supported by the Bolts that can be seen in the centre holes of the U-Section Curved Plates.

The tail assembly is supported on two Flat Trunnions, which are joined, at the centre holes in their ends at the top, by a Double Bracket. A  $5\frac{1}{2}$ " x  $1\frac{1}{2}$ " Flexible Plate representing the tail plane is bolted to the free hole of the Double Bracket. The Bolt that holds the tail plane carries also an Angle Bracket, and two  $2\frac{1}{2}$ " Semi-Circular Flat Plates are fastened to this to form the rudder.

## 3.14 GIANT LORRY

The bonnet is made up of two U-Section Curved Plates overlapped three holes and attached to the  $5\frac{1}{2}" \times 2\frac{1}{2}"$  Flanged Plate by two Angle Brackets. The front of the cabin is a  $2\frac{1}{2}" \times 1\frac{1}{2}"$  Flexible Plate, which is attached to the chassis by a Reversed Angle Bracket. Bearings for the  $3\frac{1}{2}"$  Rods forming the front and rear axles are provided by Flat Brackets bolted to the flanges of the Flanged Plate.

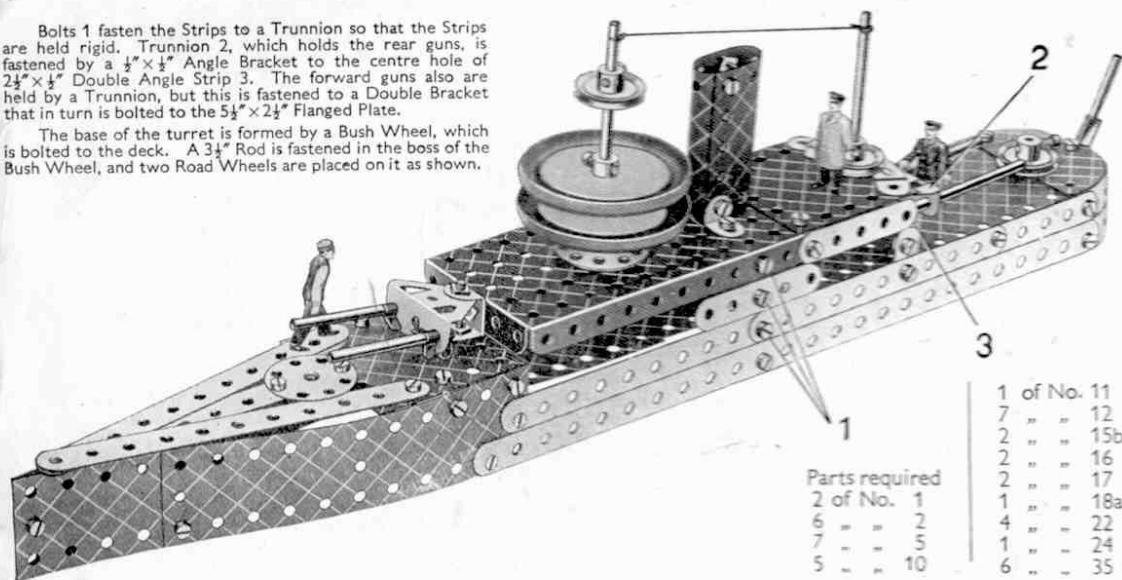


Parts required	8 of No. 12	1 of No. 38	1 of No. 176
	1 " 15b	2 " 48a	2 " 187
2 of No. 1	2 " 16	1 " 52	1 " 188
	1 " 17	4 " 90a	2 " 190
6 " 2	4 " 22	2 " 125	2 " 192
5 " 5	1 " 24	1 " 126	2 " 199
4 " 10	2 " 35	2 " 126a	2 " 200
2 " 11	50 " 37	4 " 155a	4 " 215

## 3.15 BATTLE CRUISER

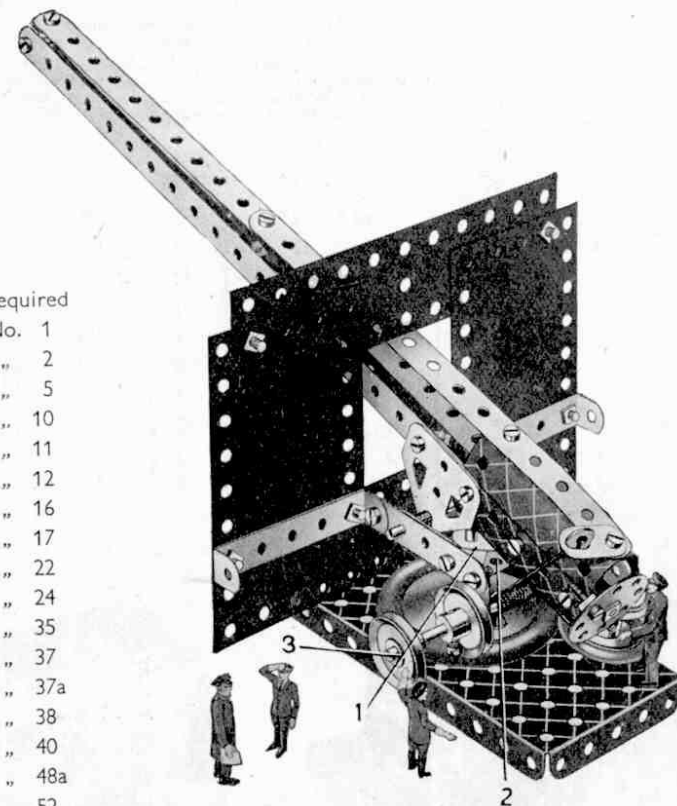
Bolts 1 fasten the Strips to a Trunnion so that the Strips are held rigid. Trunnion 2, which holds the rear guns, is fastened by a  $\frac{1}{2}" \times \frac{1}{2}"$  Angle Bracket to the centre hole of  $2\frac{1}{2}" \times \frac{1}{2}"$  Double Angle Strip 3. The forward guns also are held by a Trunnion, but this is fastened to a Double Bracket that in turn is bolted to the  $5\frac{1}{2}" \times 2\frac{1}{2}"$  Flanged Plate.

The base of the turret is formed by a Bush Wheel, which is bolted to the deck. A  $3\frac{1}{2}"$  Rod is fastened in the boss of the Bush Wheel, and two Road Wheels are placed on it as shown.



Parts required	1 of No. 11	50 of No. 37
	7 " 12	6 " 37a
2 of No. 1	2 " 15b	1 " 40
	2 " 16	2 " 48a
6 " 2	1 " 52	1 " 52
7 " 5	1 " 90a	2 " 90a
5 " 10	6 " 111c	2 " 111c
	2 " 126	2 " 126
	2 " 126a	2 " 126
	1 " 176	2 " 126a
	2 " 187	1 " 155a
	2 " 188	1 " 176
	2 " 189	1 " 187
	2 " 190	1 " 188
	1 " 191	1 " 189
	1 " 192	1 " 191
	1 " 199	1 " 192
	2 " 200	1 " 199
	1 " 212	2 " 200
	1 " 214	1 " 212
	2 " 215	1 " 214
	1 " 217a	2 " 215
	1 " 217b	1 " 217a

## 3.16 NAVAL GUN



## Parts required

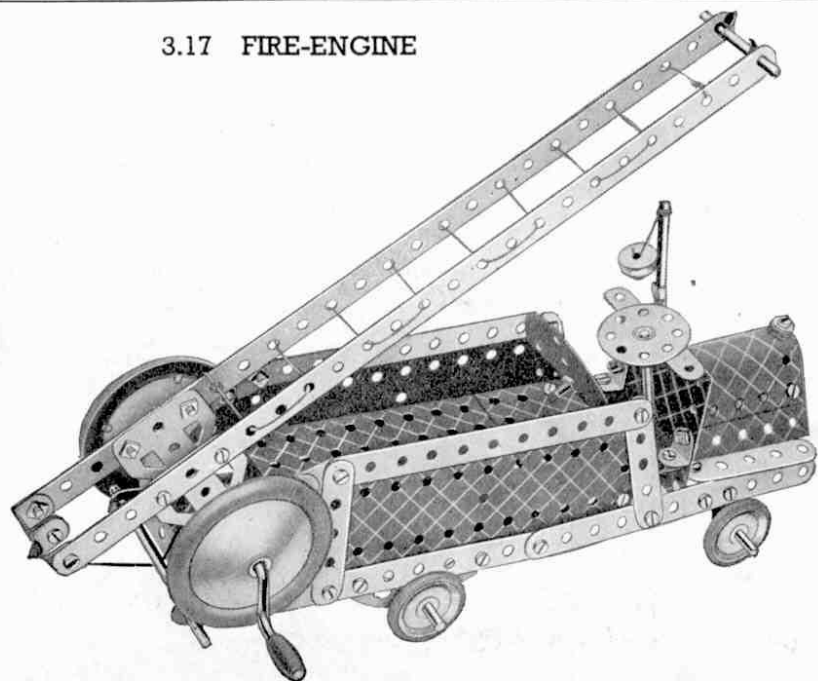
2 of No. 1	28 " 37
5 " 2	3 " 37a
3 " 5	5 " 38
3 " 10	1 " 40
2 " 11	2 " 48a
1 " 16	1 " 52
2 " 17	2 " 111c
4 " 22	2 " 126
1 " 24	2 " 126a
4 " 35	1 " 155a
28 " 37	1 " 176
3 " 37a	1 " 187
5 " 38	1 " 188
1 " 40	1 " 189
2 " 48a	1 " 191
1 " 52	1 " 192
2 " 111c	1 " 199
2 " 126	2 " 200
2 " 126a	1 " 212
1 " 155a	1 " 214
1 " 176	2 " 215
1 " 187	1 " 217a
1 " 188	1 " 217b
1 " 189	
2 " 191	
2 " 199	
1 " 217a	

The Flexible Plates forming the gun shield are fastened by means of Double Angle Strips and  $2\frac{1}{2}"$  Strips to two Trunnions 1. The Trunnions are bolted to Bush Wheel 2. A  $2"$  Rod held in the boss of the Bush Wheel passes through a Road Wheel and the centre hole of the  $5\frac{1}{2}" \times 2\frac{1}{2}"$  Flanged Plate. The Rod is fastened underneath the Flanged Plate by a Cord Anchoring Spring so that the gun is free to swivel.

The elevation of the gun is controlled by Rod 3. Cord is wound round the Rod, then passed through the hole of a Flat Bracket fastened at the rear end of the gun, and knotted to a Washer as shown. The  $1\frac{1}{2}"$  Disc at the end of the gun is fastened by an Angle Bracket to the U-Section Curved Plates representing the breech.



## 3.17 FIRE-ENGINE



## Parts required

2 of No. 1	2 of No. 125
6 " " 2	2 " " 126
8 " " 5	2 " " 126a
5 " " 10	4 " " 155a
2 " " 11	1 " " 176
7 " " 12	2 " " 187
2 " " 15b	2 " " 188
2 " " 16	2 " " 189
1 " " 17	2 " " 190
1 " " 19g	1 " " 192
4 " " 22	1 " " 199
1 " " 23	1 " " 212
1 " " 24	1 " " 214
6 " " 35	
50 " " 37	
6 " " 37a	
5 " " 38	
1 " " 40	
2 " " 48a	
1 " " 52	
4 " " 90a	
6 " " 111c	

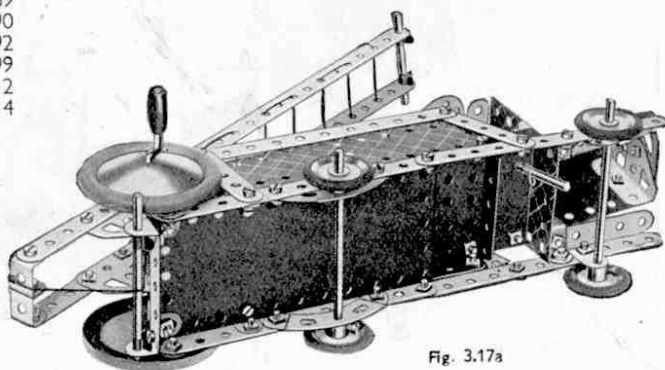
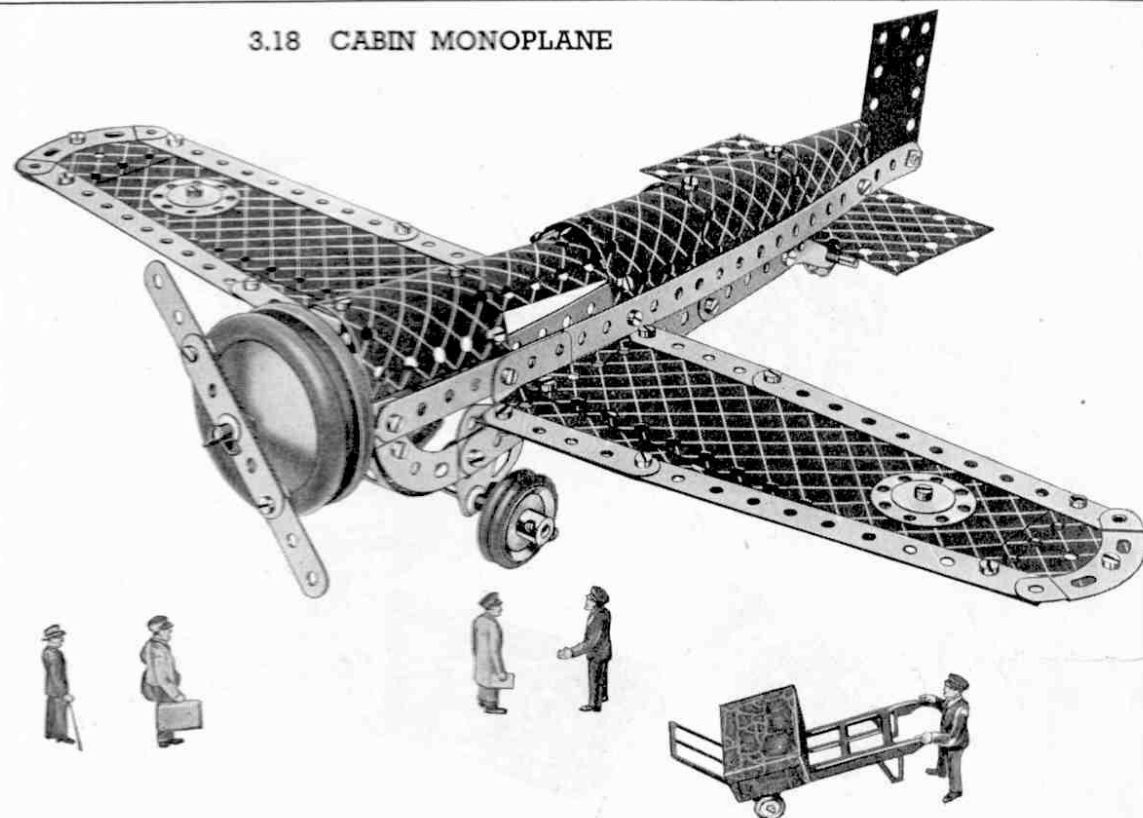


Fig. 3.17a

Two Flat Trunnions are bolted to the bottom of the ladder, and the shaft of the Crank Handle shown in Fig. 3.17a passes through the holes at their narrow ends. The bonnet, which is formed from a U-Section Curved Plate and two  $2\frac{1}{2}'' \times \frac{1}{2}''$  Flexible Plates, is fastened to the frame by Reversed Angle Brackets. These latter also support the  $2\frac{1}{2}''$  Strips at the side of the bonnet.

The  $3\frac{1}{2}''$  Rod representing the steering column passes through the free hole of a Flat Bracket bolted to the dashboard, then through a hole in the Flexible Plate at the bottom of the cab. It is fastened in position by a Cord Anchoring Spring.

## 3.18 CABIN MONOPLANE



## Parts required

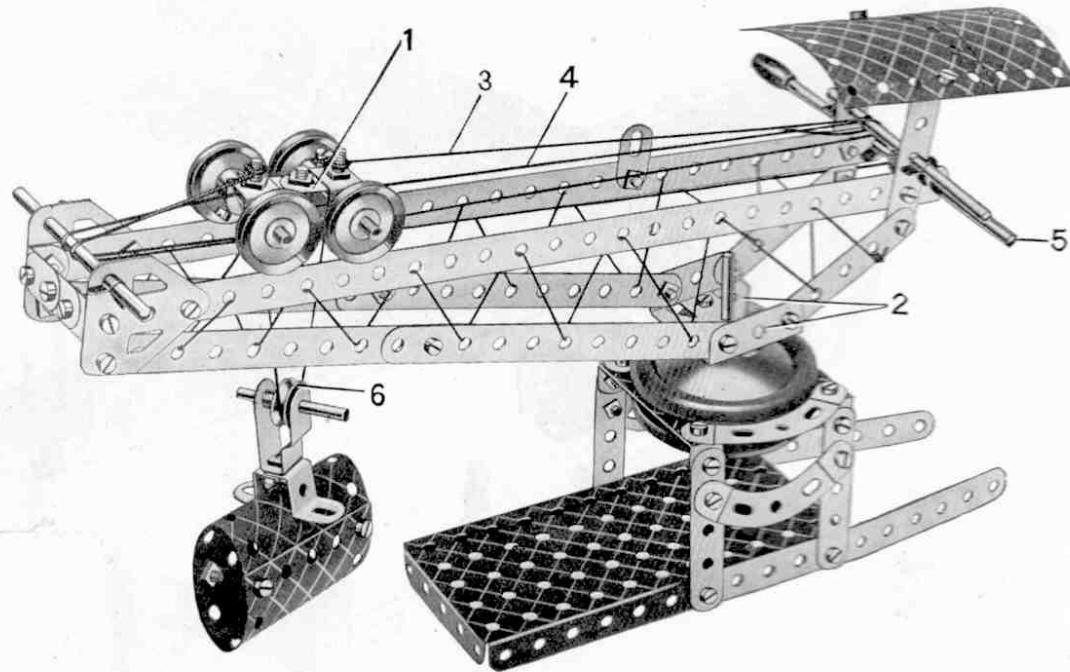
2 of No. 1	4 of No. 22	4 of No. 90a	2 of No. 190
6 " " 2	1 " " 23	6 " " 111c	1 " " 191
9 " " 5	1 " " 24	2 " " 125	2 " " 192
5 " " 10	5 " " 35	2 " " 126	2 " " 199
1 " " 11	50 " " 37	2 " " 126a	2 " " 200
8 " " 12	6 " " 37a	4 " " 155a	2 " " 214
1 " " 16	5 " " 38	2 " " 187	2 " " 215
1 " " 17	1 " " 44	2 " " 188	2 " " 217a
1 " " 18a	2 " " 48a	2 " " 189	2 " " 217b

The engine and propeller are attached by fastening a Bush Wheel to the nose of the plane by two Angle Brackets. A  $2''$  Rod is locked in the boss of the Bush Wheel and forms the support for the Road Wheels and the compound strip representing the propeller.

The wings are attached to the fuselage by  $\frac{1}{2}'' \times \frac{1}{2}''$  Angle Brackets and Trunnions. The tail wheel is supported on a  $1\frac{1}{2}''$  Rod journaled in the holes of a Cranked Bent Strip fastened to the fuselage by a Double Bracket.

The Rod on which the double landing wheels are mounted passes through the holes in the narrow ends of two Flat Trunnions bolted to the fuselage.

## 3.19 BLOCK-SETTING CRANE



## Parts required

2 of No. 1	4 of No. 37a
6 " " 2	6 " " 38
8 " " 5	1 " " 40
5 " " 10	1 " " 44
2 " " 11	2 " " 48a
4 " " 12	1 " " 52
1 " " 15b	4 " " 90a
2 " " 16	4 " " 111c
2 " " 17	2 " " 125
1 " " 18a	2 " " 126
1 " " 19g	2 " " 126a
4 " " 22	1 " " 176
1 " " 23	2 " " 187
1 " " 24	2 " " 188
6 " " 35	2 " " 199
50 " " 37	2 " " 200

The travelling bogie 1 consists of two Flat Brackets bolted together by their elongated holes, and at each end of it Double Brackets are fastened by  $\frac{3}{8}$ " Bolts. Two 2" Rods are pushed through the Double Brackets and carry 1" fixed Pulleys spaced so that their grooves fit on the two 12 $\frac{1}{2}$ " Strips that form the top of the jib. The Trunnions 2, at the base of the jib, are secured to a Bush Wheel mounted on a Rod held in the bosses of two Road Wheels. The Road Wheels are placed one above and one below the 2 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ " Flexible Plates, that form the top of the tower.

Cord 3 is first fastened to the  $\frac{3}{8}$ " Bolt at the rear end of the travelling bogie, and then wound three times around the Crank Handle. It is then led around the Rod journalled in the Flat Trunnions at the front end of the jib, and brought back and tied to another  $\frac{3}{8}$ " Bolt at the front of the bogie.

Cord 4 is first fastened to Rod 5, which is passed through the end holes of the 12 $\frac{1}{2}$ " Strips, and then over the rear axle of the bogie. It is then passed around the  $\frac{1}{2}$ " Pulley 6, led over the front axle of the bogie, around the Rod at the front end of the jib, and finally tied to the bogie. The  $\frac{1}{2}$ " loose Pulley 6 and its Rod are held in the Cranked Bent Strip by a Cord Anchoring Spring.

## 3.20 PITHEAD GEAR

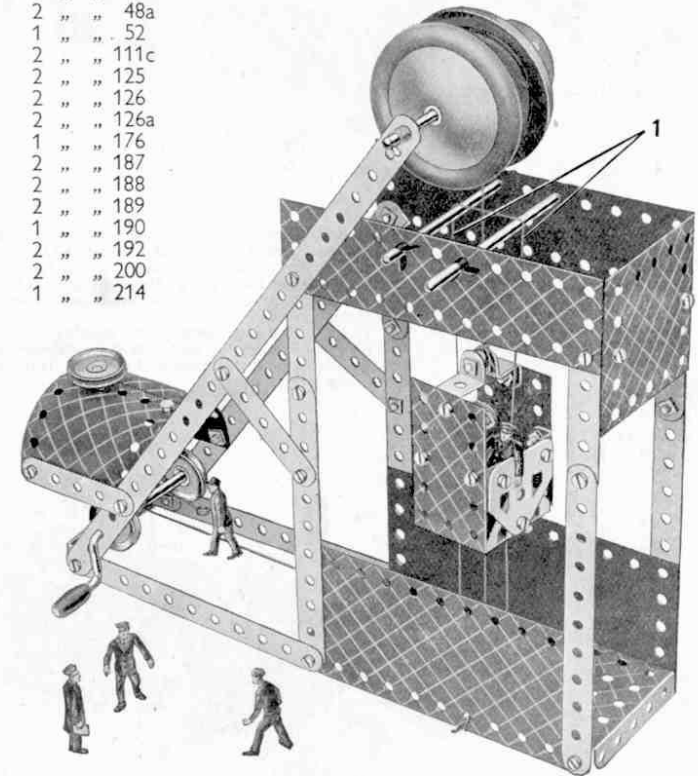
## Parts required

2 of No. 1	1
6 " " 2	2
8 " " 5	5
1 " " 10	10
1 " " 11	11
7 " " 12	12
1 " " 15b	15b
2 " " 16	16
1 " " 18a	18a
1 " " 19g	19g
4 " " 22	22
1 " " 24	24
6 " " 35	35
41 " " 37	37
1 " " 37a	37a
6 " " 38	38
1 " " 40	40
1 " " 48a	48a
1 " " 52	52
2 " " 111c	111c
2 " " 125	125
2 " " 126	126
2 " " 126a	126a
1 " " 176	176
2 " " 187	187
2 " " 188	188
2 " " 189	189
1 " " 190	190
2 " " 192	192
2 " " 200	200
1 " " 214	214

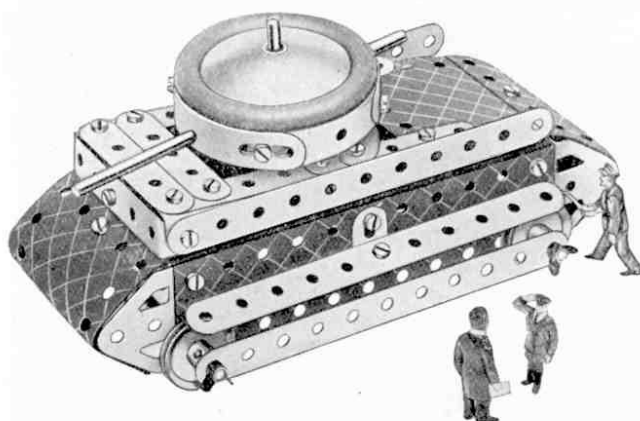
A 3 $\frac{1}{2}$ " Rod is journalled in the top holes of the 12 $\frac{1}{2}$ " Strips. Between the two Road Wheels on this rod is a 1" Fast Pulley, over which the cord controlling the cage passes. A Cord Anchoring Spring is pushed on the Rod at one end, and a Bush Wheel is locked to it at the other. The cage is built up from Trunnions and Flat Trunnions, and the 2 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ " Flexible Plates that form its sides are fastened to the Flat Trunnions by Angle Brackets.

A  $\frac{3}{8}$ " Bolt is passed through the holes of Reversed Angle Brackets bolted to the top of the cage, and Washers are placed on its shank for spacing purposes.

The guides 1 for the cage consist of a piece of Cord, which is passed over two Rods as shown and then led downward and through two holes in the Flanged Plate that forms the base. Washers are tied to each end of the Cord, underneath the Plate, to maintain it in tension.



## 3.M21 TANK



## Parts required

6 of No. 2
7 " " 5
2 " " 10
8 " " 12
2 " " 15b
2 " " 16
1 " " 17
4 " " 22
1 " " 24
6 " " 35
40 " " 37
1 " " 38
1 " " 48a
1 " " 52
1 " " 90a
1 " " 125
2 " " 126
2 " " 126a
1 " " 176
1 " " 187
2 " " 189
1 " " 190
2 " " 199
4 " " 215

1 Magic Motor

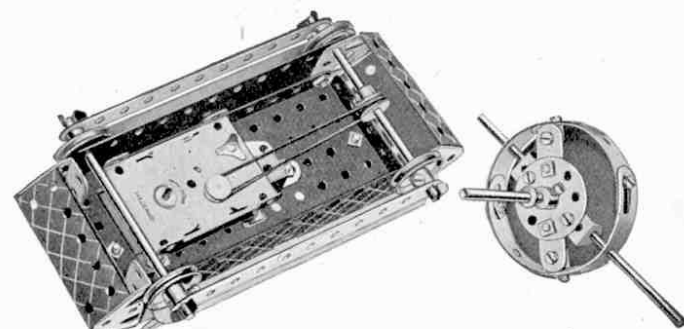


Fig. 3.M21a

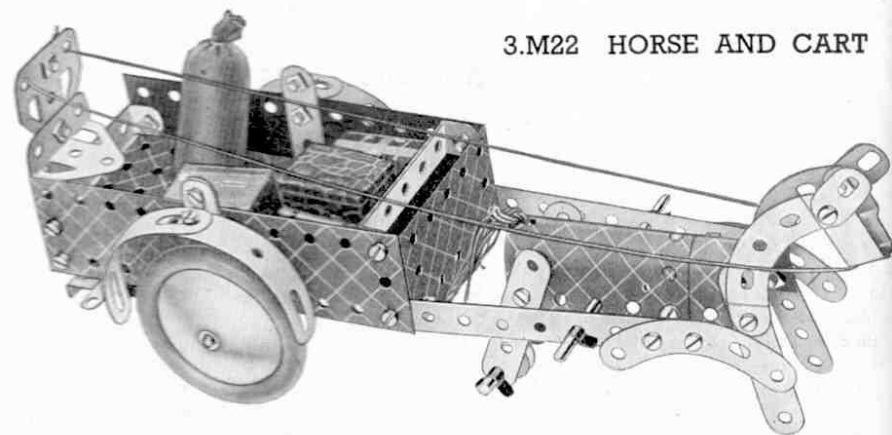
Construction of the gun turret is commenced by bolting a  $2\frac{1}{2}$ " Strip across a Bush Wheel. Four 3" Formed Slotted Strips are bolted together to form a circle and fastened to the  $2\frac{1}{2}$ " Strip by means of Angle Brackets. Next, two Angle Brackets are bolted to the Bush Wheel in the positions shown in Fig. 3.M21A. Two Rods are pushed through holes in the Formed Slotted Strips and through the free holes of the Angle Brackets, and are fastened in position by means of Spring Clips. The turret is held in place by a  $3\frac{1}{2}$ " Rod that is locked in the boss of the Bush Wheel and then passed through the  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plate and through a hole in a Reversed Angle Bracket. A Cord Anchoring Spring is then screwed on to it to hold it in position. To complete the turret a Road Wheel is fastened on the upper end of the  $3\frac{1}{2}$ " Rod. The Reversed Angle Bracket is bolted to the  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plate.

The Magic Motor is bolted to the Flanged Plate, and the drive is taken to the back axle by means of Driving Band.

## Parts required

2 of No. 2	2 of No. 48a
7 " " 5	1 " " 52
2 " " 10	4 " " 90a
2 " " 12	1 " " 125
2 " " 16	1 " " 126
1 " " 17	1 " " 126a
1 " " 23	2 " " 187
4 " " 35	1 " " 188
35 " " 37	2 " " 189
2 " " 38	2 " " 199
1 " " 40	4 " " 215
1 " " 44	Magic Motor

## 3.M22 HORSE AND CART



The model is driven by a Magic Motor fastened underneath the  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plate that forms the bottom of the cart. The drive is taken by a Driving Band from the pulley of the Motor to a  $\frac{1}{2}$ " fast Pulley on the back axle. A  $\frac{1}{2}$ " loose Pulley is fitted on a 2" Rod journalled in the bottom holes of the Strips forming the hind legs of the horse, so that the model will travel smoothly along the ground.

## 3.23 ROUNDABOUT

## Parts required

2 of No. 1	4 of No. 37a
6 " " 2	4 " " 38
8 " " 5	1 " " 40
4 " " 10	2 " " 48a
2 " " 11	1 " " 52
8 " " 12	4 " " 90a
1 " " 16	4 " " 111c
1 " " 17	2 " " 125
1 " " 18a	2 " " 126
1 " " 19g	2 " " 126a
4 " " 22	1 " " 187
1 " " 24	2 " " 188
6 " " 35	2 " " 191
50 " " 37	2 " " 199

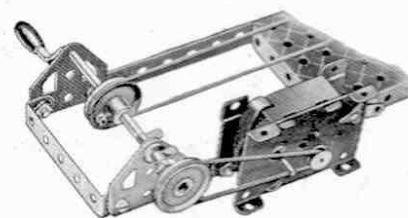


Fig. 3.23a

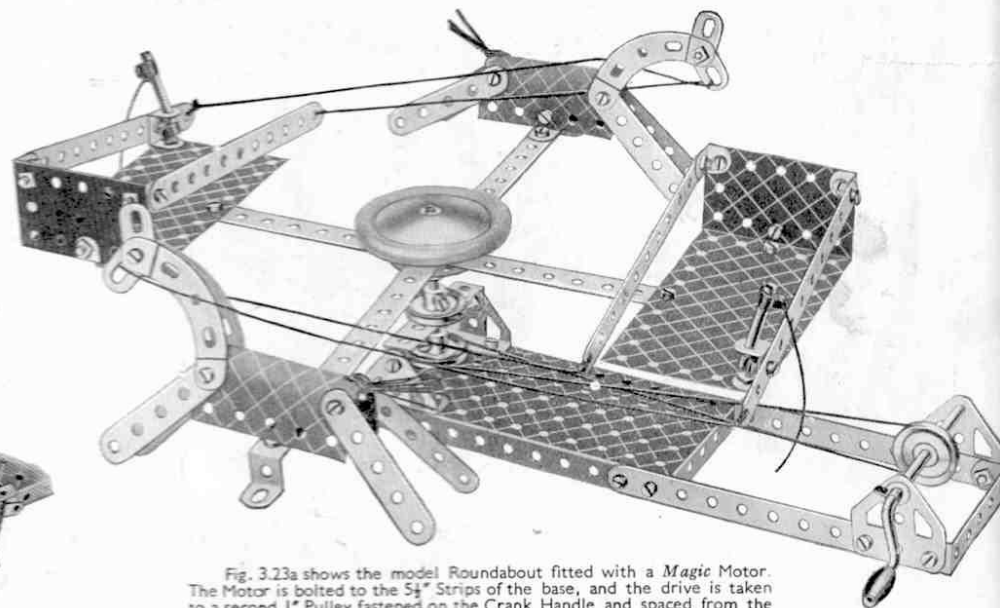
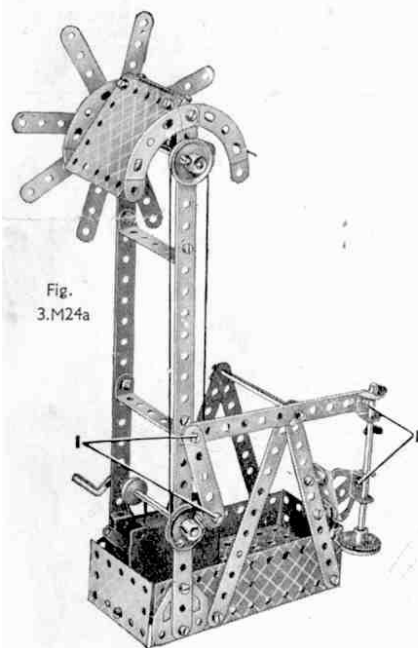
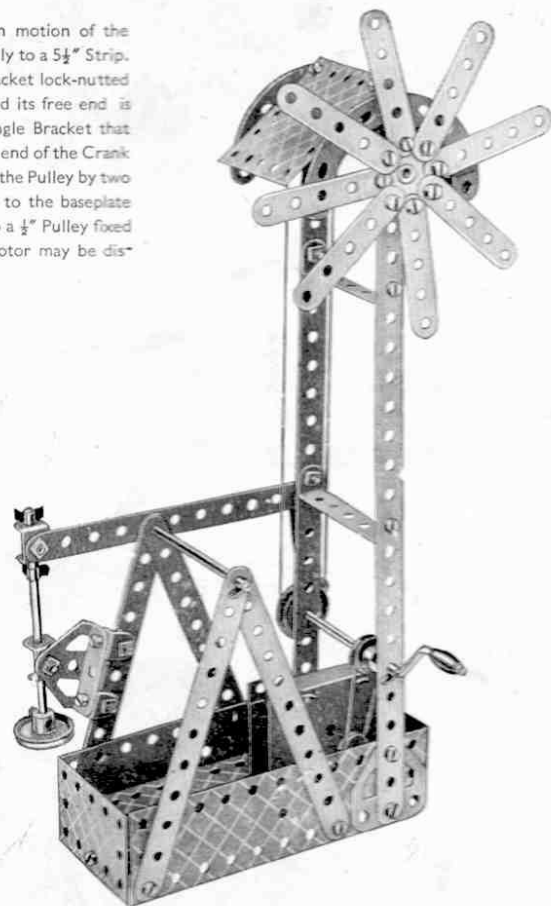


Fig. 3.23a shows the model Roundabout fitted with a Magic Motor. The Motor is bolted to the  $5\frac{1}{2}$ " Strips of the base, and the drive is taken to a second 1" Pulley fastened on the Crank Handle and spaced from the Flat Trunnion by a Spring Clip and a Washer. This Pulley is removed from the end of the pivot rod of the roundabout underneath the  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plate.



## 3.M24 WINDMILL PUMP

The Bolts 1 are lock-nutted. The up-and-down motion of the pumping shaft is obtained by securing a  $3\frac{1}{2}$ " Rod pivotally to a  $5\frac{1}{2}$ " Strip. This is done by passing the Rod through a Double Bracket lock-nutted to the  $5\frac{1}{2}$ " Strip. This Strip is pivoted on a Rod, and its free end is lock-nutted to a  $2\frac{1}{2}$ " Strip that connects it to an Angle Bracket that is fastened by a Bolt to the boss of the 1" Pulley on the end of the Crank Handle. The Angle Bracket is spaced from the boss of the Pulley by two Washers. The Magic Motor is bolted by its flanges to the baseplate and the drive is taken from the pulley of the Motor to a  $\frac{1}{2}$ " Pulley fixed on the shaft of the Crank Handle. If desired the Motor may be dispensed with and the model operated by hand.

Fig.  
3.M24a

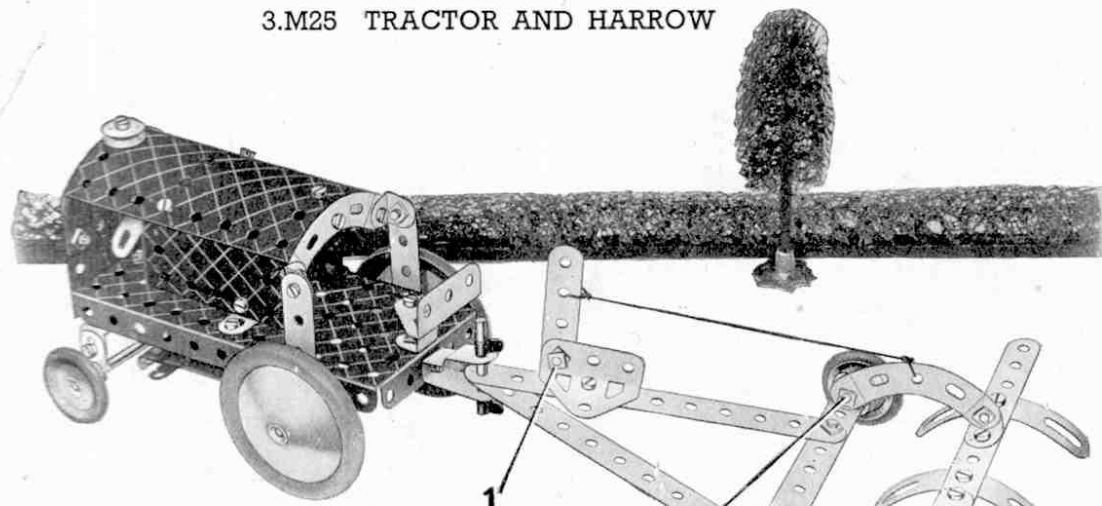
2 of No. 1	2 of No. 11
5 " " 2	7 " " 12
9 " " 5	1 " " 15b

## Parts required

2 of No. 16
1 " " 19g
3 " " 22
1 " " 24
4 " " 35
39 " " 37
3 " " 37a
2 " " 38
1 " " 40

2 of No. 1
1 " " 126
1 " " 126a
2 " " 188
2 " " 189
2 " " 190
1 Magic Motor

## 3.M25 TRACTOR AND HARROW



The rear axle is passed through the bottom holes of two  $2\frac{1}{2}$ " Strips that are bolted to the flanges of the  $5\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flanged Plate forming the base. The construction of the bonnet and radiator is clearly shown in the illustration.

The fan consists of two Flat Brackets held against the head of a  $\frac{3}{8}$ " Bolt by a nut. The  $\frac{3}{8}$ " Bolt is fastened to the radiator by means of two more nuts. The engine itself is represented by two U-Section Curved Plates, bolted together so that they overlap two holes, and then fastened to the baseplate by two Angle Brackets.

The wheels of the harrow are held by  $\frac{3}{8}$ " Bolts in Reversed Angle Brackets at each end of a  $5\frac{1}{2}$ " Strip. Small radius Curved Strips are fastened to the Reversed Angle Brackets by lock-nutted Bolts, and Cord is attached to the centre hole of one of these and also to the operating lever, which is held by lock-nuts to a Trunnion. By moving the lever forward the harrow may be raised from the ground when not in use.

The Bolts 1 shown in both illustrations are lock-nutted.

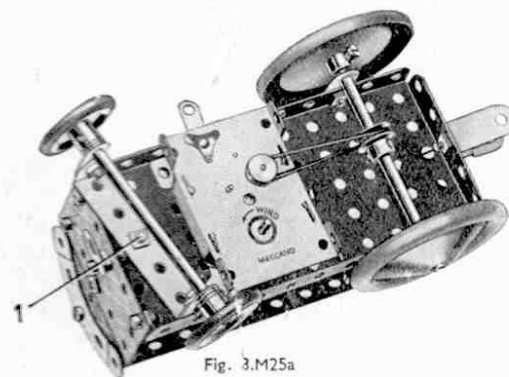


Fig. 3.M25a

## Parts required

5 of No. 2
3 " " 5
3 " " 10
2 " " 11
8 " " 12
2 " " 16
1 " " 18a

4 of No. 22
1 " " 23
2 " " 35
50 " " 37
6 " " 37a
6 " " 38
1 " " 44
1 " " 48a
1 " " 52
4 " " 90a
5 " " 111c

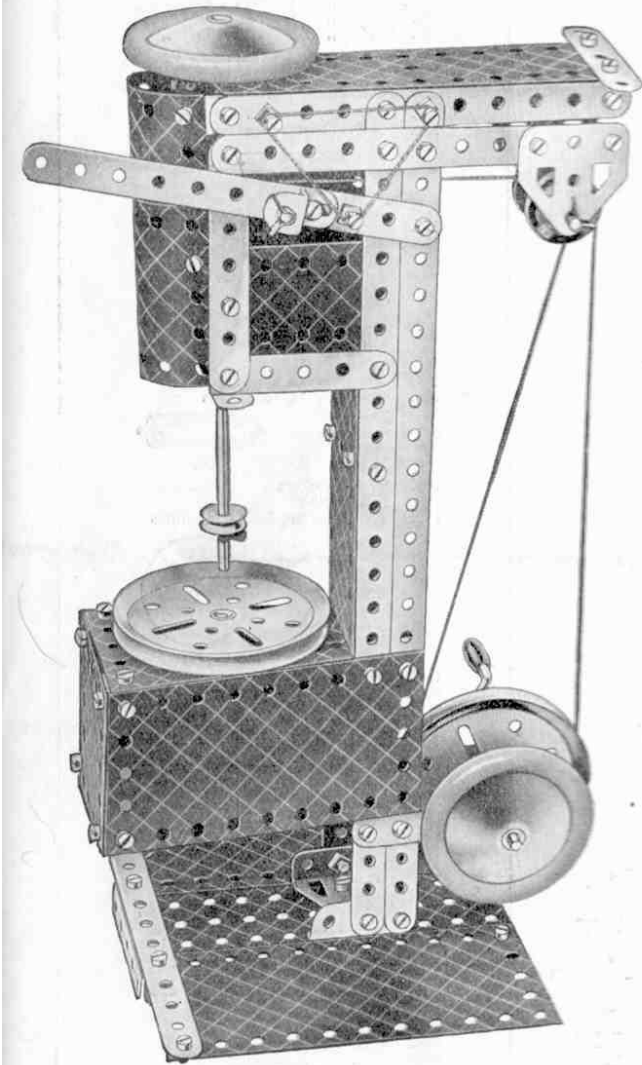
2 of No. 125
2 " " 126
4 " " 155a
2 " " 187
1 " " 188
2 " " 199
2 " " 200
1 " " 214
4 " " 215
1 Magic Motor

### BUILD BIGGER AND BETTER MODELS

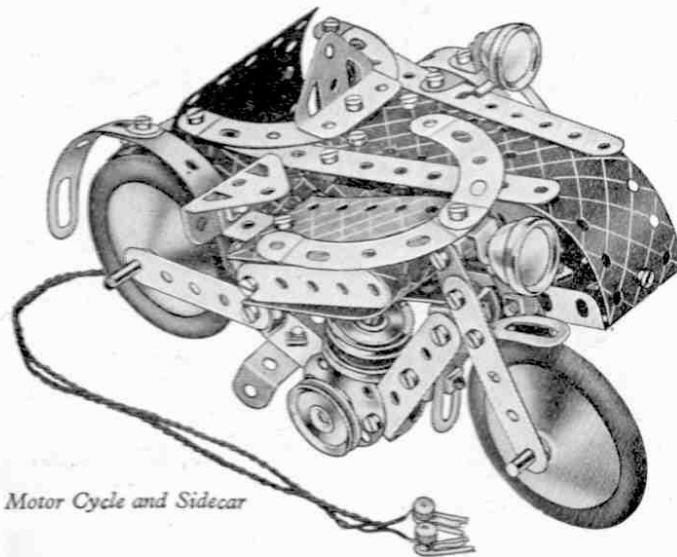
When you have built all the models shown in this Manual you will be keen to build bigger and more elaborate models. Your next step is to purchase a Meccano No. 3a Accessory Outfit containing all the parts required to convert your No. 3 into a No. 4 Outfit. You will thus be able to build the full range of No. 4 Outfit Models, a selection of which is illustrated on this 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.

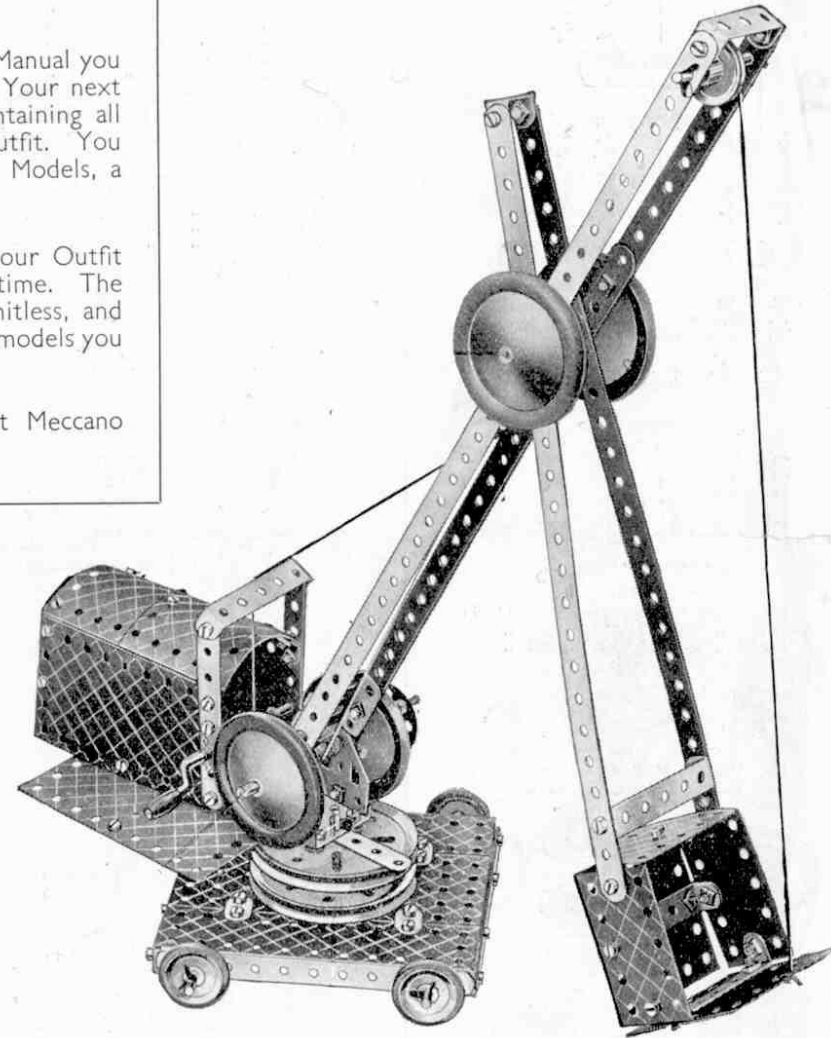
Ask your dealer to post to you regularly the latest Meccano parts lists and other Meccano literature.



*Drilling Machine*



*Motor Cycle and Sidecar*



*Giant Excavator*





- No. 120. Buffers  
120a. Spring Buffers  
120b. Compression Springs
121. Train Couplings  
122. Miniature Loaded Sacks
123. Cone Pulleys  
124. Reversed Angle Brackets, 1" 1/2"  
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, 2 1/2" diam.
133. Corner Brackets, 1 1/2"  
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, 3" rim  
142a. Motor Tyres (to fit 2" diam. rims)  
142b. " " " 3" " "  
142c. " " " 1" " "  
142d. " " " 1 1/2" " "
143. Circular Girders, 5 1/2" diam.
144. Dog Clutches
145. Circular Strips, 7 1/2" diam. overall  
146. " Plates, 6" " "  
146a. " " 4" " "
147. Pawls, with Pivot Bolt and Nuts  
147a. Pawls  
147b. Pivot Bolts with 2 nuts  
147c. Pawls without boss  
148. Ratchet Wheels
149. Collecting Sheds for Electric Locos  
150. Crane Grabs

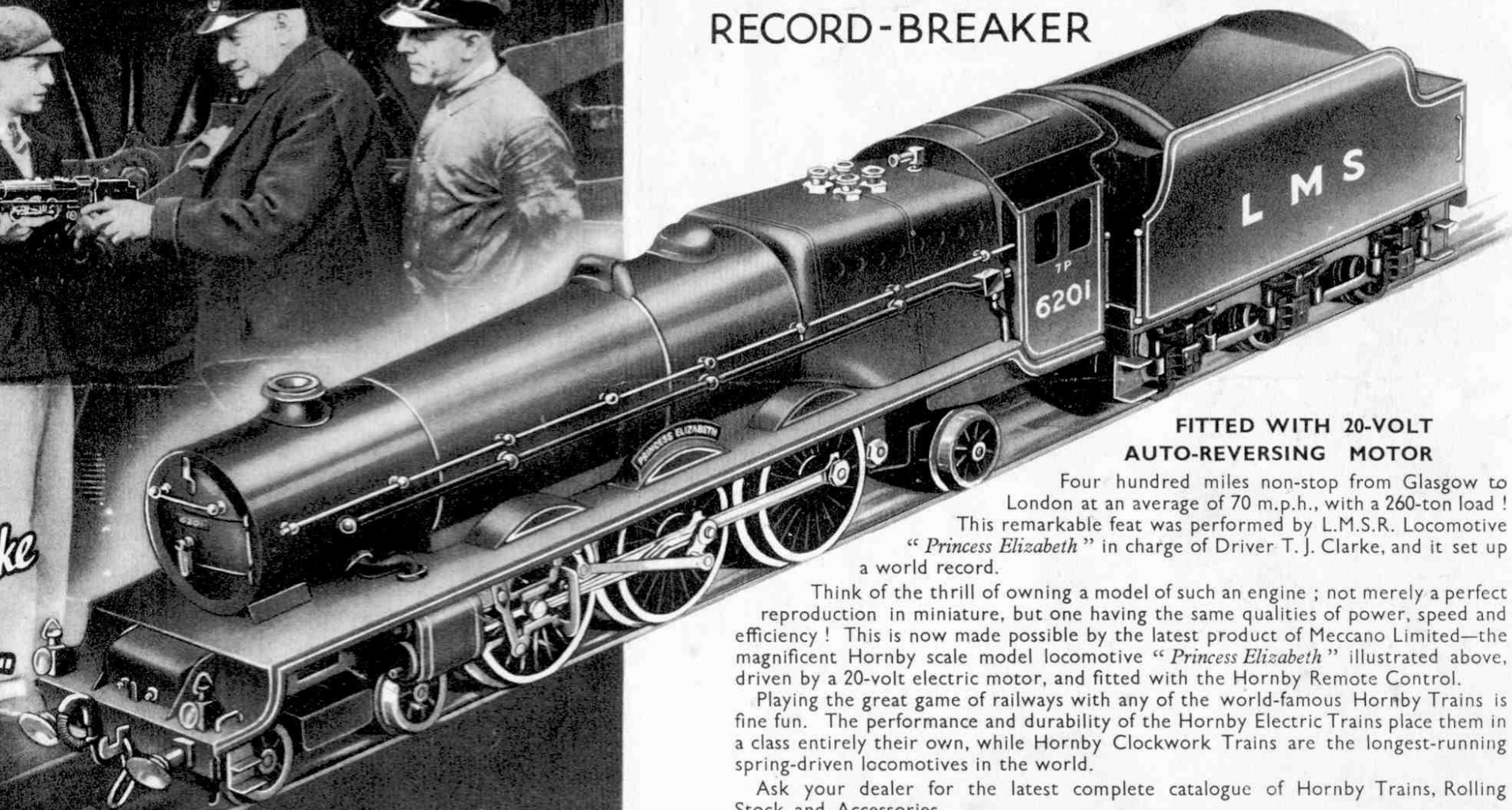
151. Pulley Blocks, Single Sheave  
152. " " Two " "  
153. " " Three " "
- 154a. Corner Angle Brackets, 1/2" (right-hand)  
154b. Corner Angle Brackets, 1/2" (left-hand)  
155. Rubber Rings (for 1" Pulleys) Black  
155a. " " " White
156. Pointers (with boss), 2 1/2" overall
157. Fans, 2" diam.  
158a. Signal Arms, Home  
158b. " " Distant
160. Channel Bearings, 1 1/2" x 1" x 1/2"  
161. Girder Brackets, 2" x 1" x 1/2"
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, 1/2" 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, 3 1/2" diam.  
181. Bobbins  
182. Insulating Bushes  
182a. Insulating Washers
183. Lamp Holders  
183a. 2 1/2-volt Lamps  
183b. 3 1/2 " " "
- 184c. 6-volt Lamps  
184d. 10 " " "  
184e. 20 " " "

185. Steering Wheels, 1 1/2" diam.  
186. Driving Bands, 3" diam. (Light)  
186a. " " 6" " "  
186b. " " 10" " "  
186c. " " 10" " (Heavy)  
186d. " " 15" " "  
186e. " " 20" " "  
187. Road Wheels
192. Flexible Plates.  
188. 2 1/2" x 1"  
189. 5 1/2" x 1"  
190. 2 1/2" x 2"  
191. 4 1/2" x 2"  
192. 5 1/2" x 2"
197. Strip Plates.  
193. 2 1/2" x 2 1/2"  
194. 3 1/2" x 2 1/2"  
195. 5 1/2" x 2 1/2"  
196. 9 1/2" x 2 1/2"  
197. 12 1/2" x 2 1/2"
198. Hinged Flat Plates, 4 1/2" x 2 1/2"  
199. Curved Plates, U-Section 2 1/2" x 2 1/2" x 1/8"  
200. " " 2 1/2" x 2 1/2", 1 1/8" radius
- 207A. Lamps with Flex (3 1/2 volts)  
202. Angle Brackets (for Headlamps)  
203. Headlamps  
203a. Headlamp Rims  
203b. " Bodies  
204. " Nuts  
205. " Glasses  
206. Lampshades  
207. 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 1/2" { Can only be used together  
211b. " " 1 1/2" "
212. Rod and Strip Connectors  
213. Rod Connectors
215. Semi-Circular Plates 2 1/2"  
214. Formed Slotted Strips 3"
216. Cylinders, 2 1/2"
- 217A. Discs, 1 1/2"  
217a. Wheel Discs  
217B. Discs 1/2"  
217b. " "



# HORNBY SCALE MODEL OF *"Princess Elizabeth"*— MIGHTY L.M.S.R. WORLD RECORD-BREAKER



## FITTED WITH 20-VOLT AUTO-REVERSING MOTOR

Four hundred miles non-stop from Glasgow to London at an average of 70 m.p.h., with a 260-ton load!

This remarkable feat was performed by L.M.S.R. Locomotive "*Princess Elizabeth*" in charge of Driver T. J. Clarke, and it set up a world record.

Think of the thrill of owning a model of such an engine; not merely a perfect reproduction in miniature, but one having the same qualities of power, speed and efficiency! This is now made possible by the latest product of Meccano Limited—the magnificent Hornby scale model locomotive "*Princess Elizabeth*" illustrated above, driven by a 20-volt electric motor, and fitted with the Hornby Remote Control.

Playing the great game of railways with any of the world-famous Hornby Trains is fine fun. The performance and durability of the Hornby Electric Trains place them in a class entirely their own, while Hornby Clockwork Trains are the longest-running spring-driven locomotives in the world.

Ask your dealer for the latest complete catalogue of Hornby Trains, Rolling Stock and Accessories.

*Driver Clarke  
says  
"It's fine!"*

# HORNBY TRAINS

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