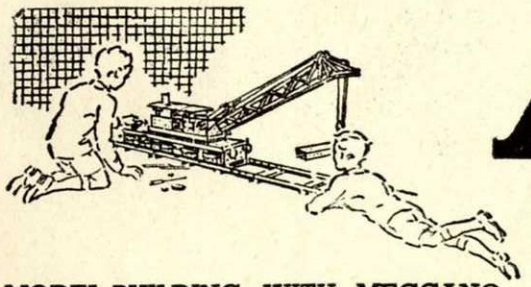
MECCANO

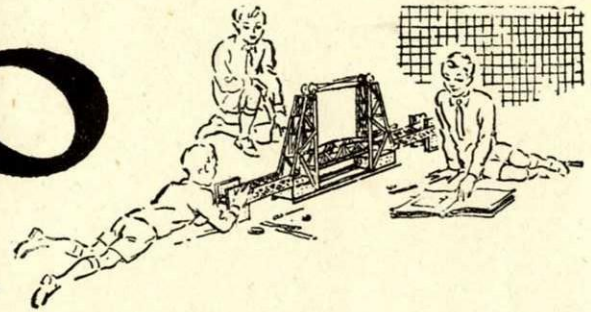
INSTRUCTIONS FOR

No. 3a ACCESSORY OUTFIT

No.
41.3a



MECCANO



Real Engineering in Miniature

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The Meccano Lighting Set has been withdrawn, but the models shown with lighting arrangements can readily be built with only slight changes.

The Aeroplane and Motor Car Constructor Outfits also are withdrawn, and the miniature pilots and drivers shown in certain models are no longer available.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

leccano—Cranes, Clocks, Motor Cars, nterests boys. A screwdriver and a necessary.

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

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

rger Outfits contain a greater quantity .

creased by the inclusion of the figures, nd drivers from the Aeroplane and Railway Series ; Meccano sacks, cable A Clockwork Motor is included in 0 only.

ELECTRIC LIGHTING OF MECCANO MODELS

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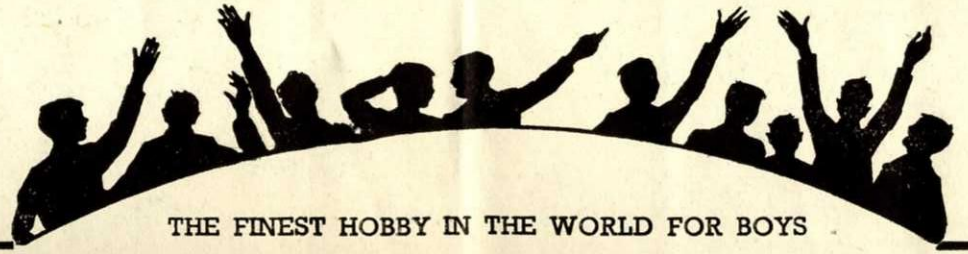
Recruiting Medallions are awarded to members who are successful in securing recruits for the Guild, and good work on behalf of Meccano clubs, or of the Guild generally, is recognised by the presentation of special Merit Medallions. Full particulars of both these awards will be sent post free on request.



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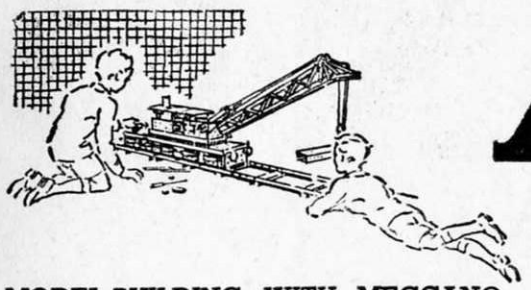
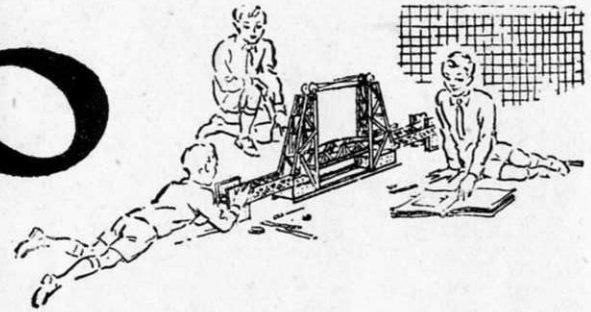


MECCANO



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. O 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.

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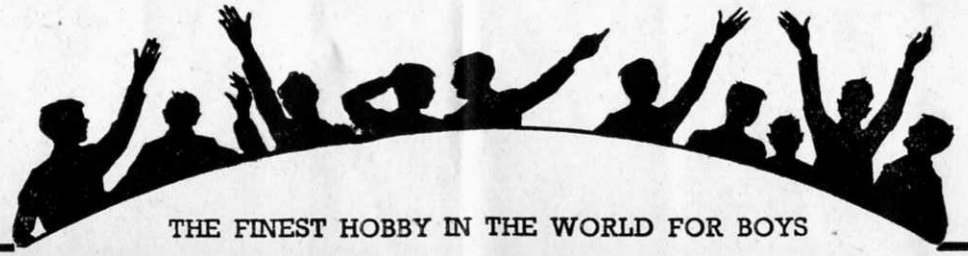

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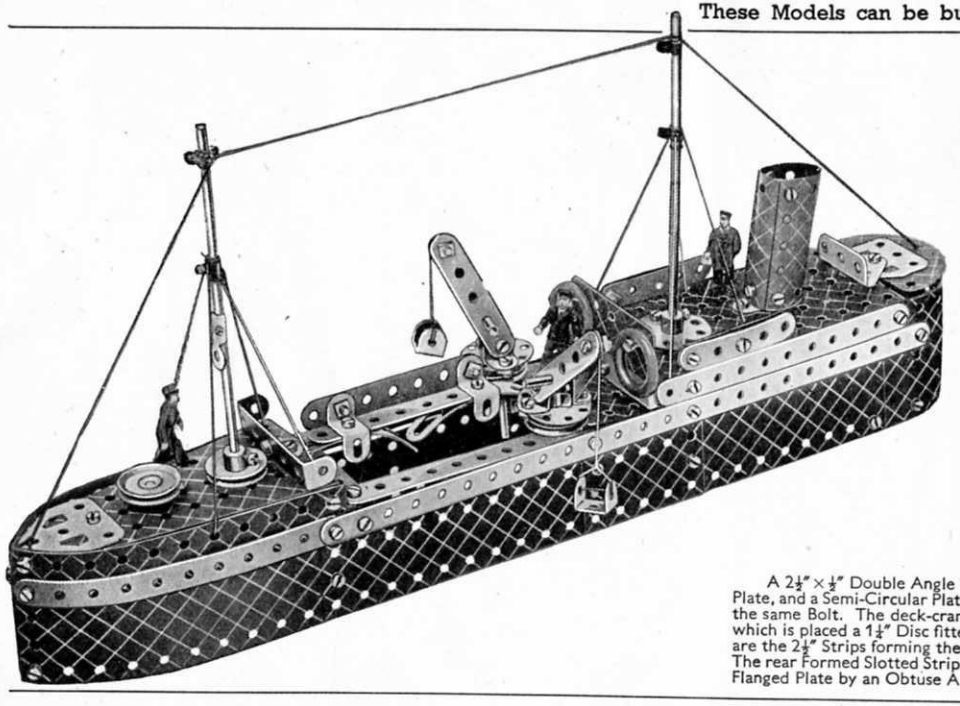


4.1 DREDGER

Parts required

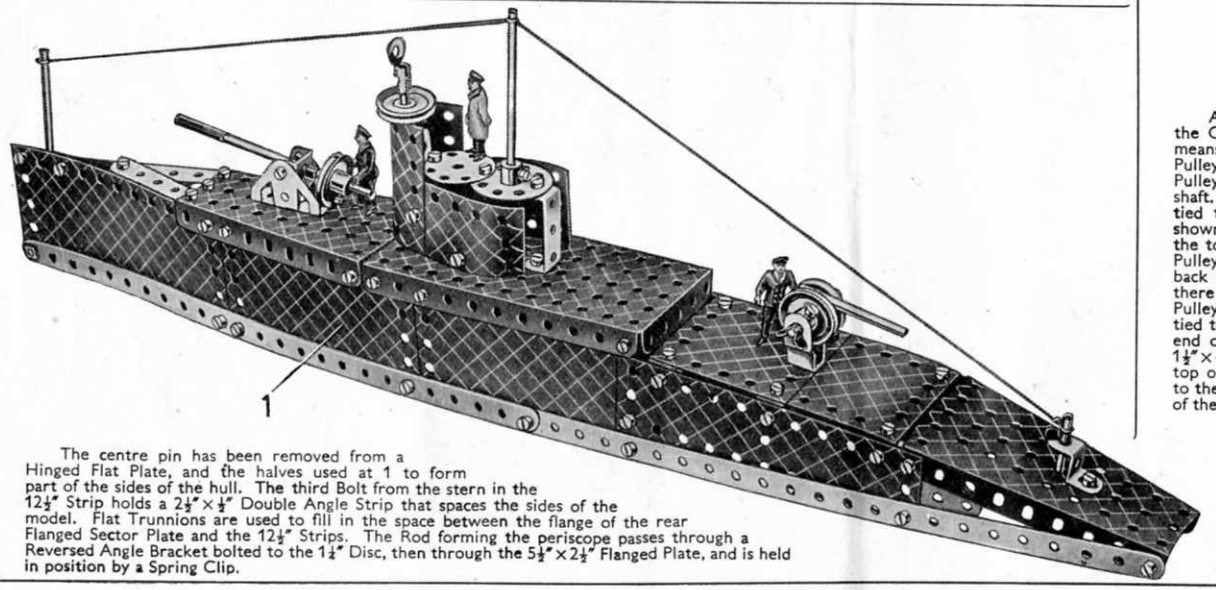
2 of No.	1	1 of No.	51
6 „ „	2	1 „ „	52
2 „ „	3	1 „ „	54a
9 „ „	5	5 „ „	111c
4 „ „	10	2 „ „	125
2 „ „	11	1 „ „	126
8 „ „	12	2 „ „	126a
2 „ „	12c	2 „ „	155a
4 „ „	16	2 „ „	188
2 „ „	17	2 „ „	189
2 „ „	18a	2 „ „	190
4 „ „	22	2 „ „	191
1 „ „	24	2 „ „	192
8 „ „	35	2 „ „	199
70 „ „	37	1 „ „	200
6 „ „	37a	1 „ „	212
4 „ „	38	2 „ „	213
1 „ „	40	2 „ „	214
3 „ „	48a	2 „ „	215
		2 „ „	217a

A 2½" × ½" Double Angle Strip is bolted to the front flange of the 5½" × 2½" Flanged Plate, and a Semi-Circular Plate is held between the flange and the Double Angle Strip by the same Bolt. The deck-cranes each consist of a 1" Pulley fastened to a 2" Rod, above which is placed a 1¼" Disc fitted with Angle Brackets. Bolted to these, and lock-nutted, are the 2½" Strips forming the jib. The complete units are held in place by Spring Clips. The rear Formed Slotted Strip of the hopper bridge is fastened to the frontof the2½" × 1½" Flanged Plate by an Obtuse Angle Bracket.

4.2 SUBMARINE

Parts required

4 of No.	1	4 of No.	48a
3 „ „	5	1 „ „	52
1 „ „	11	2 „ „	54a
2 „ „	12	2 „ „	125
1 „ „	15b	2 „ „	126
3 „ „	16	2 „ „	126a
1 „ „	17	2 „ „	188
1 „ „	18a	2 „ „	189
1 „ „	18b	2 „ „	190
4 „ „	22	2 „ „	191
1 „ „	24	2 „ „	192
5 „ „	35	1 „ „	198
64 „ „	37	1 „ „	199
1 „ „	40	1 „ „	212
1 „ „	44	1 „ „	213
1 „ „	48	1 „ „	217a

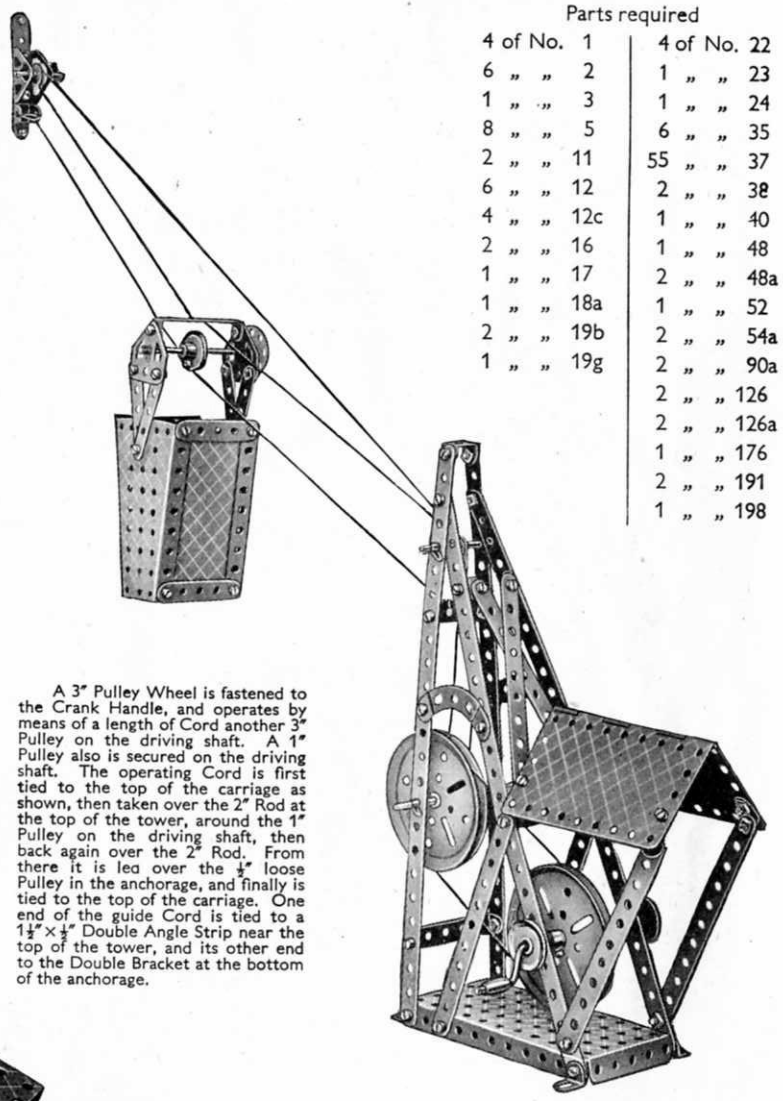


The centre pin has been removed from a Hinged Flat Plate, and the halves used at 1 to form part of the sides of the hull. The third Bolt from the stern in the 12½" Strip holds a 2½" × ½" Double Angle Strip that spaces the sides of the model. Flat Trunnions are used to fill in the space between the flange of the rear Flanged Sector Plate and the 12½" Strips. The Rod forming the periscope passes through a Reversed Angle Bracket bolted to the 1¼" Disc, then through the 5½" × 2½" Flanged Plate, and is held in position by a Spring Clip.

4.3 TELPHER SPAN

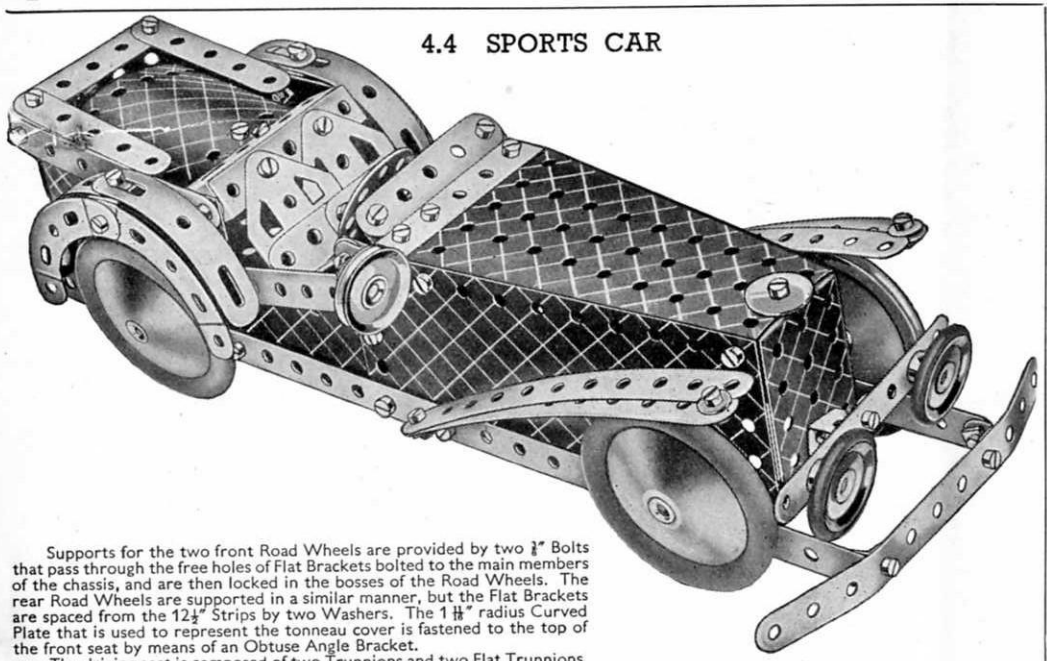
Parts required

4 of No.	1	4 of No.	22
6 „ „	2	1 „ „	23
1 „ „	3	1 „ „	24
8 „ „	5	6 „ „	35
2 „ „	11	55 „ „	37
6 „ „	12	2 „ „	38
4 „ „	12c	1 „ „	40
2 „ „	16	1 „ „	48
1 „ „	17	2 „ „	48a
1 „ „	18a	1 „ „	52
2 „ „	19b	2 „ „	54a
1 „ „	19g	2 „ „	90a
		2 „ „	126
		2 „ „	126a
		1 „ „	176
		2 „ „	191
		1 „ „	198



A 3" Pulley Wheel is fastened to the Crank Handle, and operates by means of a length of Cord another 3" Pulley on the driving shaft. A 1" Pulley also is secured on the driving shaft. The operating Cord is first tied to the top of the carriage as shown, then taken over the 2" Rod at the top of the tower, around the 1" Pulley on the driving shaft, then back again over the 2" Rod. From there it is led over the ½" loose Pulley in the anchorage, and finally is tied to the top of the carriage. One end of the guide Cord is tied to a 1½" × ½" Double Angle Strip near the top of the tower, and its other end to the Double Bracket at the bottom of the anchorage.

4.4 SPORTS CAR



Supports for the two front Road Wheels are provided by two ¾" Bolts that pass through the free holes of Flat Brackets bolted to the main members of the chassis, and are then locked in the bosses of the Road Wheels. The rear Road Wheels are supported in a similar manner, but the Flat Brackets are spaced from the 12½" Strips by two Washers. The 1 ¼" radius Curved Plate that is used to represent the tonneau cover is fastened to the top of the front seat by means of an Obtuse Angle Bracket.

The driving seat is composed of two Trunnions and two Flat Trunnions, and these are bolted to the 2½" × ½" Double Angle Strip supported by the sides of the car.

The steering wheel is a Bush Wheel fastened to a 1" Rod that is secured by two Spring Clips in an Angle Bracket bolted under the scuttle.

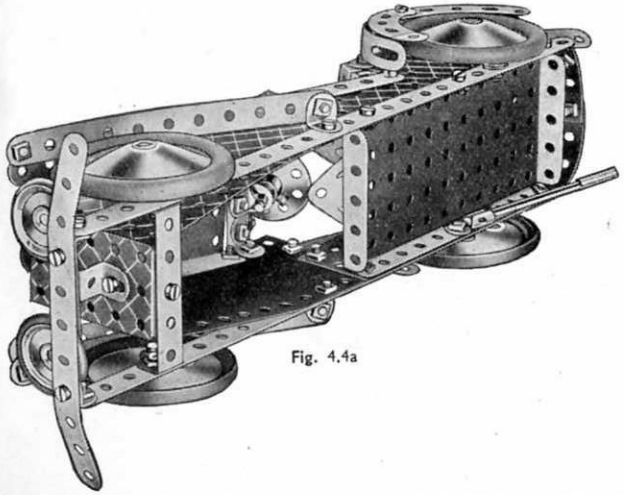


Fig. 4.4a

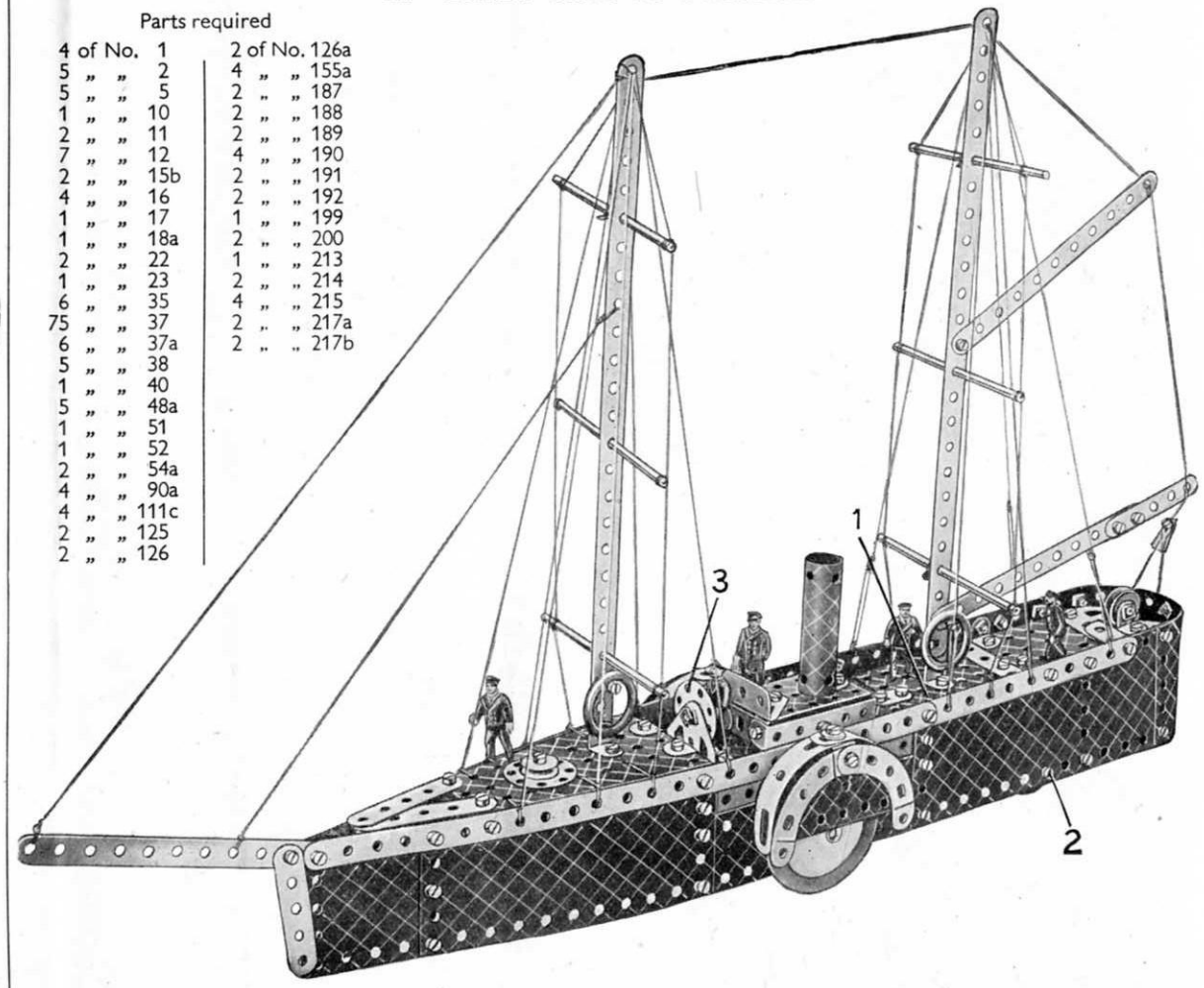
Parts required

2 of No.	1	1 of No.	52
5 „ „	2	1 „ „	54a
1 „ „	3	4 „ „	90a
9 „ „	5	6 „ „	111c
4 „ „	10	2 „ „	125
2 „ „	11	2 „ „	126
6 „ „	12	2 „ „	126a
3 „ „	12c	2 „ „	155a
1 „ „	16	4 „ „	187
1 „ „	18b	2 „ „	188
3 „ „	22	2 „ „	190
1 „ „	24	2 „ „	192
2 „ „	35	2 „ „	199
66 „ „	37	1 „ „	200
7 „ „	38	1 „ „	212
1 „ „	44	1 „ „	213
6 „ „	48a	4 „ „	215
1 „ „	51	2 „ „	217a

4.5 EARLY TYPE OF STEAMSHIP

Parts required

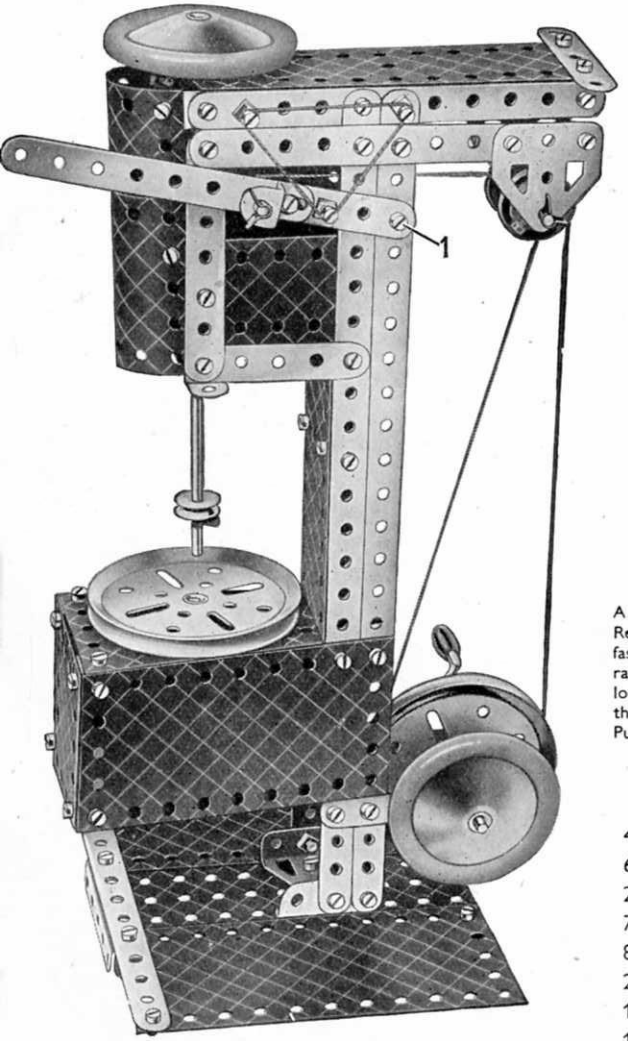
4 of No.	1	2 of No.	126a
5 „ „	2	4 „ „	155a
5 „ „	5	2 „ „	187
1 „ „	10	2 „ „	188
2 „ „	11	2 „ „	189
7 „ „	12	4 „ „	190
2 „ „	15b	2 „ „	191
4 „ „	16	2 „ „	192
1 „ „	17	1 „ „	199
1 „ „	18a	2 „ „	200
2 „ „	22	1 „ „	213
1 „ „	23	2 „ „	214
6 „ „	35	4 „ „	215
75 „ „	37	2 „ „	217a
6 „ „	37a	2 „ „	217b
5 „ „	38		
1 „ „	40		
5 „ „	48a		
1 „ „	51		
1 „ „	52		
2 „ „	54a		
4 „ „	90a		
4 „ „	111c		
2 „ „	125		
2 „ „	126		



The foredeck consists of a Flanged Sector Plate bolted to the 12½" Strips that are placed along the sides of the deck. A 5½" × 2½" Flanged Plate is used for the central portion of the deck and to the rear end of this a Flanged Sector Plate 1 is fastened by a Flat Bracket. A 2½" × ½" Double Angle Strip is bolted across the Flanged Sector Plate and to the sides of the vessel. Two 2½" × 1½" Flexible Plates, overlapped one hole, are bolted to the rear end of the Flanged Sector Plate.

The vessel runs on Road Wheels mounted on a compound rod consisting of a 1½" and a 2" Rod joined by a Rod Connector, which is journalled in the sides of the hull as shown, and also on 1" Pulleys fitted with Rubber Rings supported inside the hull on ¾" Bolts 2. The Bolts 2 pass through holes in the Flexible Plates forming the sides of the ship and are locked in the bosses of the Pulleys. A 1¼" Disc 3 is lock-nutted to a Trunnion to form the wheel.

4.6 DRILLING MACHINE



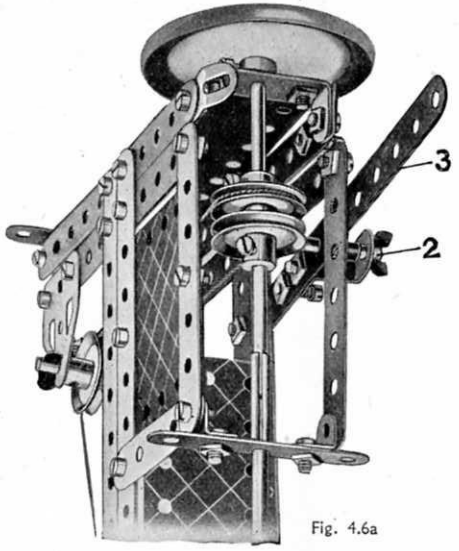


Fig. 4.6a

The height of the drill is controlled by the lever 3 (Fig. 4 6a). A 2" Rod 2, passed through a hole in the Strip 3 and through a hole in a Reversed Angle Bracket bolted to the Strip, engages between two 1" fast Pulleys on the shaft of the drill. A Driving Band, which is arranged as shown, holds the lever at its maximum height. The Bolt 1 is lock-nutted. The drill table is held in position by a ⅜" Bolt, that passes through the Flanged Sector Plate and is then locked in the boss of the Pulley.

Parts required

4	of No. 1	4	of No. 22	2	of No.126
6	„ „ 2	1	„ „ 23	2	„ „ 126a
2	„ „ 3	6	„ „ 35	2	„ „ 187
7	„ „ 5	71	„ „ 37	1	„ „ 188
8	„ „ 12	7	„ „ 37a	2	„ „ 189
2	„ „ 12c	1	„ „ 48	2	„ „ 190
1	„ „ 15b	1	„ „ 48a	2	„ „ 191
1	„ „ 16	1	„ „ 52	2	„ „ 192
2	„ „ 17	1	„ „ 54a	2	„ „ 199
2	„ „ 19b	4	„ „ 111c	1	„ „ 213
1	„ „ 19g	1	„ „ 125		

4.7 GIANT EXCAVATOR

The Cord 1 is fastened to a Crank Handle journalled in holes in the sides of the cab, and after passing round the 2½" × ½" Double Angle Strip above the cabin is tied to the jib at 2. This Cord controls the luffing movement of the jib. The Cord 3 is tied to the bucket and is passed over the 1" Pulley Wheel 5 and then wound round Rod 6. By turning the handle 7 on the Bush Wheel 7 the bucket is raised or lowered.

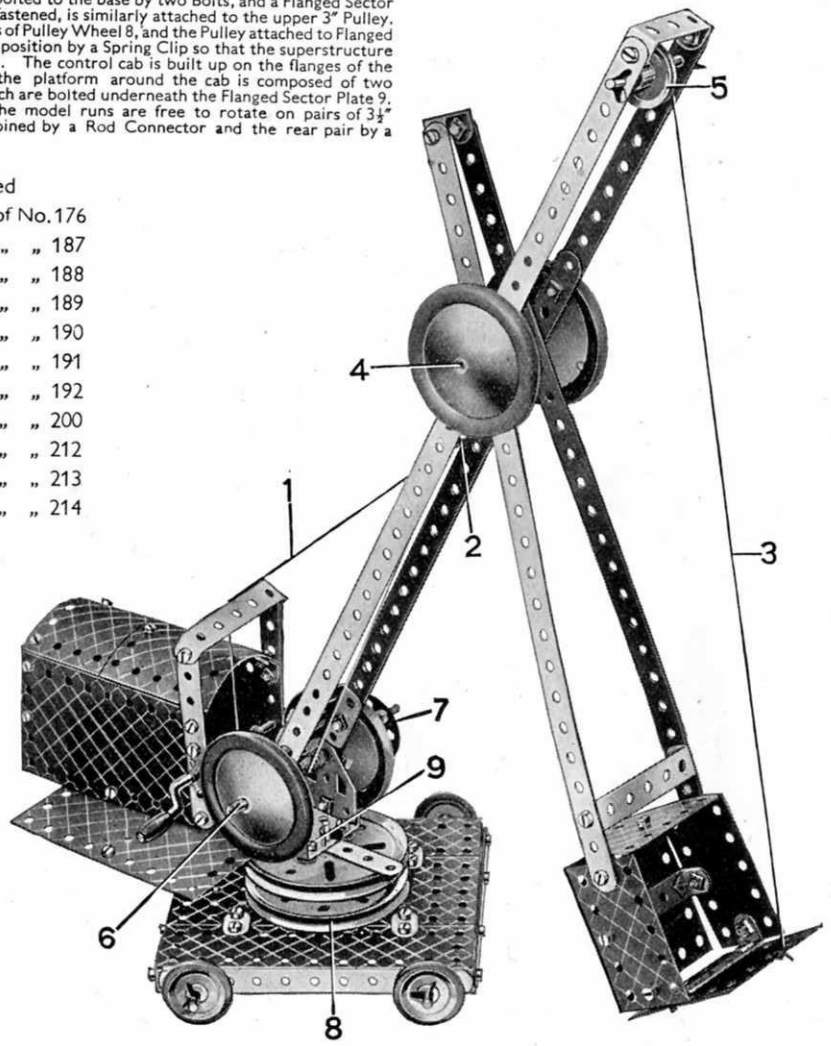
The bucket arm is pivoted on Rod 4, which passes through holes in the 12½" Strips forming the jib and the bucket arm. Road Wheels fastened at each end of Rod 4 retain it in position.

A 3" Pulley Wheel 8 is bolted to the base by two Bolts, and a Flanged Sector Plate 9, to which the cab is fastened, is similarly attached to the upper 3" Pulley. A 1½" Rod is held in the boss of Pulley Wheel 8, and the Pulley attached to Flanged Sector Plate 9 is retained in position by a Spring Clip so that the superstructure is free to swivel on the Rod. The control cab is built up on the flanges of the Flanged Sector Plate, and the platform around the cab is composed of two 5½" × 2½" Flexible Plates, which are bolted underneath the Flanged Sector Plate 9.

The wheels on which the model runs are free to rotate on pairs of 3½" Rods. The front pair are joined by a Rod Connector and the rear pair by a Rod and Strip Connector.

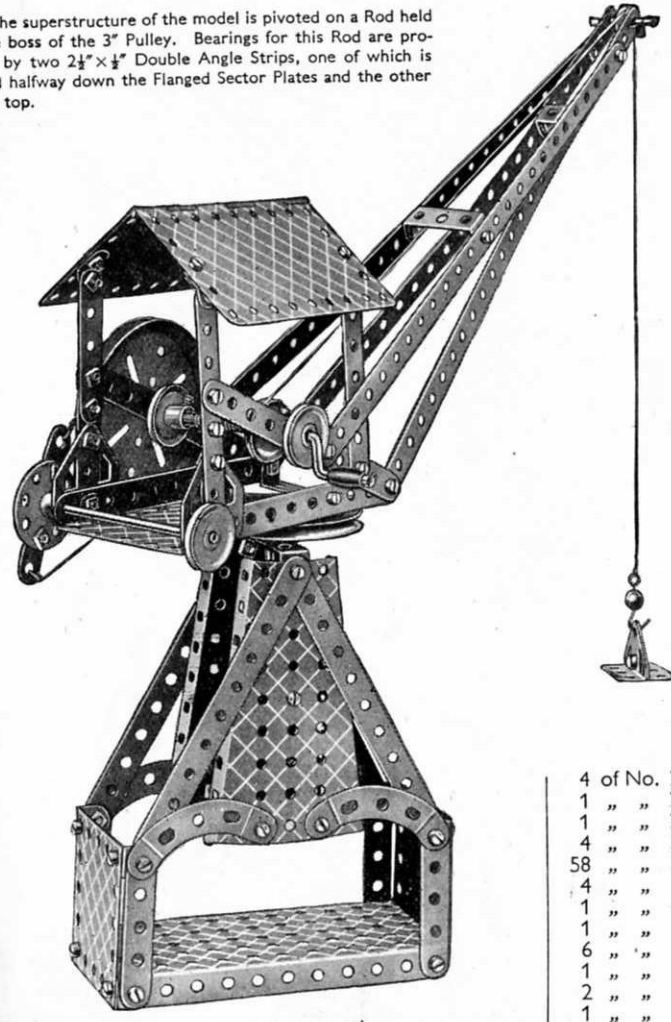
Parts required

4	of No. 1	1	of No.176
6	„ „ 2	4	„ „ 187
5	„ „ 5	2	„ „ 188
4	„ „ 10	2	„ „ 189
1	„ „ 11	4	„ „ 190
6	„ „ 12	2	„ „ 191
4	„ „ 12c	2	„ „ 192
1	„ „ 15b	2	„ „ 200
4	„ „ 16	1	„ „ 212
2	„ „ 17	1	„ „ 213
1	„ „ 18a	1	„ „ 214
2	„ „ 19b		
1	„ „ 19g		
5	„ „ 22		
1	„ „ 24		
8	„ „ 35		
73	„ „ 37		
5	„ „ 37a		
4	„ „ 38		
1	„ „ 40		
1	„ „ 48		
6	„ „ 48a		
1	„ „ 52		
1	„ „ 54a		
5	„ „ 111c		
2	„ „ 126		
2	„ „ 126a		
4	„ „ 155a		



4.8 ELEVATED JIB CRANE

The superstructure of the model is pivoted on a Rod held in the boss of the 3" Pulley. Bearings for this Rod are provided by two 2½"×½" Double Angle Strips, one of which is bolted halfway down the Flanged Sector Plates and the other at the top.



Parts required

4 of No.	1	2 of No.	12
8 „ „	2	3 „ „	12c
1 „ „	3	2 „ „	16
9 „ „	5	1 „ „	18a
1 „ „	11	2 „ „	19b
		1 „ „	19g

4 of No.	22	1 „ „	23
1 „ „	24	4 „ „	35
58 „ „	37	4 „ „	38
1 „ „	40	1 „ „	48
1 „ „	48a	6 „ „	52
1 „ „	54a	2 „ „	57c
1 „ „	90a	4 „ „	126
2 „ „	126a	1 „ „	176
3 „ „	190	1 „ „	198

4.9 GANTRY CRANE

Parts required

4 of No.	1	8 of No.	38
6 „ „	2	1 „ „	40
9 „ „	5	1 „ „	44
1 „ „	10	1 „ „	48
1 „ „	11	4 „ „	48a
6 „ „	12	1 „ „	51
4 „ „	12c	1 „ „	52
1 „ „	15b	2 „ „	54a
3 „ „	16	1 „ „	57c
1 „ „	18a	4 „ „	90a
1 „ „	18b	4 „ „	111c
2 „ „	19b	2 „ „	126a
1 „ „	19g	3 „ „	187
5 „ „	22	1 „ „	188
1 „ „	23	2 „ „	189
1 „ „	24	4 „ „	190
8 „ „	35	2 „ „	200
64 „ „	37	1 „ „	212
6 „ „	37a	2 „ „	217a

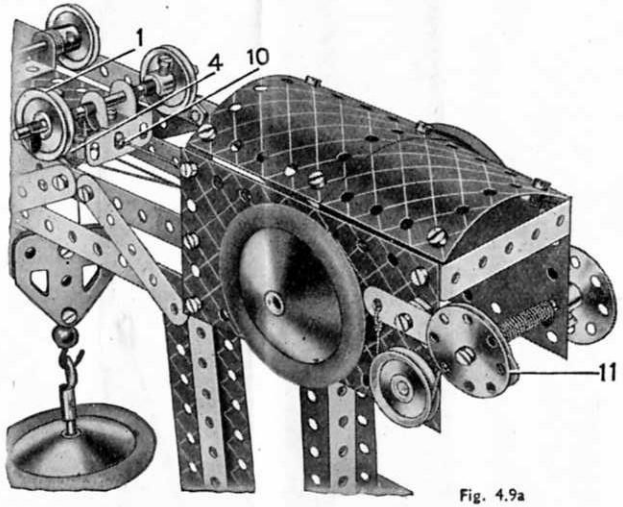
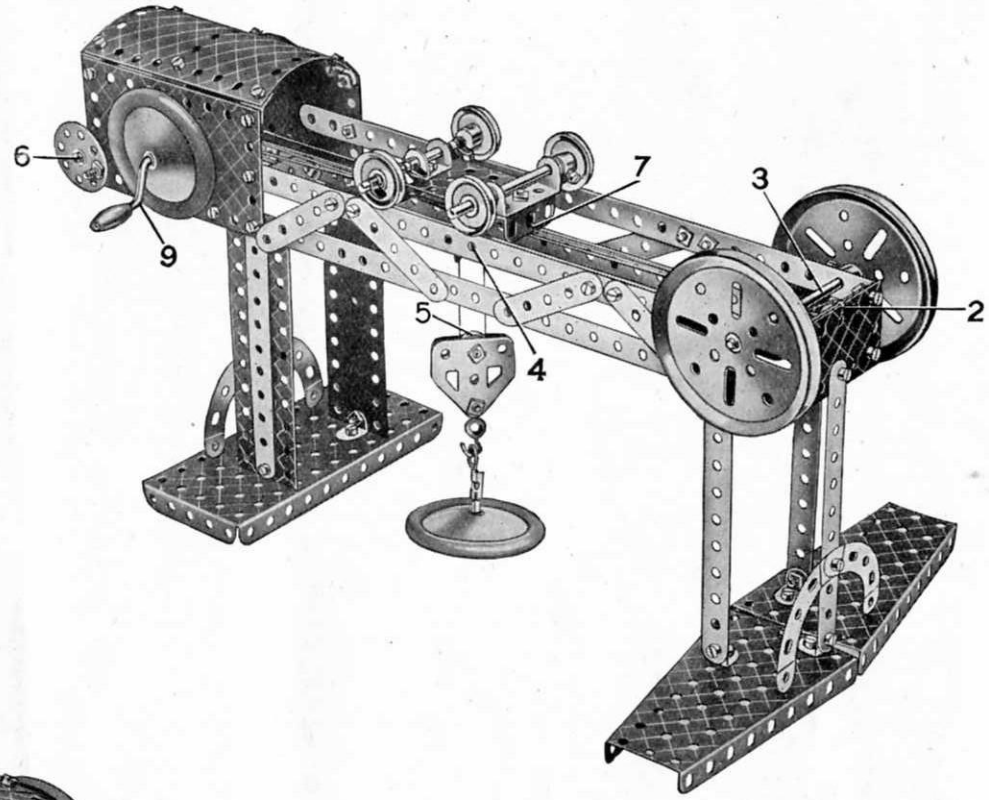


Fig. 4.9a



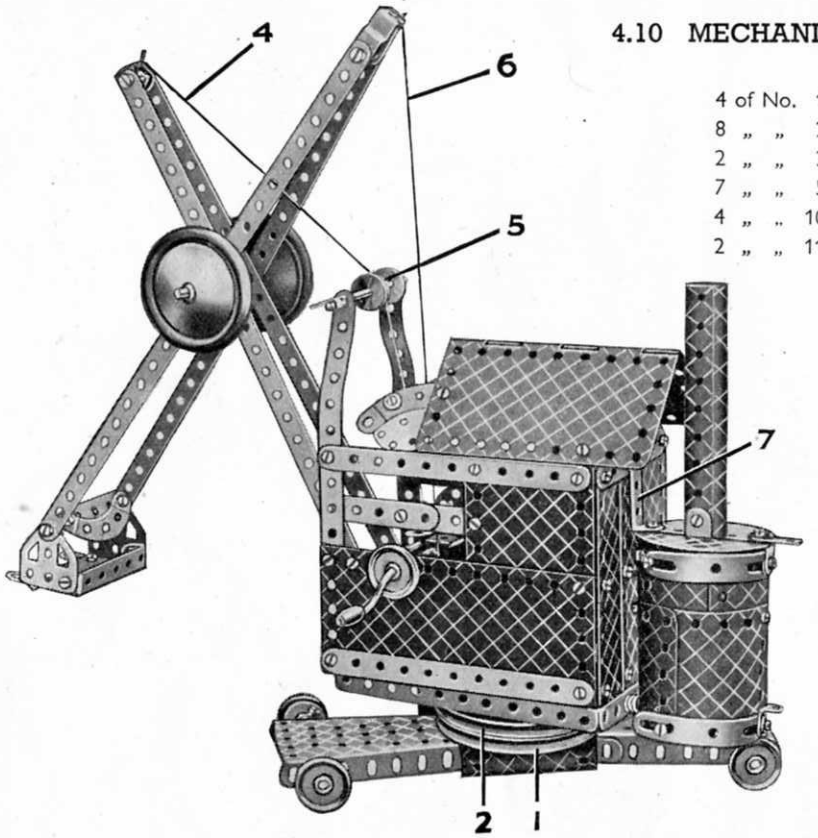
The sides of the cabin each consist of two 2½"×2½" Flexible Plates overlapped one hole. The top of the cabin, which consists of two 1 11/16" radius Curved Plates, is attached to the sides by means of Obtuse Angle Brackets at each corner as shown.

The hoisting carriage is a 2½"×1½" Flanged Plate 7. Bearings for one of the 3½" Rods carrying the 1" Pulley Wheels are provided by the holes in the turned up ends of a 1½"×½" Double Angle Strip, and for the other Rod by the holes in a Double Bracket. The Bolt 1 (Fig. 4.9a) secures a Cranked Bent Strip 4 vertically to the underside of the Flanged Plate 7. A 1" Rod passes through the lower holes of the Cranked Bent Strip and is held in position by Spring Clips.

Two Flat Trunnions form the pulley block. They are fastened together at their wide ends by a ⅜" Bolt, which carries a ½" loose Pulley 5 on its shank between the two Flat Trunnions.

The Cord that operates the hoisting carriage 7 is tied at 10. It is then passed round Rod 3, which carries the two 3" Pulleys, and is taken to the Crank Handle 9. The Cord is wound round the Crank Handle several times to enable it to grip the shaft, and finally is tied to the rear end of the carriage. The hoisting cord is tied to Rod 6 fitted with a Bush Wheel, and wound round it several times. It is then taken over the 1" Rod held in the Cranked Bent Strip 4, round Pulley 5, back over the 1" Rod, and tied at 2. Strip 11 is the lever of a band brake, the cord of which passes around a 1 Pulley on Rod 6.

4.10 MECHANICAL DIGGER



Parts required

4 of No. 1	7 of No. 12	1 of No. 51	1 of No. 212
8 „ „ 2	4 „ „ 12c	1 „ „ 52	1 „ „ 213
2 „ „ 3	2 „ „ 15b	2 „ „ 54a	2 „ „ 214
7 „ „ 5	3 „ „ 16	3 „ „ 90a	4 „ „ 215
4 „ „ 10	2 „ „ 17	5 „ „ 111c	2 „ „ 217a
2 „ „ 11	2 „ „ 19b	2 „ „ 125	2 „ „ 217b
	1 „ „ 19g	2 „ „ 126	
	5 „ „ 22	2 „ „ 126a	
	1 „ „ 23	1 „ „ 176	
	1 „ „ 24	3 „ „ 187	
	8 „ „ 35	2 „ „ 188	
	81 „ „ 37a	2 „ „ 189	
	75 „ „ 37b	4 „ „ 190	
	7 „ „ 38	2 „ „ 191	
	1 „ „ 40	2 „ „ 192	
	1 „ „ 44	1 „ „ 198	
	1 „ „ 48	2 „ „ 199	
	5 „ „ 48a	2 „ „ 200	

The bogie is constructed from two Flanged Sector Plates, the flanges of which are connected by two 2½" Strips. A gap of ½" is left between the ends of the Plates. A 3" Pulley 1 is then bolted boss downwards, to the Flanged Sector Plates by two ⅜" Bolts.

A 2" Rod is locked in the boss of Pulley 1, and on it is placed Pulley 2, boss downward. The base of the cab (Fig. 4.10a) is a 5½"×2½" Flanged Plate, which rests on Pulley 2 and is retained on the 2" Rod by a Road Wheel 3.

The construction of the cab is clear from the illustrations. The boiler comprises a cylinder built up from two 1⅜" radius Curved Plates, a 4½"×2½" Flexible Plate, and two 5½"×1½" Flexible Plates. The edges of the cylinder are strengthened with Formed Slotted Strips. Semi-Circular Plates are attached to the top of the boiler by a 2½"×½" Double Angle Strip. The Chimney is a 4½"×2½" Flexible Plate rolled into a tube and fixed in place by a Double Bracket. The boiler is fastened to the back of the cab by a 1½"×½" Double Angle Strip 7 at the top, and by a ⅜" Bolt at the bottom, where it is spaced from the cab by three Washers.

The Cord 4 is taken over the ½" Pulley 5 and tied to the Double Bracket at the top of the jib. This ½" Pulley 5 is clamped loosely between the two ¾" Discs by two Spring Clips to form a deep-grooved pulley.

The Cord 6 is wound around the Crank Handle and is tied to the Cranked Bent Strip at the top of the dipper stick.

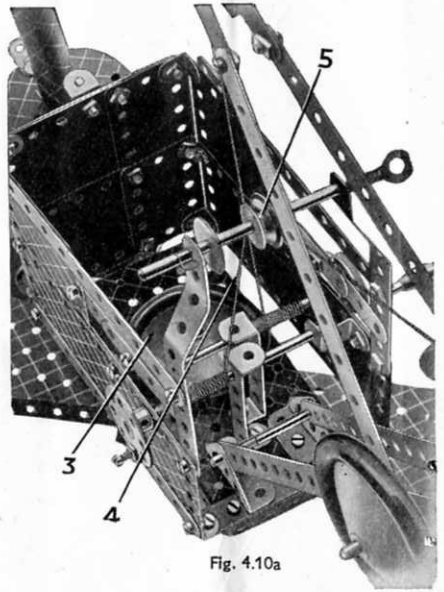
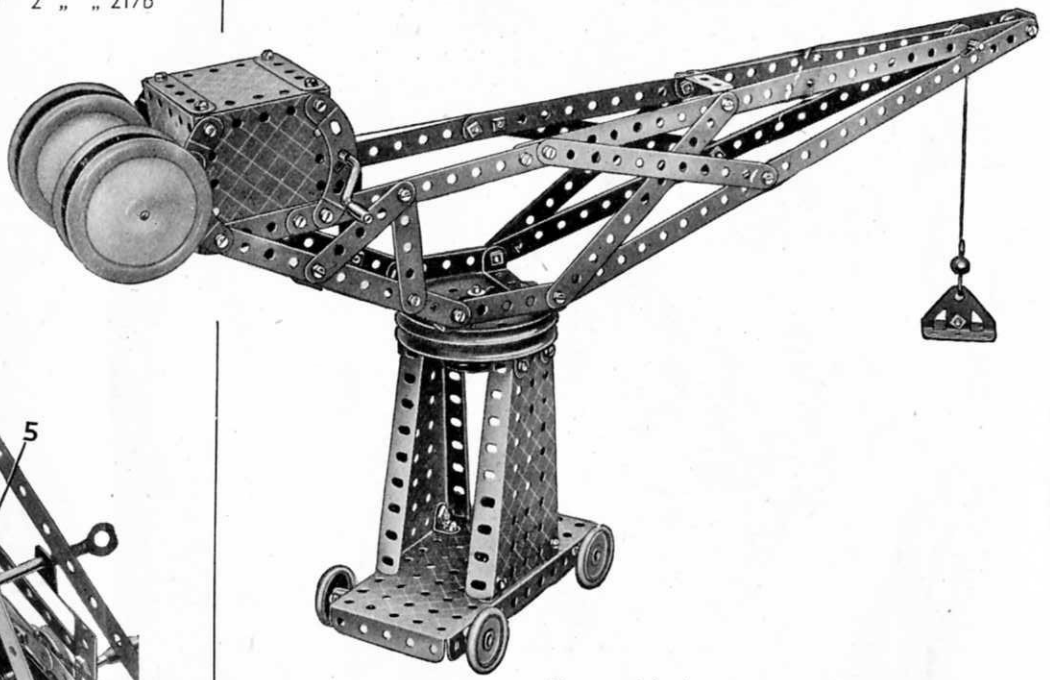


Fig. 4.10a

4.11 HAMMERHEAD CRANE

The jib of the crane is bolted to the upper 3" Pulley, and the lower 3" Pulley is bolted to two 2½"×½" Double Angle Strips fastened to the narrow ends of the Flanged Sector Plates. A 1½" Rod is secured in the boss of the upper Pulley, but is free to rotate in the boss of the lower Pulley. A Bush Wheel fastened to the lower end of the Rod retains the jib in place.

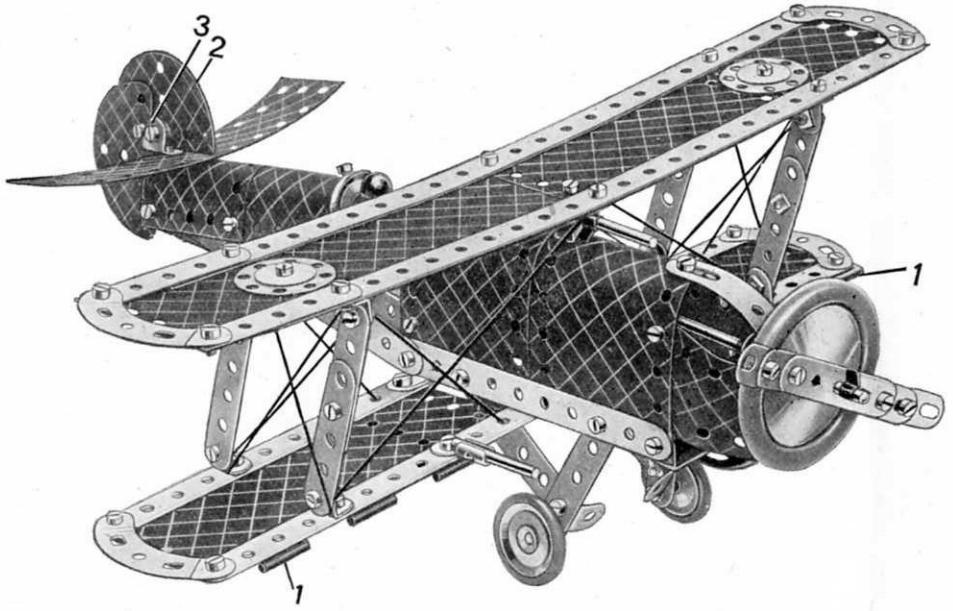
The four Road Wheels are fastened to a 4" Rod that passes through the holes of two Flat Trunnions bolted to the 2½" small radius Curved Strips.



Parts required

4 of No. 1	2 of No. 18a	55 of No. 37	4 of No. 90a
8 „ „ 2	2 „ „ 19b	1 „ „ 40	2 „ „ 126
9 „ „ 5	1 „ „ 19g	1 „ „ 48	2 „ „ 126a
1 „ „ 11	4 „ „ 22	6 „ „ 48a	4 „ „ 155a
8 „ „ 12	1 „ „ 23	1 „ „ 52	1 „ „ 176
1 „ „ 15b	1 „ „ 24	2 „ „ 54a	4 „ „ 187
2 „ „ 16	4 „ „ 35	1 „ „ 57c	4 „ „ 190

4.12 FIGHTING BIPLANE



Parts required

4 of No. 1	1 of No. 16	1 of No. 40	1 of No. 187
6 „ „ 2	2 „ „ 17	1 „ „ 48	2 „ „ 188
2 „ „ 3	1 „ „ 18a	4 „ „ 48a	1 „ „ 189
9 „ „ 5	4 „ „ 22	4 „ „ 90a	4 „ „ 190
4 „ „ 10	6 „ „ 35	5 „ „ 111c	2 „ „ 191
2 „ „ 11	74 „ „ 37	2 „ „ 125	2 „ „ 192
8 „ „ 12	1 „ „ 37a	2 „ „ 126a	1 „ „ 198
3 „ „ 12c	5 „ „ 38	2 „ „ 155a	2 „ „ 199

1 of No. 212
2 „ „ 214
2 „ „ 215
2 „ „ 217a
2 „ „ 217b

The two 3" Formed Slotted Strips that can be seen in the illustration, one forming the top and one the underside of the nose of the plane, are joined end to end by a Bolt through their slotted holes. The Bolt holds also a Reversed Angle Bracket inside the nose, and an Obtuse Angle Bracket, which is outside the nose. The 3½" Rod that forms the propeller shaft passes through the free hole of the Obtuse Angle Bracket, through the unoccupied part of the slots in the 3" Formed Slotted Strips, and through the hole of the Reversed Angle Bracket. The Rod is held in position by Spring Clips. The centre pin of a Hinged Flat Plate has been withdrawn, and the two parts used as flat plates 1, to form part of the lower wing. The Semi-Circular Plate 2 is fastened to the fuselage by means of a Double Bracket 3, and is spaced from the inside of the Bracket by three Washers. Flat Trunnions are used for the sides of the cockpit. The 1" fast Pulleys forming the front and the back of the cockpit are each fastened by a Bolt passing through the top of the U-Section Curved Plates and into the tapped hole of the boss.

4.13 TANK LOCOMOTIVE

The construction of the model is commenced by building the chassis as shown in Fig. 4.10a. The Flat Brackets 1 must be bolted to the 12½" Strips 2 before the Flanged Sector Plate 3 is fitted. The 1¼" Discs 5 rotate on ⅜" Bolts lock-nutted in the end holes of two 2½" small radius Curved Strips, which are bolted to the 12½" Strips forming the side members of the frame.

The top of the cab consists of two 1 11/16" radius Curved Plates, overlapped three holes and fastened by an Angle Bracket to a small radius Curved Strip. The Curved Strip in turn is fastened by Angle Brackets to two 2½" Strips bolted to the frame. A 2½"×1½" Flanged Plate is used for the back of the cab, and Flat Trunnions 8 fill in the sides.

The centre and rear parts of the boiler are formed by 5½"×2½" Flexible Plates, which are bolted direct to the 12½" Strips forming the side members of the chassis. The forward part of the boiler consists of two 2½"×2½" Flexible Plates bent to shape and bolted to the centre portion of the boiler. The ⅜" Bolt 6 that forms part of the safety valve is held in the top of the boiler by a Nut, and the Flat Bracket 7 is then slipped over it and fastened in position by a further Nut. The buffers 4 are lock-nutted to a 2½"×½" Double Angle Strip bolted to the flanges of the Flanged Sector Plate 3.

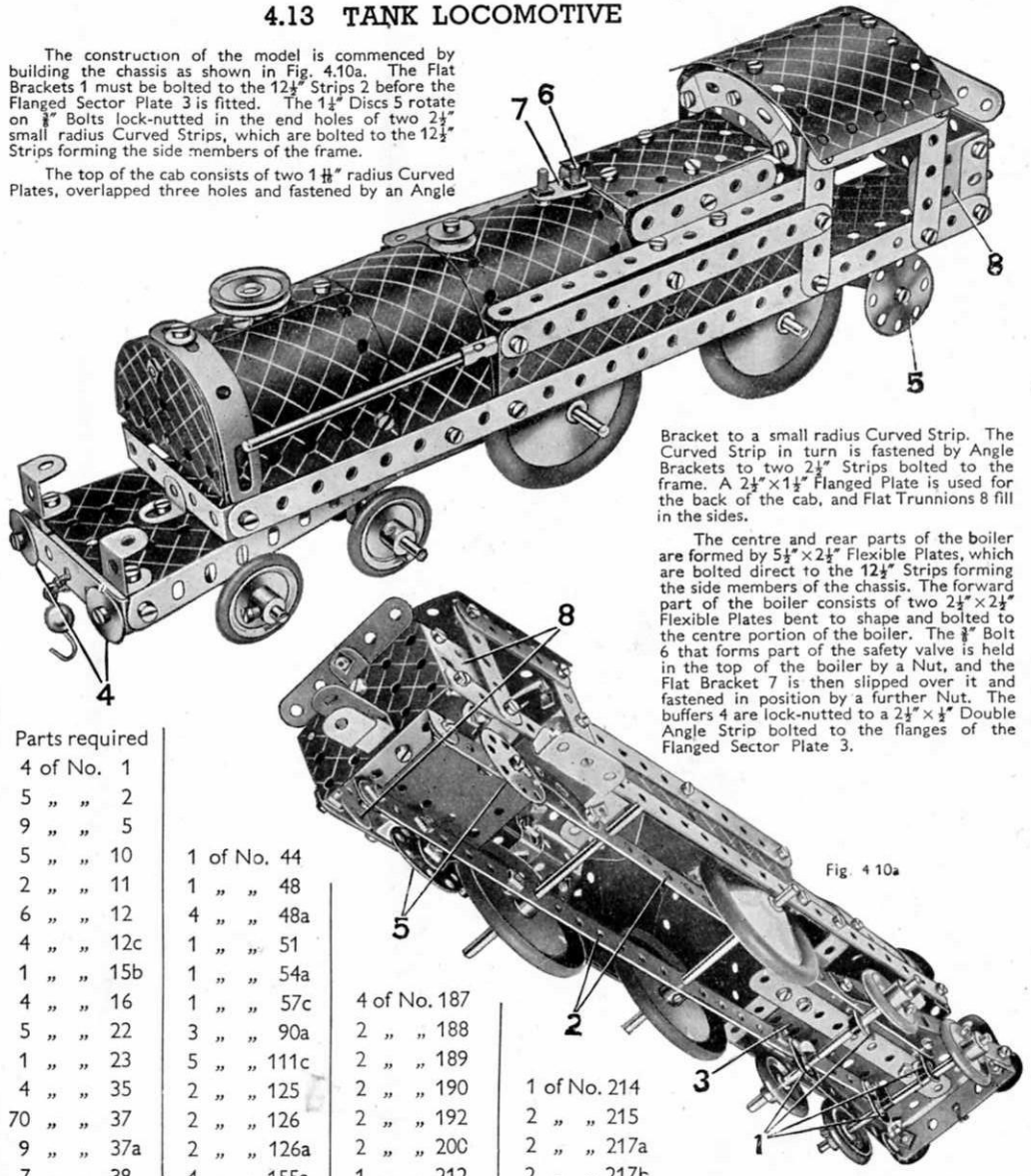


Fig. 4.10a

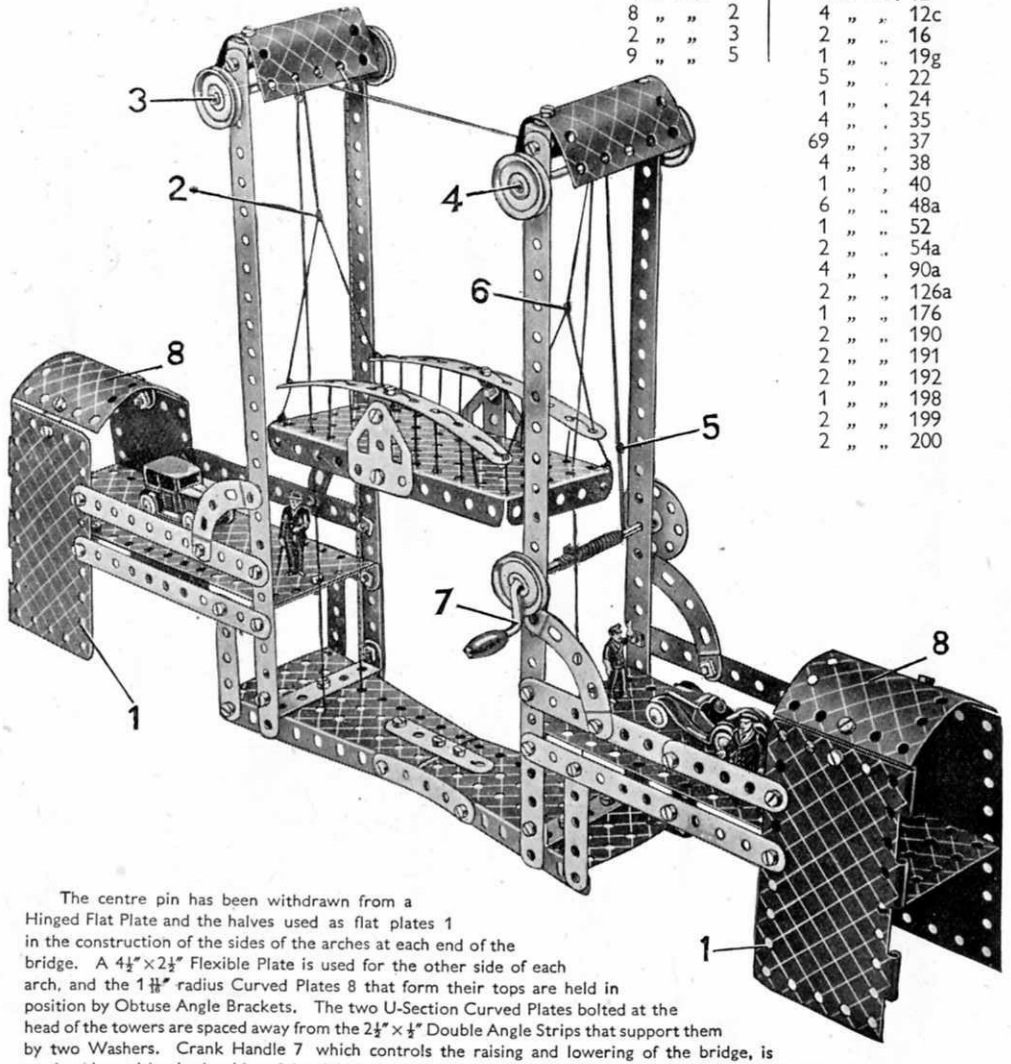
Parts required

4 of No. 1	1 of No. 44	4 of No. 187	
5 „ „ 2	1 „ „ 48	2 „ „ 188	
9 „ „ 5	4 „ „ 48a	2 „ „ 189	
5 „ „ 10	1 „ „ 51	2 „ „ 190	1 of No. 214
2 „ „ 11	1 „ „ 54a	2 „ „ 192	2 „ „ 215
6 „ „ 12	1 „ „ 57c	2 „ „ 200	2 „ „ 217a
4 „ „ 12c	3 „ „ 90a	1 „ „ 212	2 „ „ 217b
1 „ „ 15b	5 „ „ 111c		
4 „ „ 16	2 „ „ 125		
5 „ „ 22	2 „ „ 126		
1 „ „ 23	2 „ „ 126a		
4 „ „ 35	4 „ „ 155a		
70 „ „ 37			
9 „ „ 37a			
7 „ „ 38			

4.14 LIFTING BRIDGE

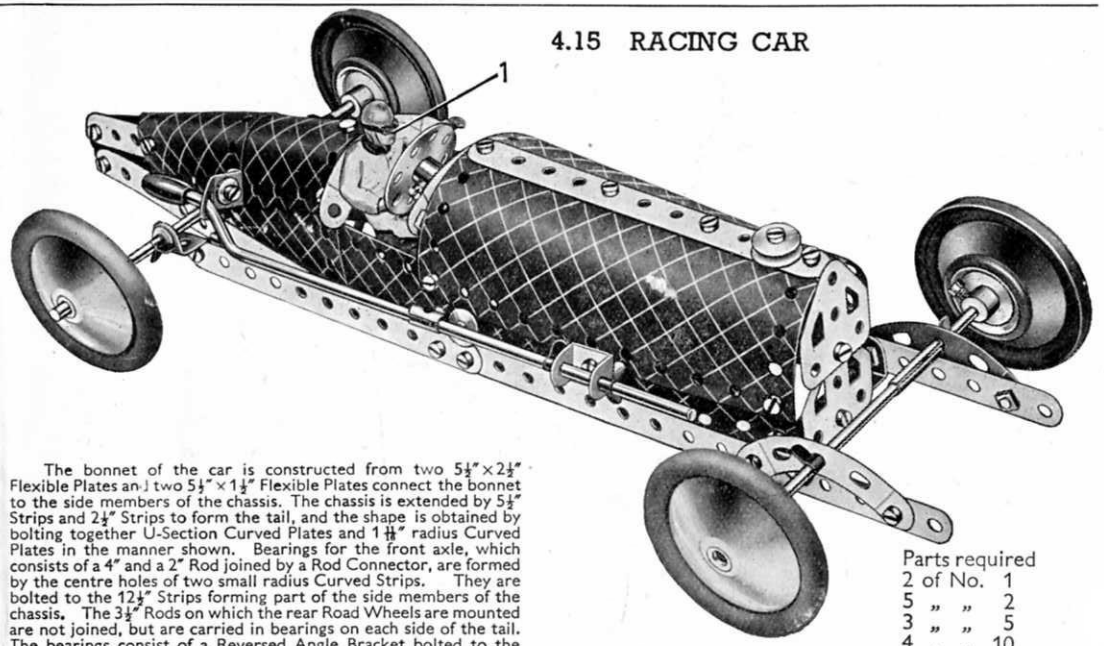
Parts required

4 of No.	1	6 of No.	12
8 „ „	2	4 „ „	12c
2 „ „	3	2 „ „	16
9 „ „	5	1 „ „	19g
		5 „ „	22
		1 „ „	24
		4 „ „	35
		69 „ „	37
		4 „ „	38
		1 „ „	40
		6 „ „	48a
		1 „ „	52
		2 „ „	54a
		4 „ „	90a
		2 „ „	126a
		1 „ „	176
		2 „ „	190
		2 „ „	191
		2 „ „	192
		1 „ „	198
		2 „ „	199
		2 „ „	200



The centre pin has been withdrawn from a Hinged Flat Plate and the halves used as flat plates 1 in the construction of the sides of the arches at each end of the bridge. A 4½″×2½″ Flexible Plate is used for the other side of each arch, and the 1 11/16″ radius Curved Plates 8 that form their tops are held in position by Obtuse Angle Brackets. The two U-Section Curved Plates bolted at the head of the towers are spaced away from the 2½″×½″ Double Angle Strips that support them by two Washers. Crank Handle 7 which controls the raising and lowering of the bridge, is retained in position in the sides of the right hand tower by a Bush Wheel and a 1″ Pulley. Cord is wound round the shaft of Crank Handle 7, and at 5 a second length of Cord is knotted to it, and both are led over the Rod 4. One of the Cords is led downward and is tied at 6 to the Cords supporting the span ; while the other is passed over Rod 3 and is tied at 2 to the other supporting Cords. Guide Cords are tied to Rods 3 and 4, and after passing through holes in the 5½″×2½″ Flanged Plate are fastened to the two Flanged Sector Plates forming the base.

4.15 RACING CAR



The bonnet of the car is constructed from two 5½″×2½″ Flexible Plates and two 5½″×1½″ Flexible Plates connect the bonnet to the side members of the chassis. The chassis is extended by 5½″ Strips and 2½″ Strips to form the tail, and the shape is obtained by bolting together U-Section Curved Plates and 1 11/16″ radius Curved Plates in the manner shown. Bearings for the front axle, which consists of a 4″ and a 2″ Rod joined by a Rod Connector, are formed by the centre holes of two small radius Curved Strips. They are bolted to the 12½″ Strips forming part of the side members of the chassis. The 3½″ Rods on which the rear Road Wheels are mounted are not joined, but are carried in bearings on each side of the tail. The bearings consist of a Reversed Angle Bracket bolted to the chassis and a Flat Bracket fastened to the side of the car. The Rods are held in position by Spring Clips. The Driver 1 (Motor Car Constructor Part No.A1100) is not included in the Outfit, but can be purchased separately if required.

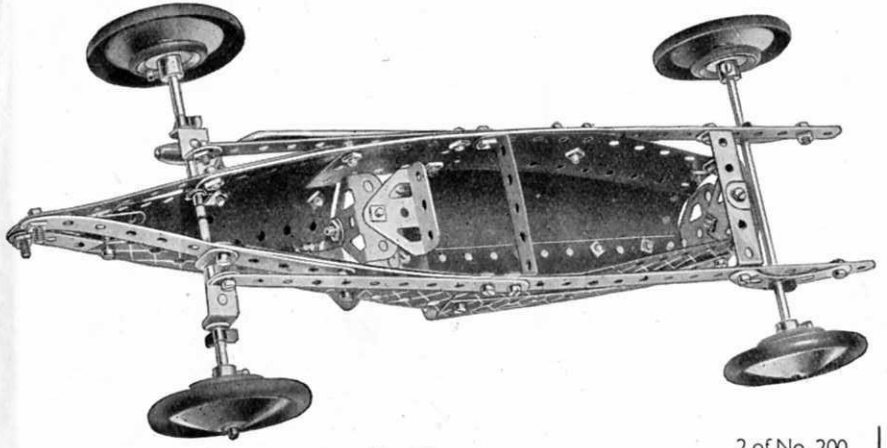
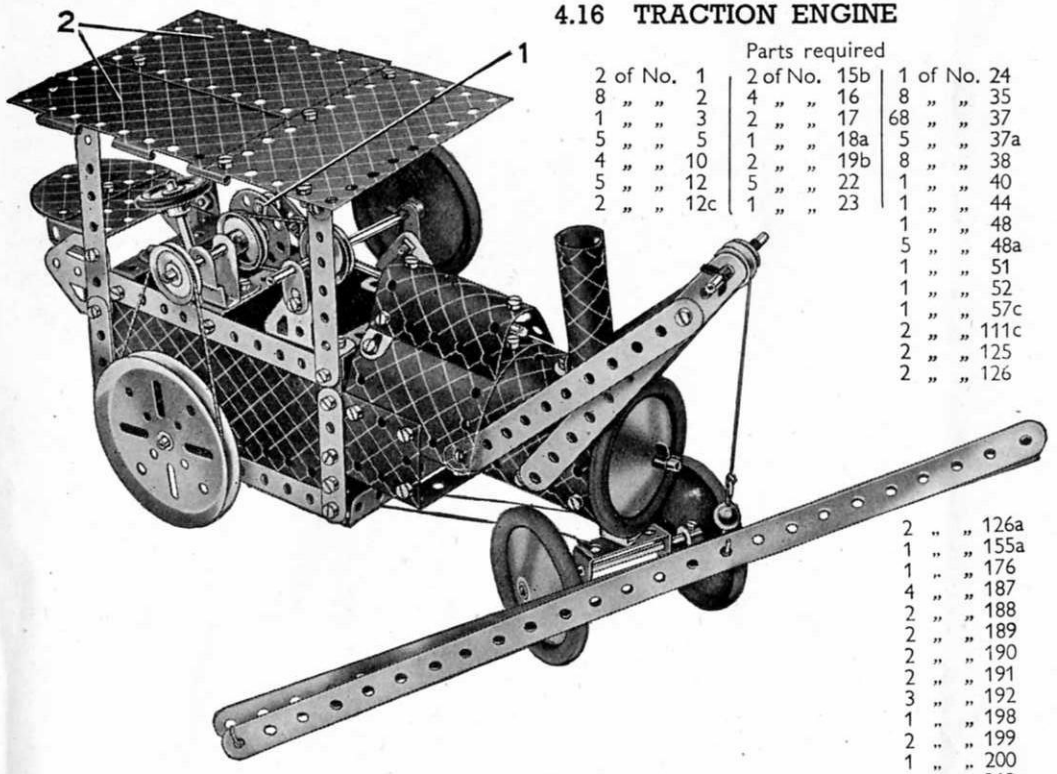


Fig. 4.15a

Parts required

2 of No.	200	2 of No.	1
1 „ „	212	5 „ „	2
1 „ „	213	3 „ „	5
		4 „ „	10
		1 „ „	11
		4 „ „	12
		1 „ „	12c
		2 „ „	15b
		2 „ „	16
		1 „ „	17
		1 „ „	19g
		4 „ „	22
		1 „ „	23
		1 „ „	24
		8 „ „	35
		42 „ „	37
		2 „ „	37a
		7 „ „	38
		1 „ „	48
		2 „ „	48a
		4 „ „	90a
		4 „ „	111c
		2 „ „	125
		2 „ „	126
		2 „ „	126a
		4 „ „	155a
		4 „ „	187
		2 „ „	188
		2 „ „	189
		2 „ „	192
		2 „ „	199

4.16 TRACTION ENGINE



Parts required

2 of No.	1	2 of No.	15b	1 of No.	24
8 „ „	2	4 „ „	16	8 „ „	35
1 „ „	3	2 „ „	17	68 „ „	37
5 „ „	5	1 „ „	18a	5 „ „	37a
4 „ „	10	2 „ „	19b	8 „ „	38
5 „ „	12	5 „ „	22	1 „ „	40
2 „ „	12c	1 „ „	23	1 „ „	44
				1 „ „	48
				5 „ „	48a
				1 „ „	51
				1 „ „	52
				1 „ „	57c
				2 „ „	111c
				2 „ „	125
				2 „ „	126
				2 „ „	126a
				1 „ „	155a
				1 „ „	176
				4 „ „	187
				2 „ „	188
				2 „ „	189
				2 „ „	190
				2 „ „	191
				3 „ „	192
				1 „ „	198
				2 „ „	199
				1 „ „	200
				1 „ „	212
				1 „ „	213
				1 „ „	214
				2 „ „	215
				1 „ „	217b

The cylinder consists of a U-Section Curved Plate, fastened to the boiler by Obtuse Angle Brackets. Bearings for the piston rod are formed by the holes of two Angle Brackets, which are held in place by the Bolts that can be seen at the top of the cylinder. The Bolts 1, which pass through a connecting rod consisting of two Flat Brackets, are lock-nutted. A U-Section Curved Plate, bent so that its ends overlap one hole, is used for the chimney. The centre pin of a Hinged Flat Plate has been removed and the two parts used as flat plates 2 in the construction of the roof of the cab.

The 1½"×½" Double Angle Strip that supports the front axle is pivotally attached by a lock-nutted Bolt, to the centre hole of a double bent strip, which consists of two Reversed Angle Brackets. The Cord controlling the steering is wound twice around the lower end of the steering column.

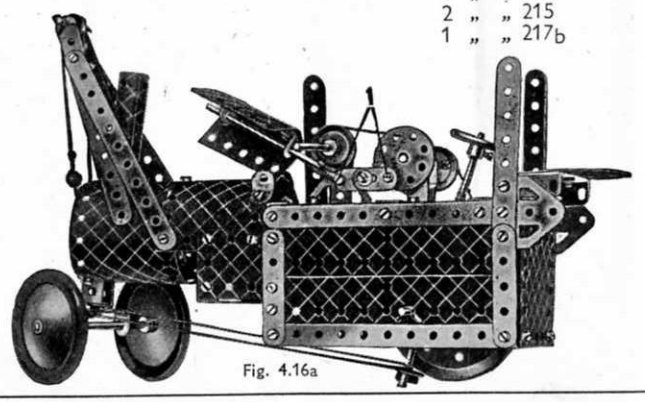


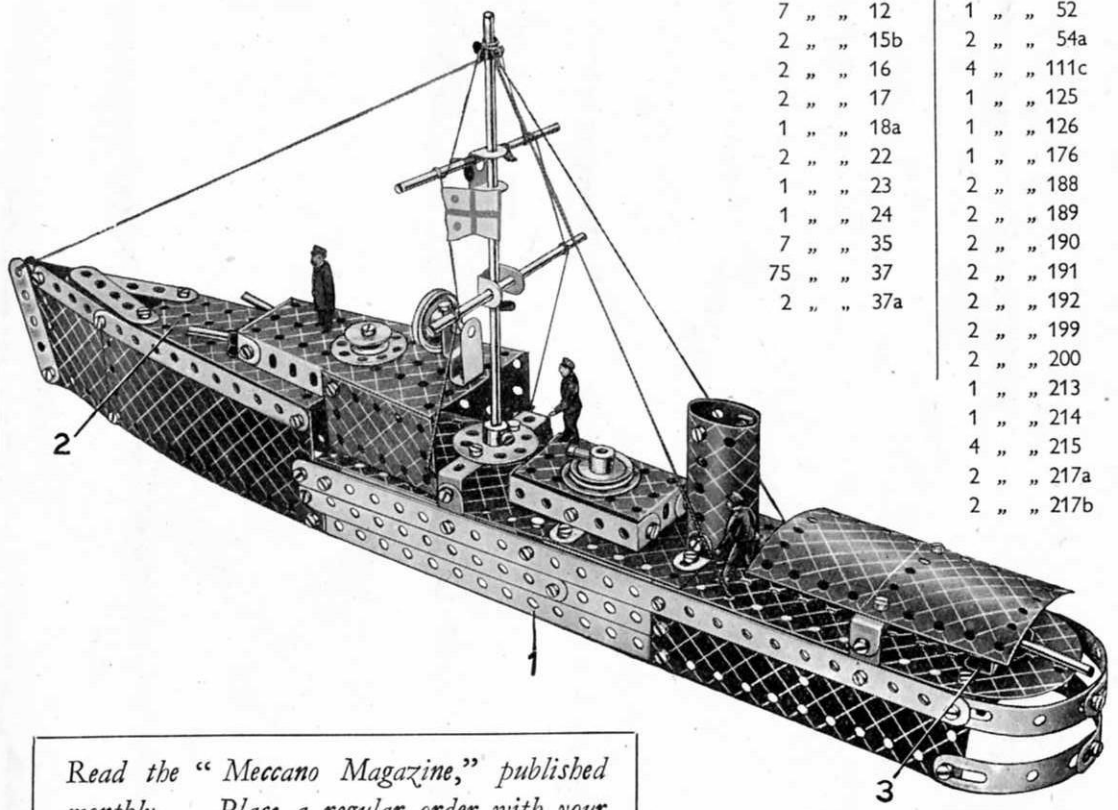
Fig. 4.16a

4.17 RIVER GUN-BOAT

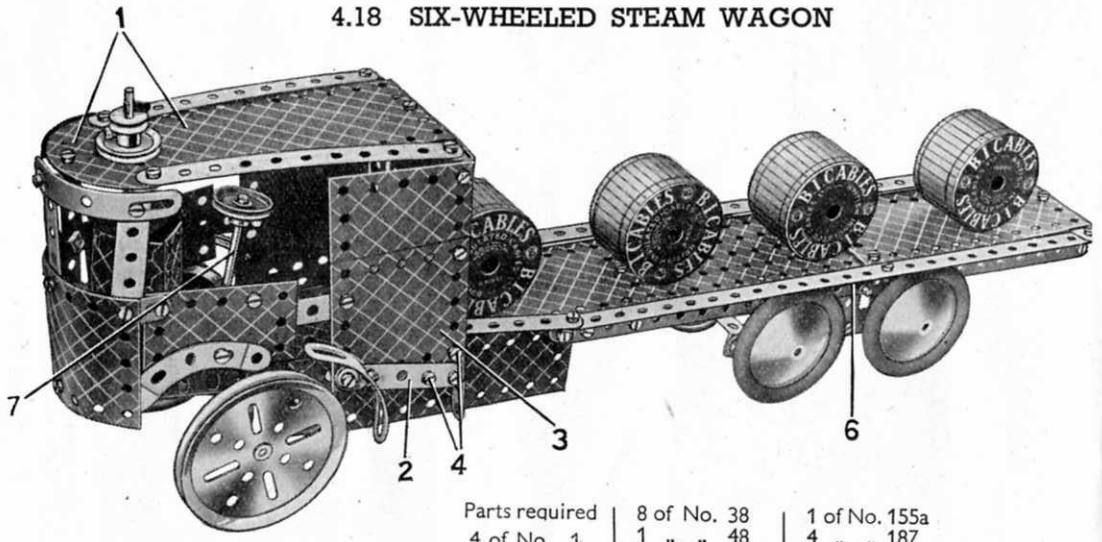
Each side of the forward part of the ship consists of a 2½"×2½" and a 5½"×2½" Flexible Plate. These are bolted to the 12½" Strip 1 and to the Flanged Sector Plate 2. The funnel is represented by two U-Section Curved Plates bent so that their ends overlap two holes at each side, and it is fastened to the deck by two Angle Brackets. The forward gun turret, also a Flanged Sector Plate, is fastened to the raised portion of the deck by means of an ½"×½" Angle Bracket. The guns are represented by two 2" Rods, held by Spring Clips in the holes of a 1½"×½" Double Angle Strip bolted to the narrow end of the Flanged Sector Plate 2. A 1½" Rod, held by a Spring Clip and a Cord Anchoring Spring in a Trunnion 3, forms the rear gun. The gun in front of the funnel is held in place by a ⅜" Bolt passed through the centre hole of the Flanged Plate and locked in the boss of the Pulley by the ⅜" Bolt representing the gun barrel.

Parts required

4 of No.	1	1 of No.	40
4 „ „	2	1 „ „	44
8 „ „	5	1 „ „	48
4 „ „	10*	5 „ „	48a
2 „ „	11	1 „ „	51
7 „ „	12	1 „ „	52
2 „ „	15b	2 „ „	54a
2 „ „	16	4 „ „	111c
2 „ „	17	1 „ „	125
1 „ „	18a	1 „ „	126
2 „ „	22	1 „ „	176
1 „ „	23	2 „ „	188
1 „ „	24	2 „ „	189
7 „ „	35	2 „ „	190
75 „ „	37	2 „ „	191
2 „ „	37a	2 „ „	192
		2 „ „	199
		2 „ „	200
		1 „ „	213
		1 „ „	214
		4 „ „	215
		2 „ „	217a
		2 „ „	217b



4.18 SIX-WHEELED STEAM WAGON



Parts required								
4 of No.	1	8 of No.	38	1 of No.	155a
8 „ „	2	1 „ „	48	4 „ „	187
2 „ „	3	6 „ „	48a	2 „ „	188
6 „ „	5	1 „ „	51	2 „ „	189
4 „ „	10	1 „ „	52	4 „ „	190
2 „ „	11	1 „ „	54a	2 „ „	191
8 „ „	12	4 „ „	90a	2 „ „	192
2 „ „	12c	2 „ „	111c	2 „ „	199
2 „ „	15b	2 „ „	125	2 „ „	200
4 „ „	16	1 „ „	126	1 „ „	214
2 „ „	19b	2 „ „	126a	4 „ „	215
5 „ „	22				
1 „ „	23				
1 „ „	24				
8 „ „	35				
75 „ „	37				
2 „ „	37a				

In Fig. 4.18a the top of the cab has been removed to show the construction of the boiler and steering wheel. The boiler consists of two U-Section Curved Plates fastened by a 1½" × ½" Double Angle Strip to the Flanged Sector Plate forming the bottom of the cab. The two 1" Pulleys seen in Fig. 4.18a are fixed to the steering column 7, which passes through the bottom of the cab and is held in the boss of a Bush Wheel carrying a 2½" × ½" Double Angle Strip. The holes in the turned down ends of the Double Angle Strip support the 4" Rod that forms the front axle. The method of attaching the chimney to the two Plates 1 is shown in Fig. 4.18c. The Bolts 4 pass through a Flat Bracket behind Plate 3, thus securing the Strip 2 to the Plate. The 1" Pulley with Rubber Ring represents the top of the boiler.

Fig. 4.18b shows the construction of the rear wheel bogie. The bogie is attached to the wagon by a Rod 5, which passes through the holes in the 12½" Strips 6 and through the upper holes in the Flat Trunnions bolted to the bogie. The Rod is held in position by Spring Clips.

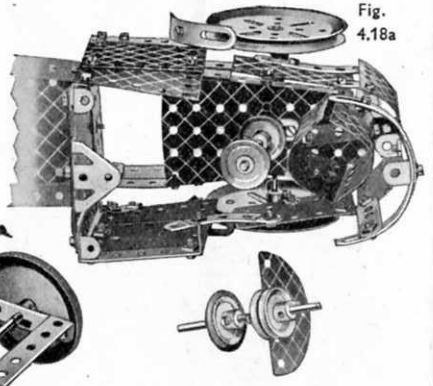


Fig. 4.18a

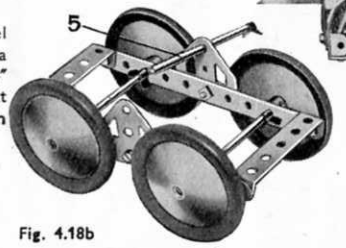
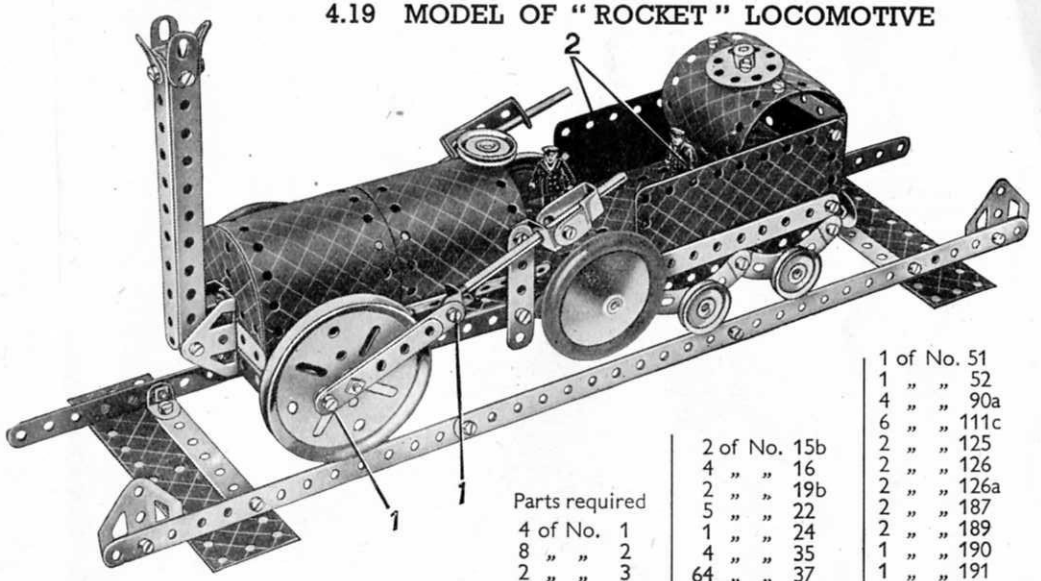


Fig. 4.18b

Fig. 4.18c

4.19 MODEL OF "ROCKET" LOCOMOTIVE



Parts required								
4 of No.	1	2 of No.	15b	1 of No.	51
8 „ „	2	4 „ „	16	1 „ „	52
2 „ „	3	2 „ „	19b	4 „ „	90a
9 „ „	5	5 „ „	22	6 „ „	111c
4 „ „	10	1 „ „	24	2 „ „	125
1 „ „	11	4 „ „	35	2 „ „	126
8 „ „	12	64 „ „	37	2 „ „	126a
4 „ „	12c	12 „ „	37a	2 „ „	187
		8 „ „	38	2 „ „	189
		1 „ „	44	1 „ „	190
		1 „ „	48	1 „ „	191
		2 „ „	48a	2 „ „	192
				1 „ „	198
				2 „ „	200
				2 „ „	214
				2 „ „	217b

The pin has been removed from a Hinged Flat Plate and the halves used as flat plates 2, to form the sides of the tender. The chassis of the engine consists of a 5½" × 2½" and a 2½" × 1½" Flanged Plate, fastened together by two 2½" Strips. Two 5½" × 2½" Flexible Plates bolted to 5½" Strips form the boiler, and are fastened to the 5½" × 2½" Flanged Plate by Obtuse Angle Brackets, two of which can be seen in Fig. 4.19a. Semi-Circular Plates form the ends of the boiler.

The four 5½" Strips that represent the chimney are joined together at the top by a Double Bracket and an Angle Bracket. The Chimney is bolted to two Trunnions, secured to the chassis and to the boiler front. Bearings for the piston rods are formed on one side by a 1½" × ½" Double Angle Strip and a Reversed Angle Bracket, and on the other side by a Cranked Bent Strip and a Reversed Angle Bracket. The Bolts 1 on the connecting rods are lock-nutted, and the piston rods are retained in position by Spring Clips placed on each side of the Angle Brackets. The ¾" Discs representing buffers are fastened against the heads of the ¾" Bolts, which are lock-nutted to the Flexible Plate forming the back of the tender.

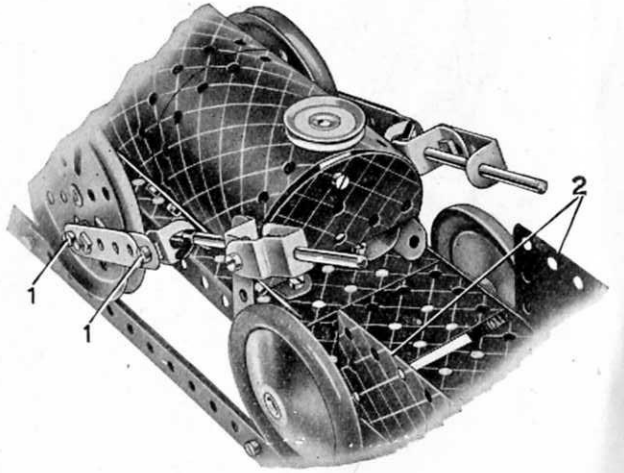
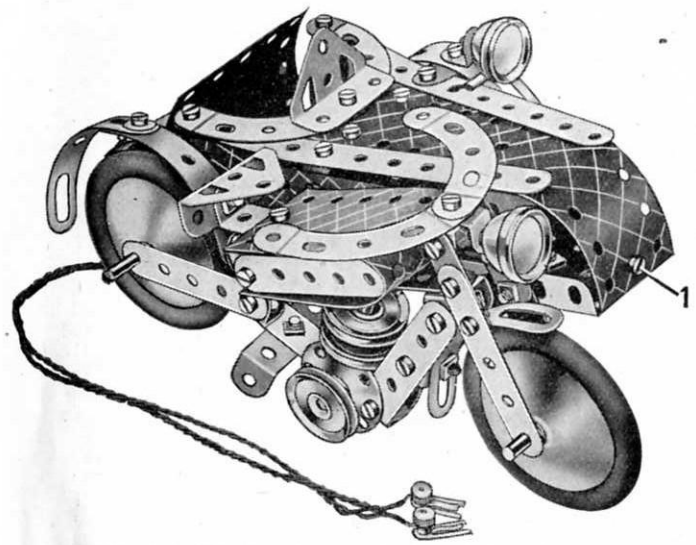


Fig 4.19a

4.20 MOTOR CYCLE AND SIDECAR



Parts required

5	of No.	2	1	of No.	54a
1	„ „	3	4	„ „	90a
8	„ „	5	1	„ „	111c
5	„ „	10	1	„ „	125
2	„ „	11	2	„ „	126
8	„ „	12	2	„ „	126a
1	„ „	12c	3	„ „	187
1	„ „	16	2	„ „	188
2	„ „	17	2	„ „	189
1	„ „	18a	1	„ „	190
3	„ „	22	2	„ „	199
1	„ „	35	1	„ „	200
51	„ „	37	2	„ „	214
2	„ „	38	4	„ „	215
1	„ „	48	2	„ „	217a
3	„ „	48a	Lighting Set (Not included in Outfit)		

The 5½"×1½" Flexible Plate that forms the front of the sidecar is bolted at 1 to a 2½"×½" Double Angle Strip, which is fastened by Bolt 2 to the 4½" Flanged Sector Plate forming the bottom of the sidecar. The Bolts 3 pass through the Flexible Plates and also through a 2½"×½" Double Angle Strip.

The engine cylinder consists of two 1" Pulleys mounted on a 2" Rod, one end of which is journalled in the Strip 4 that forms the top of the frame. The other end of the Rod is held between the two Bolts that fasten the 1¼" Discs to the frame.

The model is fitted with two Spotlights taken from a Meccano Lighting Set. These are fastened by the Angle Brackets supplied with the Lighting Set, to the handlebars and sidecar mudguard. The battery for supplying current for the Spotlights can be concealed in the sidecar.

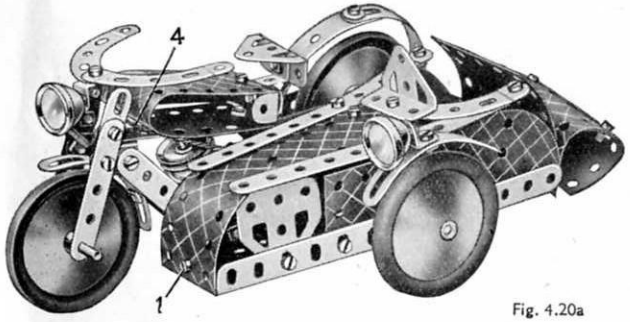


Fig. 4.20a

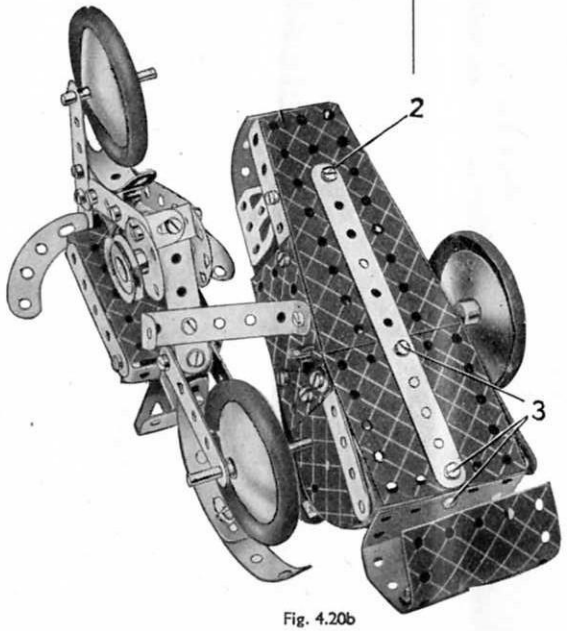
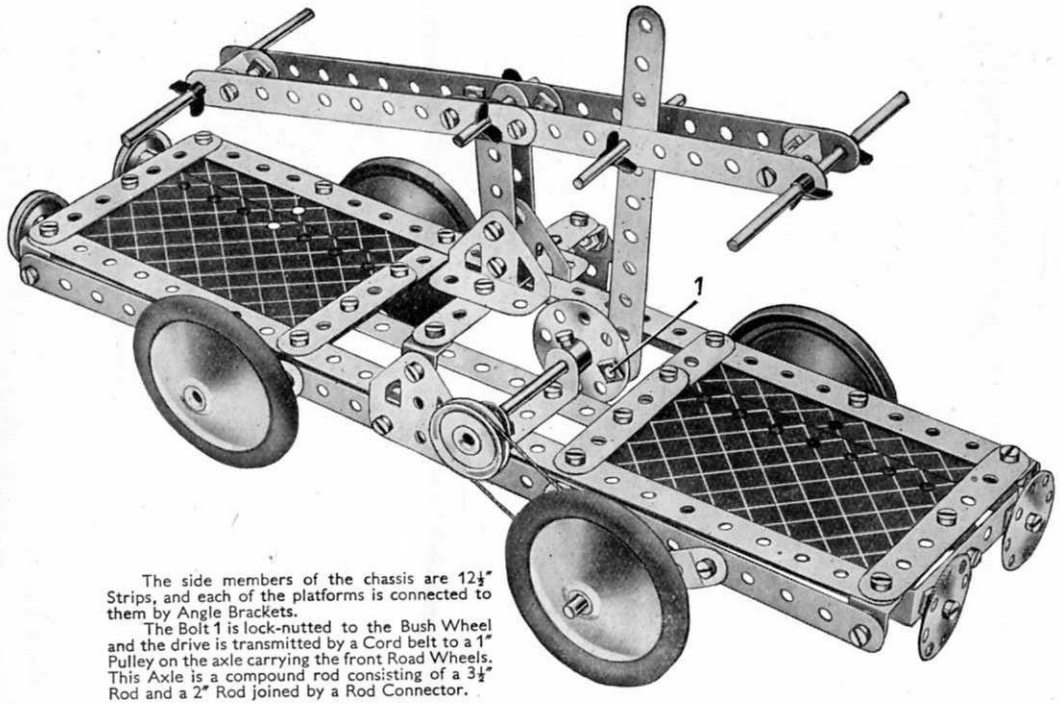


Fig. 4.20b

4.21 HAND TROLLEY CAR



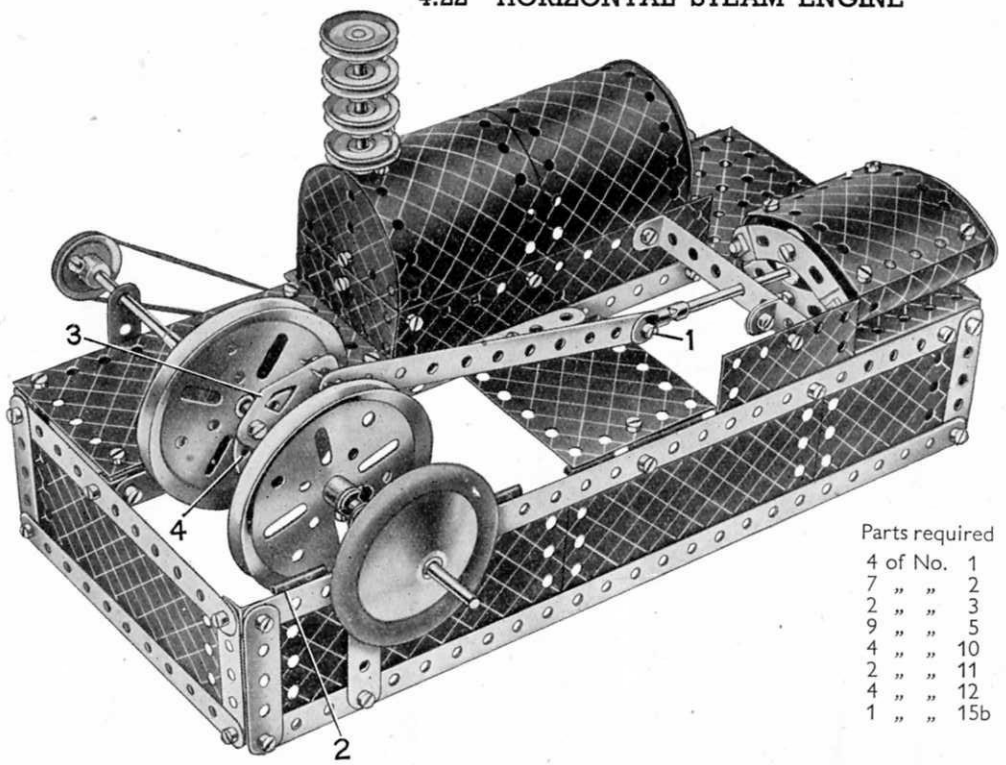
The side members of the chassis are 12½" Strips, and each of the platforms is connected to them by Angle Brackets.

The Bolt 1 is lock-nutted to the Bush Wheel and the drive is transmitted by a Cord belt to a 1" Pulley on the axle carrying the front Road Wheels. This Axle is a compound rod consisting of a 3½" Rod and a 2" Rod joined by a Rod Connector.

Parts required

4	of No.	1	2	of No.	18a	4	of No.	90a
6	„ „	2	4	„ „	22	4	„ „	111c
2	„ „	3	1	„ „	24	2	„ „	126
8	„ „	5	8	„ „	35	2	„ „	126a
2	„ „	11	54	„ „	37	4	„ „	187
8	„ „	12	7	„ „	37a	4	„ „	190
1	„ „	15b	2	„ „	38	2	„ „	191
3	„ „	16	1	„ „	48	1	„ „	213
2	„ „	17	2	„ „	48a	2	„ „	217a

4.22 HORIZONTAL STEAM ENGINE



Parts required

4	of No.	1
7	„ „	2
2	„ „	3
9	„ „	5
4	„ „	10
2	„ „	11
4	„ „	12
1	„ „	15b
3	of No.	16
1	„ „	17
1	„ „	18b
2	„ „	19b
5	„ „	22
1	„ „	24
6	„ „	35
75	„ „	37
6	„ „	37a
3	„ „	38
6	„ „	48a
1	„ „	51
1	„ „	52
4	„ „	90a
6	„ „	111c
2	„ „	125
2	„ „	126
2	„ „	126a
1	„ „	176
1	„ „	187
2	„ „	188
2	„ „	189
4	„ „	190
2	„ „	191
2	„ „	192
1	„ „	198
2	„ „	199
2	„ „	200
1	„ „	212
1	„ „	213
2	„ „	214
1	„ „	217a
1	*Magic*	Motor

The Bolt 1 is lock-nutted. The centre pin is withdrawn from a Hinged Flat Plate and the two halves used as flat plates at 2. The Flat Trunnion 3 is bolted to Bush Wheel 4 and forms one web of the crank. The Bush Wheel is fastened to a 2" Rod, which carries also a 3" Pulley, and a Rod Connector joins this Rod to a 3½" Rod that transmits the drive from the *Magic* Motor. The other web of the crank is made by bolting a 1¼" Disc 5 to a Flat Trunnion 6, one of the bolts holding also a Reversed Angle Bracket 7. A Spring Clip 8 is fixed in position so that when the crankshaft is rotated the Rod on which the 3" Pulley and the Road Wheel are fastened is rotated by the Reversed Angle Bracket 7. The cylinder is composed of two 1 11/16" radius Curved Plates and two U-Section Curved Plates bolted together as shown, and the complete unit is fastened in position to the 5½"×2½" Flanged Plate that forms the base.

The boiler consists of two 5½"×2½" Flexible Plates bolted to 5½"×1½" Flexible Plates, and its ends are closed by Semi-circular Plates and 2½"×1½" Flexible Plates. The fire-box door is represented by a Trunnion. The chimney is a 4" Rod fitted with 1" Pulleys, and is held in place by a Cord Anchoring Spring. Fig. 4.22a shows the arrangement for driving the model with a *Magic* Motor.

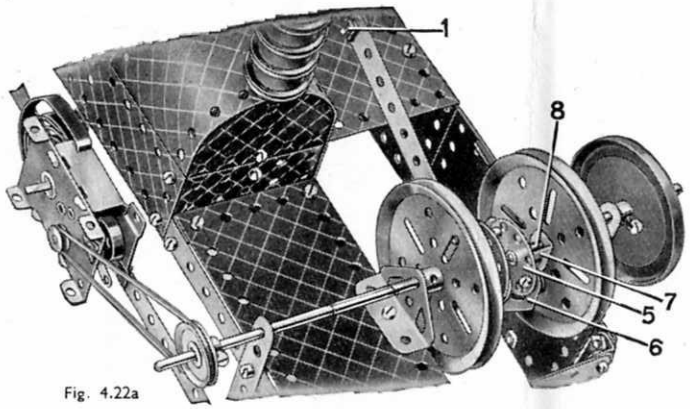
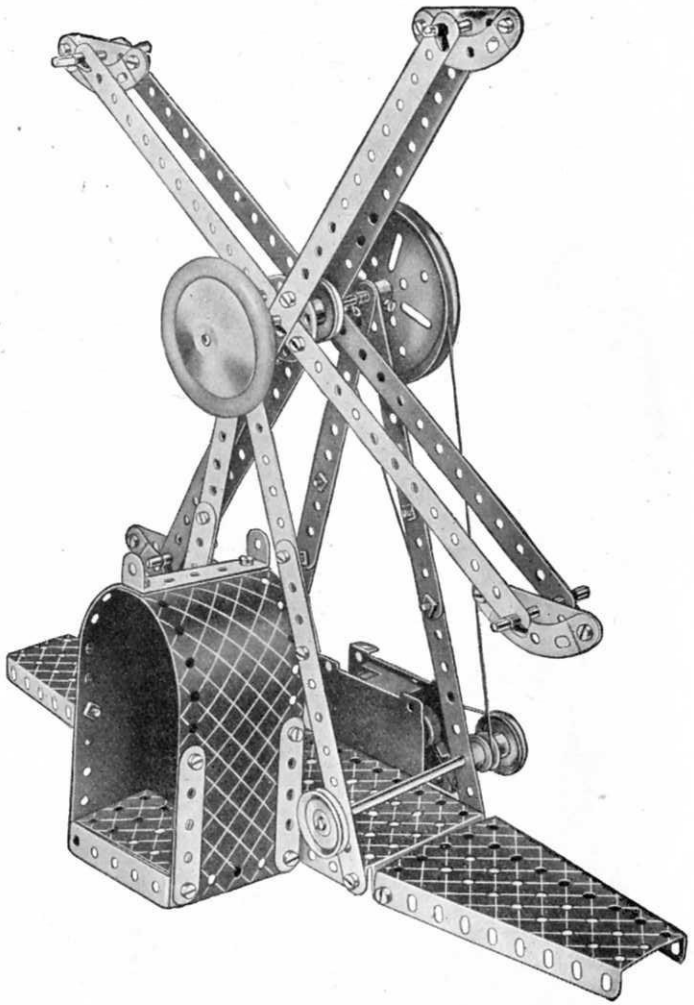


Fig. 4.22a

4.23 FLYBOATS

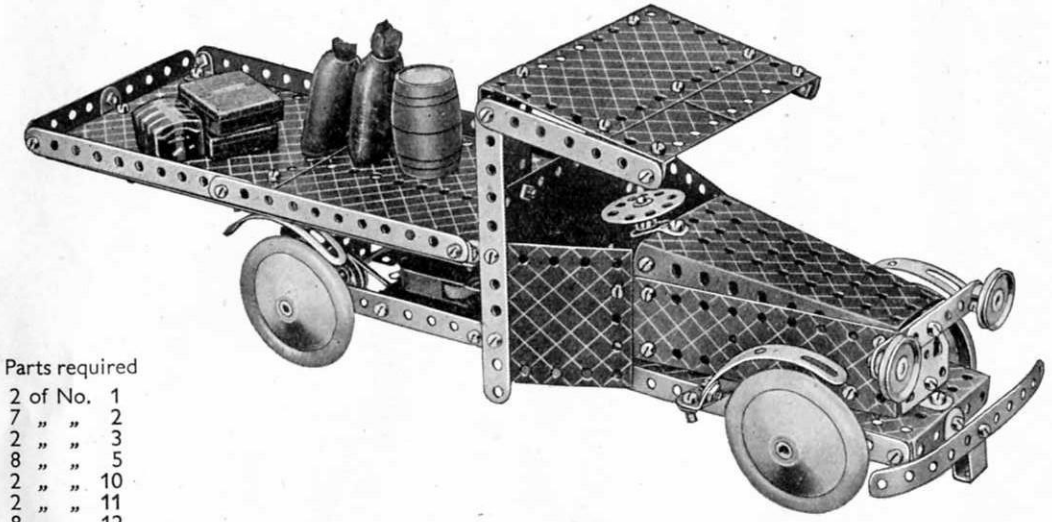
Parts required

4	of No.	1
8	„ „	2
8	„ „	5
2	„ „	15b
2	„ „	17
2	„ „	18a
1	„ „	19b
3	„ „	22
1	„ „	24
8	„ „	35
44	„ „	37
1	„ „	40
6	„ „	48a
1	„ „	51
1	„ „	52
2	„ „	54a
4	„ „	90a
1	„ „	176
1	„ „	187
2	„ „	192
1	*Magic*	Motor



The *Magic* Motor is bolted to the flange of the 5½"×2½" Flanged Plate, and the drive is taken from the pulley of the Motor to a 1" Pulley fastened on a Rod journalled in the 12½" Strips that support the main shaft. A ½" fast Pulley also is secured on this Rod, and drives through a belt of Cord a 3" Pulley on the main shaft. The arms that support the boats are bolted to a Bush Wheel fastened on the main shaft. Each of the boats consists of a 2½" Strip and a 2½" small radius Curved Strip bolted together.

4.24 MOTOR LORRY



Parts required

2	of No.	1
7	„ „	2
2	„ „	3
8	„ „	5
2	„ „	10
2	„ „	11
8	„ „	12
3	„ „	12c
2	„ „	15b
1	„ „	16
3	„ „	22
1	„ „	24
5	„ „	35
75	„ „	37
2	„ „	37a
5	„ „	38
1	„ „	44
1	„ „	48
4	„ „	48a
1	„ „	52
2	„ „	54a
4	„ „	111c
2	„ „	125
2	„ „	126
1	„ „	126a
4	„ „	187
2	„ „	188
2	„ „	189
4	„ „	190
2	„ „	191
2	„ „	192
1	„ „	198
4	„ „	215
1	*Magic* Motor	

The chassis of the model consists of two 12½" Strips bolted to a 5½"×2½" Flanged Plate and secured at their free ends by a 2½"×½" Double Angle Strip. Both the front and rear axles are journalled directly in the chassis. The *Magic* Motor is attached by its flanges to one of the 12½" Strips, and the drive is taken through a Driving Band from the pulley of the Motor to a 1" fast Pulley fastened on the back axle of the lorry.

The platform is fixed to the end of the chassis by two 2½"×½" Double Angle Strips, the ends of which can be seen in Fig. 4.24a and also to the back of the cab by a 1½"×½" Double Angle Strip. The front bumper consists of a 5½" Strip curved to shape and fastened by a Cranked Bent Strip to the 5½"×2½" Flanged Plate forming the front of the chassis. The headlamps, which are 1" Pulleys, are fixed in place by ⅜" Bolts pushed through the 2½" Strips into the bosses of the Pulleys and held by the setscrews.

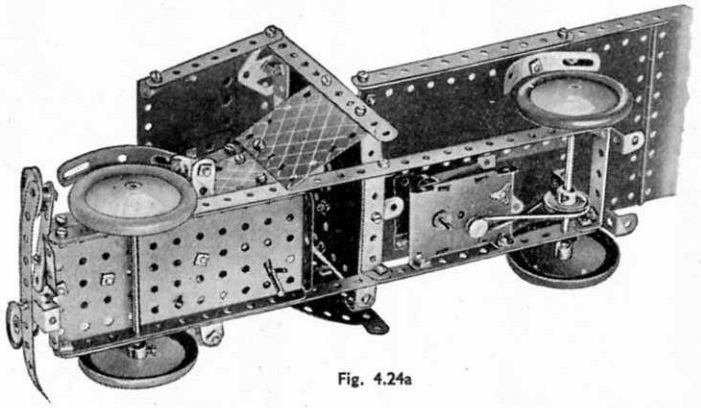
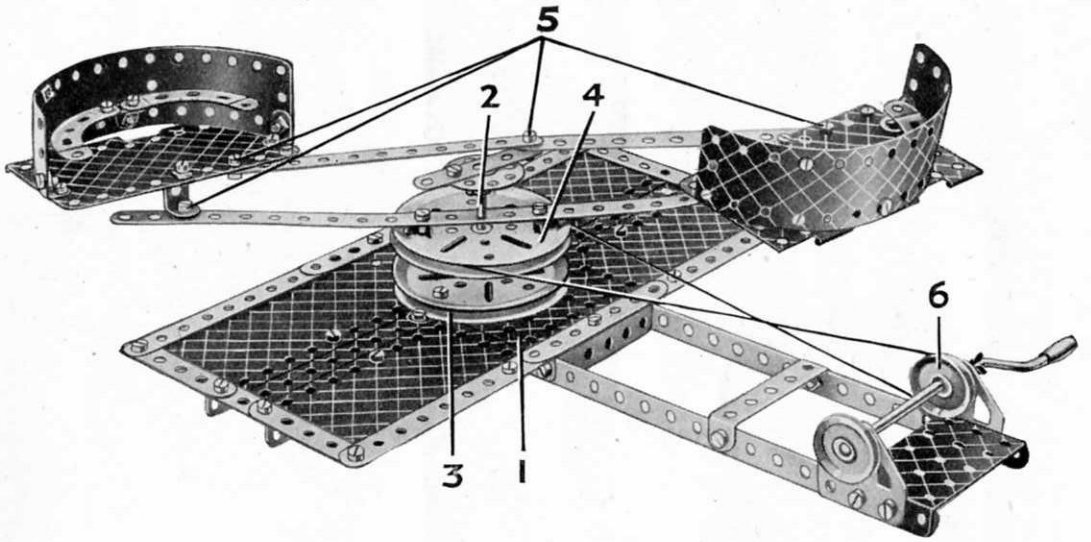


Fig. 4.24a

4.25 "WHIP" ROUNDABOUT



Parts required

3	of No.	1	52	of No.	37b
7	„ „	2	8	„ „	38
2	„ „	3	1	„ „	40
4	„ „	5	1	„ „	48a
4	„ „	10	1	„ „	51
2	„ „	11	1	„ „	52
6	„ „	12	2	„ „	54a
1	„ „	17	4	„ „	90a
2	„ „	19b	6	„ „	111c
1	„ „	19g	2	„ „	126a
2	„ „	22	2	„ „	188
1	„ „	24	2	„ „	189
4	„ „	35	2	„ „	191
65	„ „	37a	2	„ „	192
			1	of No.	198

The base of the model is formed by a 5½"×2½" Flanged Plate 1 extended on each side by a Flanged Sector Plate, a 5½"×2½" and a 4½"×2½" Flexible Plate. The edges of the base are strengthened with Strips. Two 12½" Strips are bolted to the flanges of Plate 1 and their ends are connected by a 2½"×1½" Flanged Plate. Two Flat Trunnions provide bearings for a Small Crank Handle.

A 3" Pulley 3 is bolted to Flanged Plate 1 and in its boss is fixed a 2" Rod 2. A second 3" Pulley 4 is spaced from Pulley 3 by a Spring Clip and is free to turn on Rod 2. Across its face is bolted a 12½" Strip, the Strip being spaced from the Pulley by a Spring Clip and two Washers placed on the shank of each securing Bolt.

A Bush Wheel fitted with a 2½" Strip is secured on Rod 2 in the position shown, the end of the Strip being connected to the cars by 5½" Strips. All the Bolts 5 are lock-nutted.

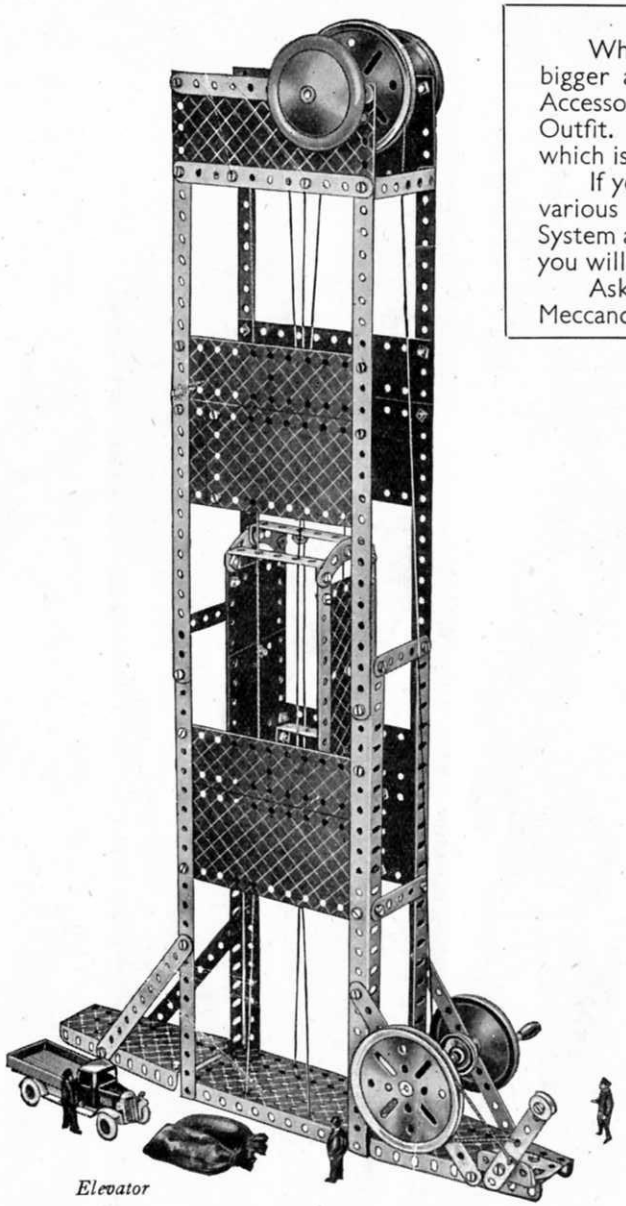
The 1" Pulley 6 mounted on the Crank Handle, drives Pulley 4 through a belt of Cord.

BUILD BIGGER AND BETTER MODELS

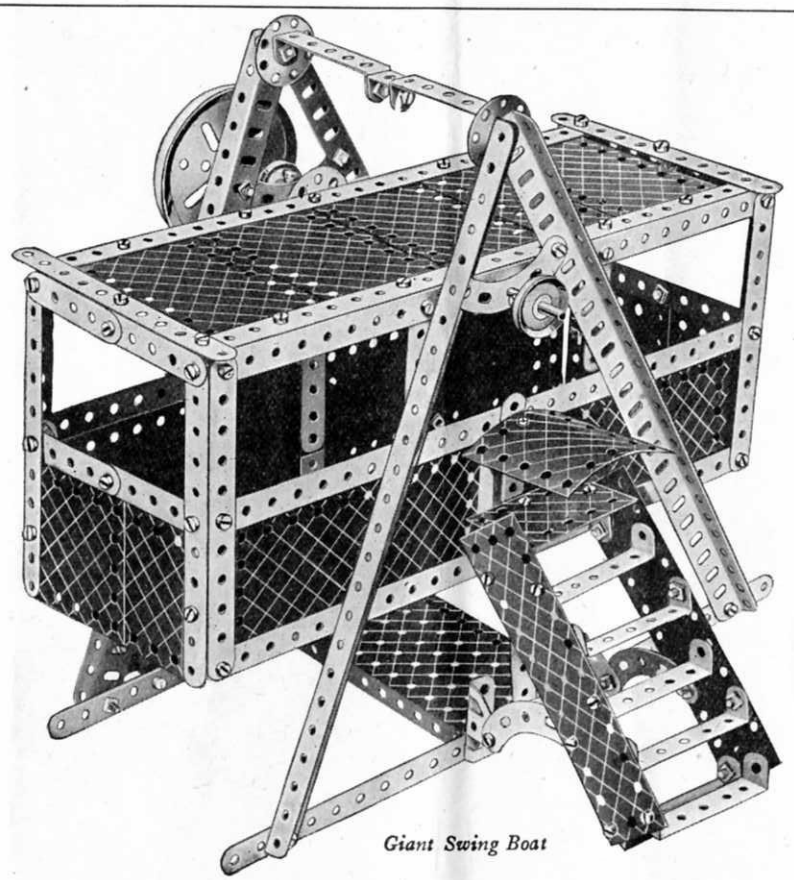
When you have built all the models shown in this Manual you will be keen to build bigger and more elaborate models. Your next step is to purchase a Meccano No. 4a Accessory Outfit containing all the parts required to convert your No. 4 into a No. 5 Outfit. You will then be able to build the full range of No. 5 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.

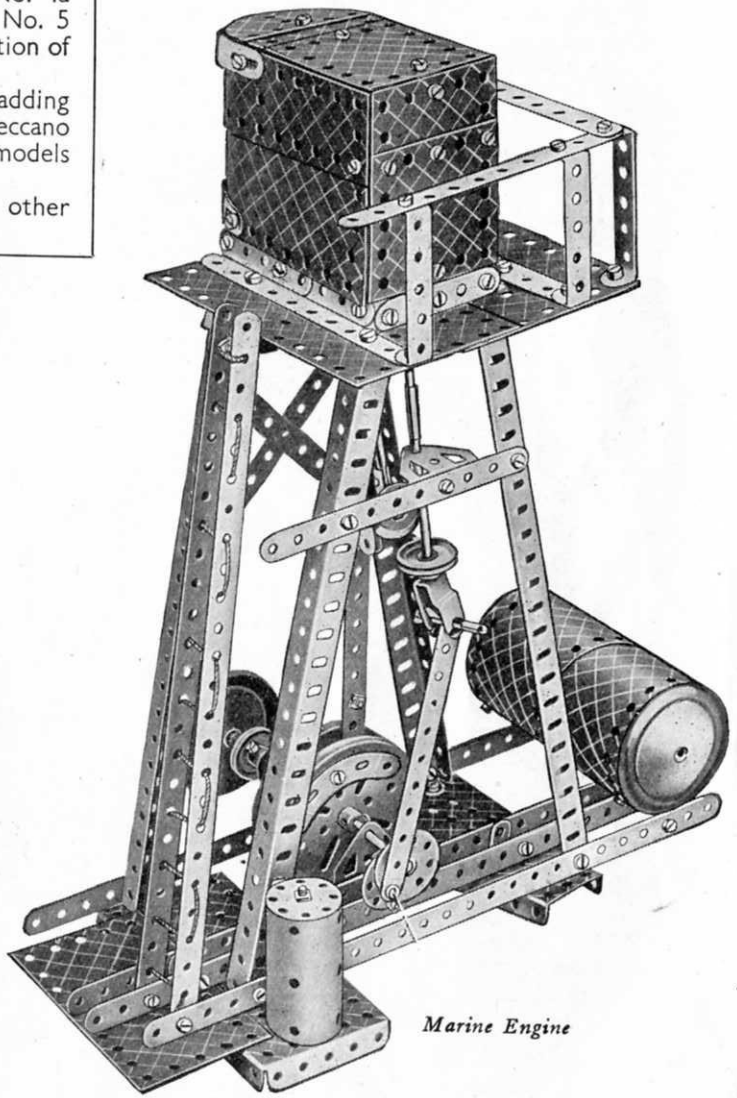
Ask your dealer to post to you regularly the latest Meccano parts lists and other Meccano literature.



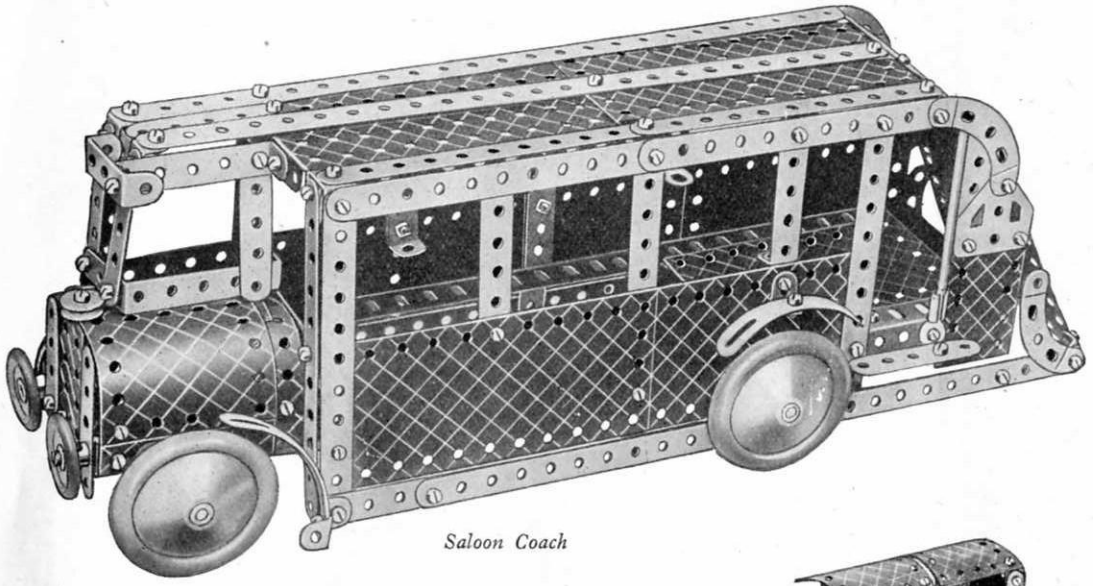
Elevator



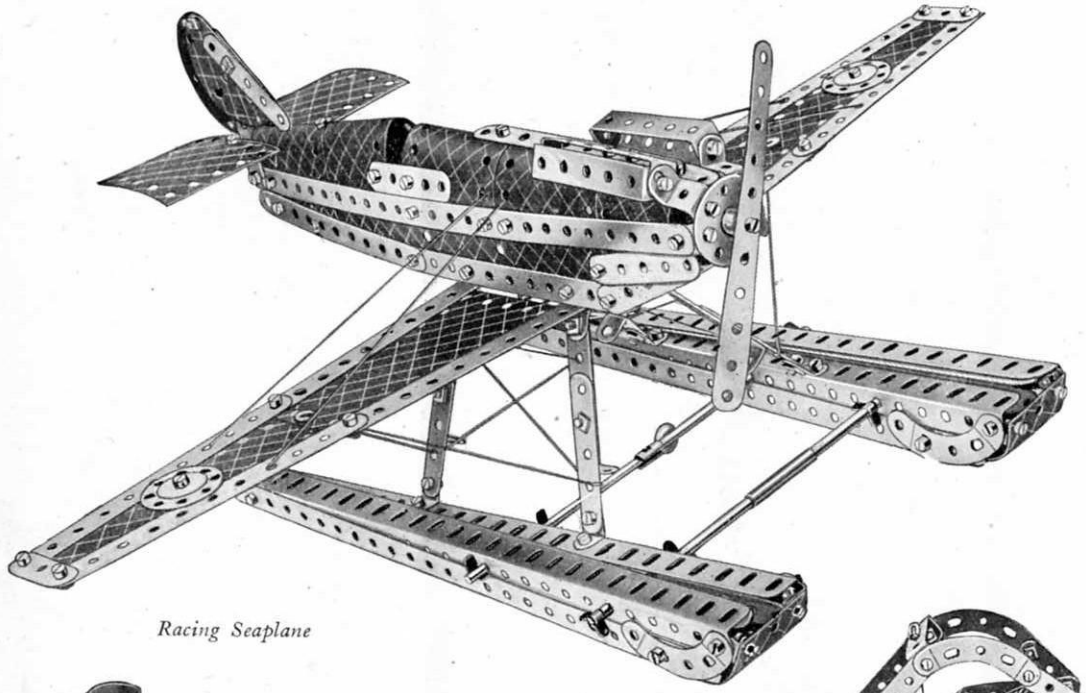
Giant Swing Boat



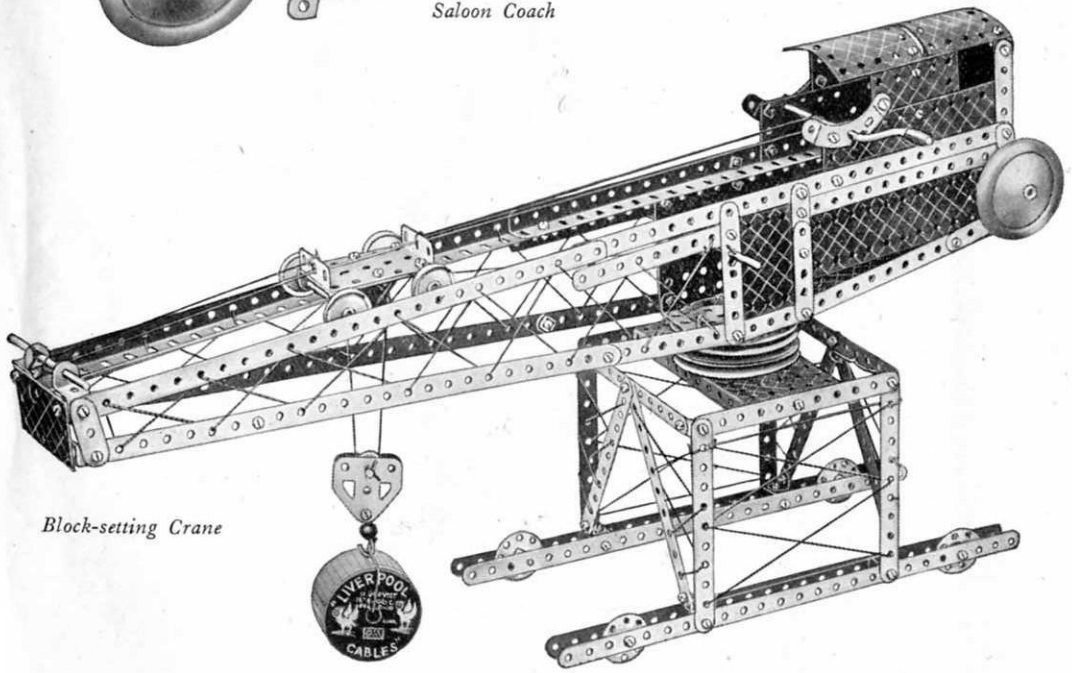
Marine Engine



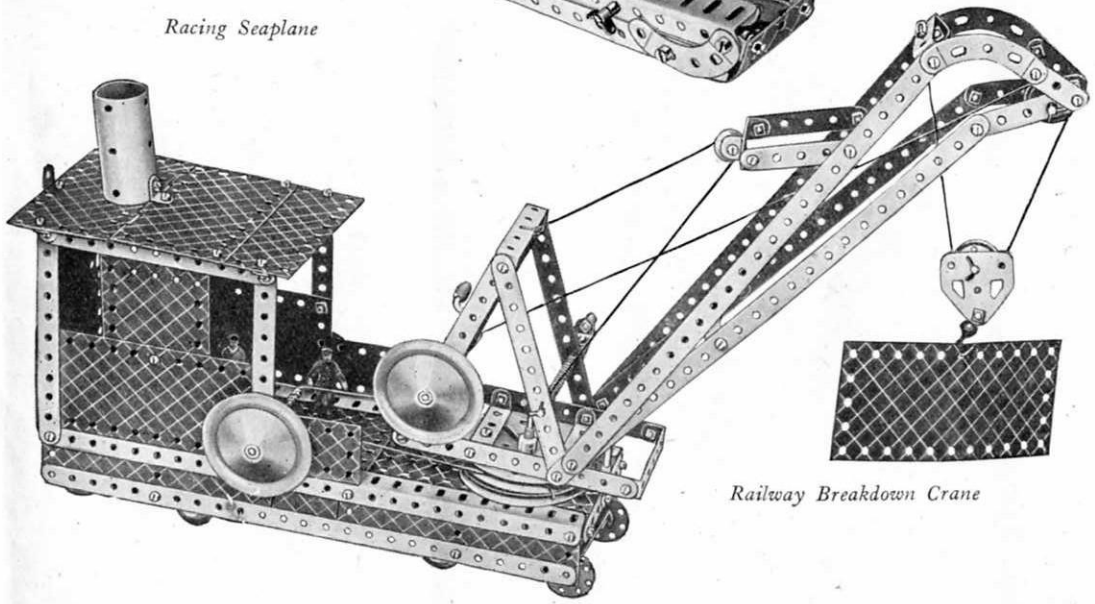
Saloon Coach



Racing Seaplane



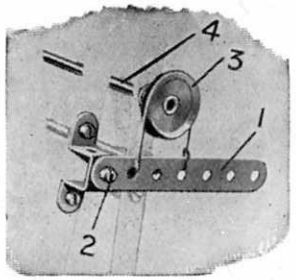
Block-setting Crane



Railway Breakdown Crane

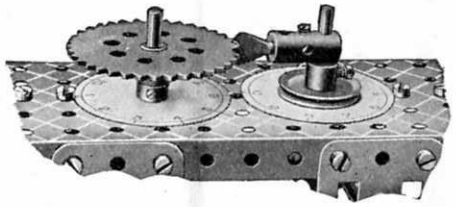
Here are a few simple and interesting movements showing how easily real mechanisms can be reproduced with Meccano.

STRAP AND LEVER BRAKE



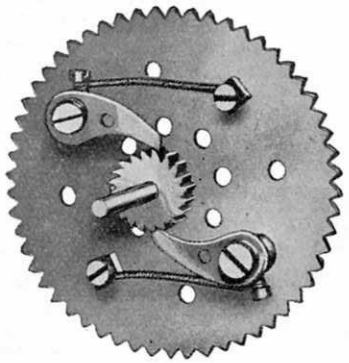
This device will be found very useful as a quick emergency hand-brake. Although it is the simplest of such devices, it is also one of the most valuable and can be used in a great variety of models.

INTERMITTENT ROTARY MOTION



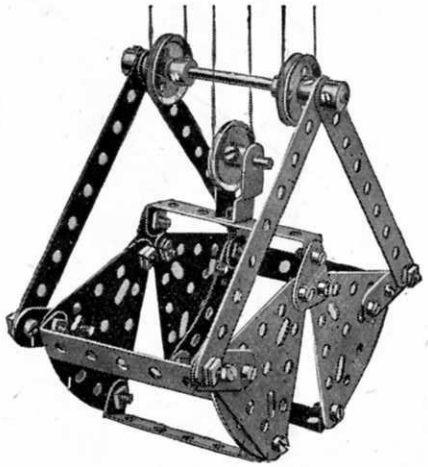
Intermittent rotary motion can be obtained by means of the above device. Such an arrangement is useful in revolution counters, measuring machines, etc. In addition to mechanisms that give true intermittent motion, different types of cams that convert a regular rotary motion into a constant or intermittent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

PAWL AND RATCHET MOVEMENT



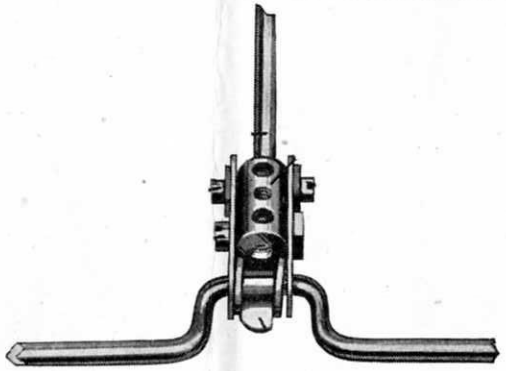
By means of this device it is possible to construct certain types of automatic brakes and free wheels.
The illustration shows the method of building up a free-wheel unit.

GRABS



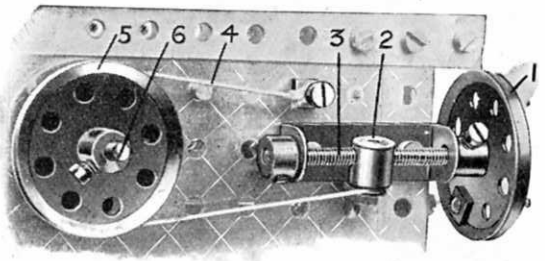
Here is a typical example of the many kinds of grab that can be constructed from Meccano. If the grab is fitted to a model crane or ship-coaler, all its movements can be controlled from an operating box built into the frame of the model. The outer sides of the jaws may be filled in with cardboard and 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 1½" Strip, and these are connected together by means of a Coupling. A ½" Bolt passes completely through the two 1½" 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.

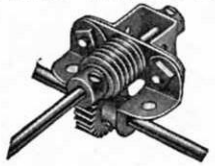
STRAP AND SCREW BRAKE



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 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

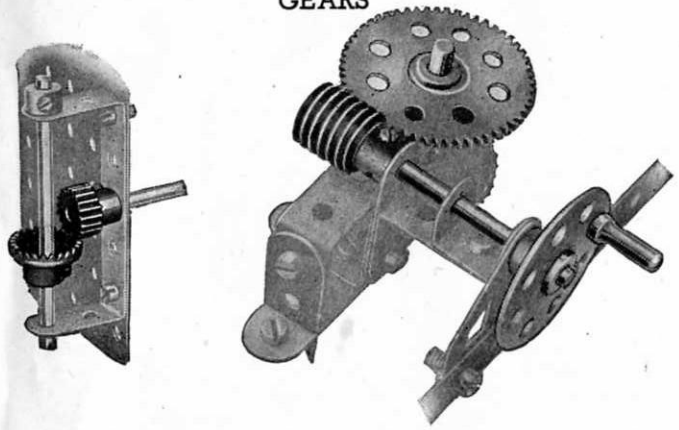


The compact rear axle drive unit illustrated above is intended chiefly for use in small models of motor cars. Two Corner Angle Brackets are secured by Bolts passing through their elongated holes to a 1½" Strip, to which a Double Bent Strip also is secured. The Rod carrying the Worm is passed through the centre hole of the Strips and held in position by a Collar.

The driven Rod is journalled 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 ¾" Pinion.

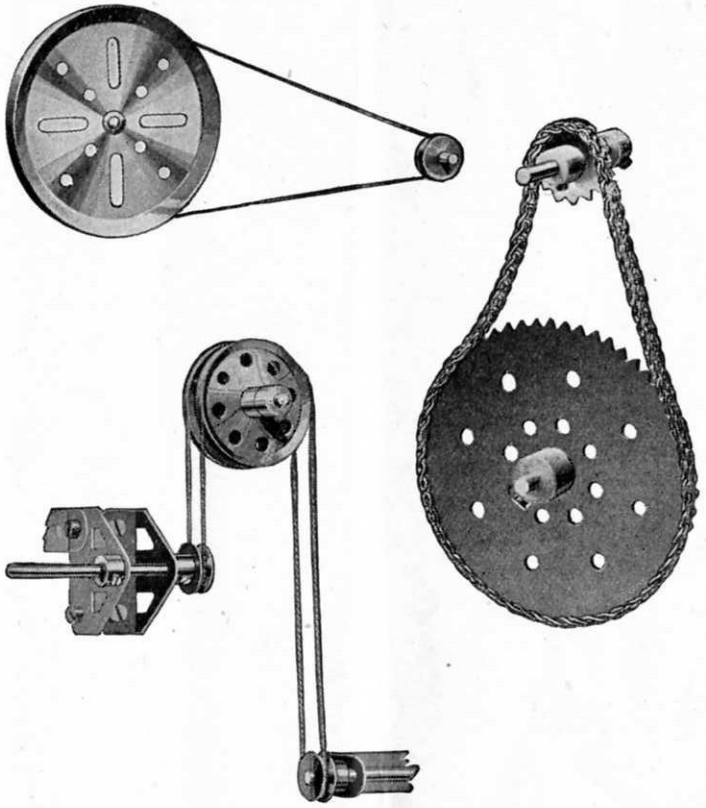
GEARS



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.

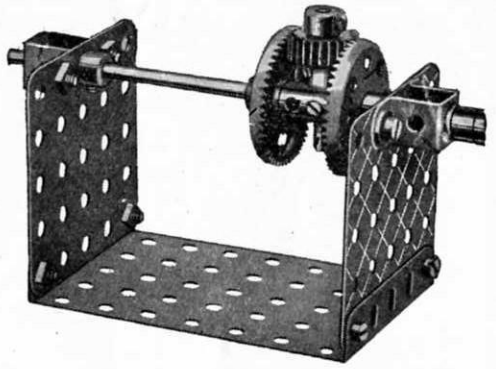
BELT AND CHAIN DRIVES



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.

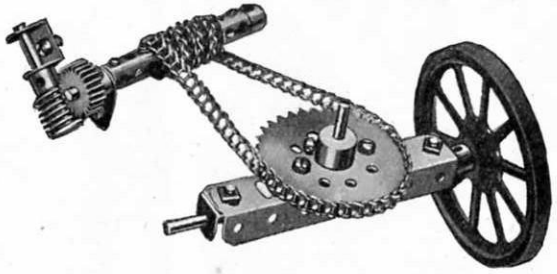
EPICYCLIC TRANSMISSION GEAR



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.

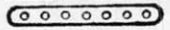
STEERING GEARS



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

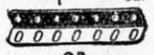
In the example illustrated, the road wheels are controlled by an endless Sprocket Chain operated by a Worm and Pinion mechanism.

MECCANO PARTS



3 Perforated Strips

No.		No.	
1.	12½"	3.	3½"
1a.	9½"	4.	3"
1b.	7½"	5.	2½"
2.	5½"	6.	2"
2a.	4½"	6a.	1½"

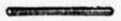


9B Angle Girders

7.	24½"	9a.	4½"
7a.	18½"	9b.	3½"
8.	12½"	9c.	3"
8a.	9½"	9d.	2½"
8b.	7½"	9e.	2"
9.	5½"	9f.	1½"

10 11 12

10. Flat Brackets
11. Double Brackets
12. Angle Brackets, ½"×½"
12a. " " 1"×1"
12b. " " 1"×½"
12c. Obtuse Angle Brackets, ½"×½"

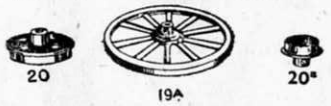


Axle Rods.

13.	11½"	16.	3½"
13a.	8"	16a.	2½"
14.	6½"	16b.	3"
15.	5"	17.	2"
15a.	4½"	18a.	1½"
15b.	4"	18b.	1"

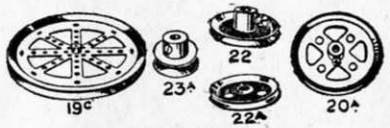
19H

19g. Crank Handles, 3½" with Erinoid grip
19h. " " 5" " "
19s. " " 3½" without "



20 19A 20A

19a. Wheels, 3" diam., with set-screws
20. Flanged Wheels, 1½" diam.
20b. " " ¾" "



19C 23A 22 22A 20A

Pulley Wheels

19b. 3" diam. with centre boss & set-screw
19c. 6" " " " "
20a. 2" " " " "
21. 1½" " " " "
22. 1" " " " "
23a. ½" " " " and grub-screw
22a. 1" " without " " "
23. ½" " " " "

24. Bush Wheels

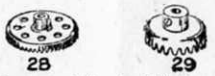
26B

No.			
25.	Pinion Wheels, ¾"	diam.,	½" face
25a.	"	"	½" "
25b.	"	"	½" "
26.	"	"	½" "
26a.	"	"	½" "
26b.	"	"	½" "

27 27A 27B

Gear Wheels

27. 50 teeth, to gear with ¾" pinion
27a. 57 " " " ½" "
27b. 133 " " " ½" " (3½" diam.)
27c. 95 " " " ½" " (2½" diam.)

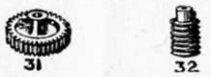


28 29

28. Contrate Wheels, 1½" diam.
29. " " ¾" "

30A & 30C 30

30. Bevel Gears, ¾", 26 teeth
30a. " " ½", 16 " } Can only be
30c. " " 1½", 48 " } used together



31 32

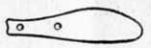
31. Gear Wheels, 1", 38 teeth
32. Worms.

34B

34. Spanners
34b. Box Spanners

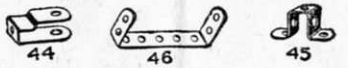
35

35.	Spring Clips	... ...	box of 20
35s.	"	"	box of 60
36.	Screwdrivers		
36a.	"	Extra Long	
36b.	"	Special	
37.	Nuts and Bolts, ¾"		box of 12
37af.	Nuts ...	... ...	box of 50
37bf.	Bolts, ¾"	... ...	box of 50
37f.	Nuts and Bolts, ¾"		box of 50
37g.	" " ¾"	...	box of 144
38.	Washers	... ...	pkt. of 20
38s.	"	... ...	box of 60
40.	Hanks of Cord		



41. Propeller Blades

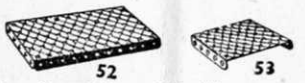
No.
43. Springs



44 46 45

44. Cranked Bent Strips
45. Double " "
46. Double Angle Strips, 2½"×1"
47. " " " 2½"×1½"
47a. " " " 3"×1½"
48. " " " 1½"×½"
48a. " " " 2½"×½"
48b. " " " 3½"×½"
48c. " " " 4½"×½"
48d. " " " 5½"×½"

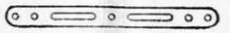
50a. Eye Pieces, with boss



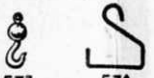
52 53

51. Flanged Plates, 2½"×1½"
52. " " 5½"×2½"
52a. Flat Plates, 5½"×3½"
53. Flanged Plates, 3½"×2½"
53a. Flat Plates, 4½"×2½"

54a. Flanged Sector Plates, 4½" long



55. Perforated Strips, slotted, 5½" long
55a. " " " 2" long



57B 57A 57

57. Hooks
57a. " Scientific
57b. " Loaded, Large
57c. " Loaded, Small

58 58B

58. Spring Cord, 40" Length
58a. Coupling Screws for Spring Cord
58b. Hooks for Spring Cord

59. Collars, with grub-screws

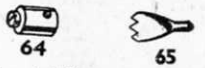
61. Windmill Sails

62 62A

No.	
62.	Cranks
62a.	Threaded Cranks
62b.	Double Arm Cranks

63 63A 63B 63C

63. Couplings
63a. Octagonal Couplings
63b. Strip Couplings
63c. Threaded Couplings



64 65

64. Threaded Bosses
65. Centre Forks

66 & 67

66. Weights, 50 grammes
67. " 25 "
68. Woodscrews, ½"
69. Set Screws
69a. Grub Screws, ⅛"
69b. " " ¼"
69c. " " ⅜"

76 72 77

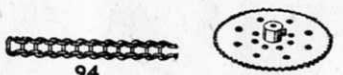
70. Flat Plates, 5½"×2½"
72. " " 2½"×2½"
73. " " 3"×1½"
76. Triangular Plates, 2½"
77. " " 1"

80A Screwed Rods

78.	11½"	80b.	4½"
79.	8"	80c.	3"
79a.	6"	81.	2"
80.	5"	82.	1"
80a.	3½"		

90

89. 5½" Curved Strips, 10" radius
89a. 3" " " cranked, 1½" radius 4 to circle
89b. 4" Curved Strips, cranked, 4½" radius, 8 to circle
90. 2½" Curved Strips, 2⅜" radius
90a. 2½" " " cranked. 1⅜" radius, 4 to circle



94 95B

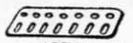
94. Sprocket Chain, per 40" length
95. " Wheels, 36 teeth, 2" diam.
95a. " " 28 " 1½" "
95b. " " 56 " 3" "
96. " " 18 " 1" "
96a. " " 14 " ¾" "

99 Braced Girders

No.		No.	
97.	3½" long	99a.	9½" long
97a.	3" "	99b.	7½" "
98.	2½" "	100.	5½" "
99.	12½" "	100a.	4½" "

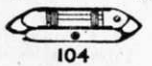
101 102

101. Heatds, for looms
102. Single Bent Strips



103B Flat Girders

103.	5½" long	103e.	3" long
103a.	9½" "	103f.	2½" "
103b.	12½" "	103g.	2" "
103c.	4½" "	103h.	1½" "
103d.	3½" "	103k.	7½" "

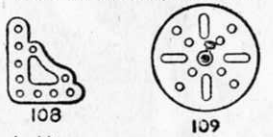


104

104. Shuttles, for looms
105. Reed Hooks, for looms

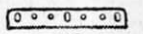
106 106A

106. Wood Rollers
106a. Sand Rollers
107. Tables for designing machines



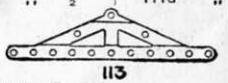
108 109

108. Architraves
109. Face Plates, 2½" diam.



110

110. Rack Strips, 3½" long
110a. " " 6½" "
111. Bolts, ¾" 111c. Bolts, ¾"
111a. " ½" 111d " 1⅛"



113

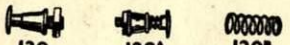
113. Girder Frames

114 115 116A

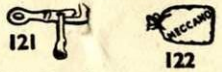
114. Hinges
115. Threaded Pins
116. Fork Pieces, Large
116a. " " Small
117. Steel Balls, ⅜" diam.

118. Hub Discs, 5½" diam.

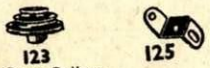
MECCANO PARTS



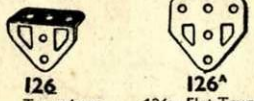
No.
120. Buffers 120a. Spring Buffers
120b. Compression Springs



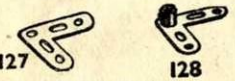
121. Train Couplings
122. Miniature Loaded Sacks



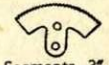
123. Cone Pulleys
124. Reversed Angle Brackets, 1"
125. " " " ½"



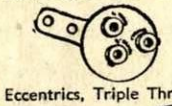
126. Trunnions 126a. Flat Trunnions



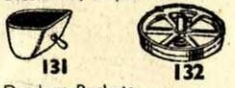
127. Simple Bell Cranks
128. Boss Bell Cranks



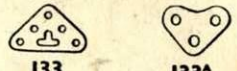
129. Rack Segments, 3" diam.



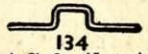
130. Eccentrics, Triple Throw



131. Dredger Buckets
132. Flywheels, 2¾" diam.



133. Corner Brackets, 1½"
133a. " " 1"



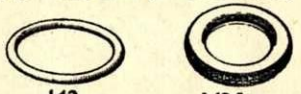
134. Crank Shafts, 1" stroke
135. Theodolite Protractors

136. Handrail Supports
136a. Handrail Couplings
137. Wheel Flanges

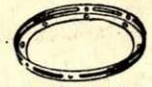
No.
138. Ships' Funnels
138a-z. " " Raked

139. Flanged Brackets (right)
139a. " " (left)

140. Universal Couplings
141. Wire Lines (for clock weights)

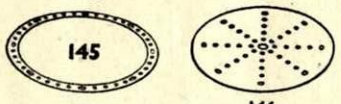


142. Rubber Rings (to fit 3" diam. rims)
142a. Motor Tyres (to fit 2" diam. rims)
142b. " " " 3" "
142c. " " " 1" "
142d. " " " 1½" "



143. Circular Girders, 5½" diam.

144. Dog Clutches



145. Circular Strips, 7½" diam. overall
146. " Plates, 6" "
146a. " " 4" "

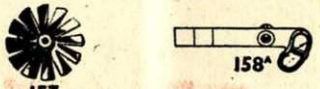
147. Pawls, with Pivot Bolt and Nuts
147a. Pawls
147b. Pivot Bolts with 2 Nuts
147c. Pawls without boss
148 Ratchet Wheels

149. Collecting Shoes for Electric Locos
150. Crane Grabs

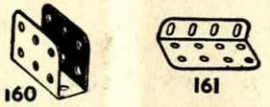
No.
151. Pulley Blocks, Single Sheave
152. " " Two "
153. " " Three "

154a. Corner Angle Brackets, ½" (right-hand)
154b. Corner Angle Brackets, ½" (left-hand)
155. Rubber Rings (for 1" Pulleys) Black
155a. " " " White

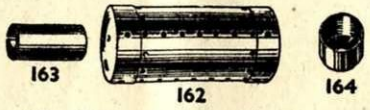
156. Pointers (with boss) 2½" overall



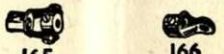
157. Fans, 2" diam.
158a. Signal Arms, Home
158b. " " Distant



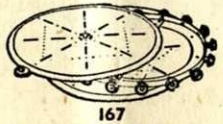
160. Channel Bearings, 1½"×1"×½"
161. Girder Brackets, 2"×1"×½"



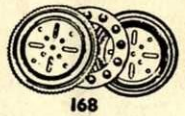
162. Boilers, complete, with ends
162a. " Ends
162b. " without ends
163. Sleeve Pieces
164. Chimney Adaptors



165. Swivel Bearings
166. End "

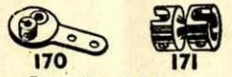


167. Geared Roller Bearings
167a. Roller Races, geared, 192 teeth
167b. Ring Frames for Rollers
167c. Pinions for Roller Bearings (16 teeth)



No.
168. Ball Bearings, 4" diam.
168a. " Races, flanged discs
168b. " " toothed "
168c. " Casings, complete with balls

169. Digger Buckets



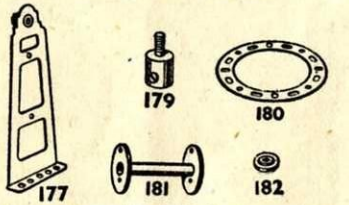
170. Eccentrics, ½" throw
171. Socket Couplings

172. Pendulum Connections
173. Rail Adaptors

174. Grease Cups

175. Flexible Coupling Units

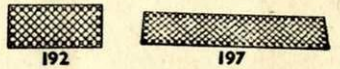
176. Anchoring Springs for Cord



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 | 184c. 6-volt Lamps
184a. 2½-volt Lamps | 184d. 10 " "
184b. 3½ " " | 184e. 20 " "

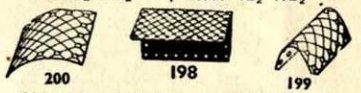
No.
185. Steering Wheels, 1¾" diam.
186. Driving Bands, 2½" (Light)
186a. " " 6" "
186b. " " 10" "
186c. " " 10" (Heavy)
186d. " " 15" "
186e. " " 20" "
187. Road Wheels



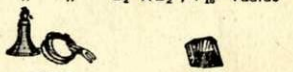
Flexible Plates.
188. 2½"×1½"
189. 5½"×1½"
190. 2½"×2½"
190a. 3½"×2½"

191. 4½"×2½"
192. 5½"×2½"

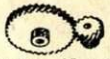
Strip Plates.
196. 9½"×2½"
197. 12½"×2½"



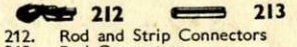
198. Hinged Flat Plates, 4½"×2½"
199. Curved Plates, U-Section 2½"×2½"×½"
200. " " 2½"×2½", 1 11/16" radius



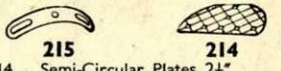
201. Lamps with Flex (3½ volts)
202. Angle Brackets (for Headlamps)
203. Headlamps
203a. Headlamp Rims
203b. " Bodies
204. " Nuts
205. " Glasses
206. Lampshades
207. Lamp Bases
207a. Lamp with Standard and Flex
208. Battery Tags and Studs
208a. Washers for Battery Studs
210. Nuts for Battery Studs



211a. Helical Gear ½" } *Can only be*
211b. " " 1½" } *used together*

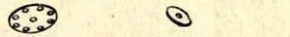


212. Rod and Strip Connectors
213. Rod Connectors



214. Semi-Circular Plates 2½"
215. Formed Slotted Strips 3"

216. Cylinders, 2½"



217a. Discs, 1½" | 217b. Discs ¾"
219. Wheel Discs

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