

MECCANO

TRADE MARKS 296321, 501113, 76, 12633, 10274, 55/13476, 569/13, 884/25, 2913, 80, 124, 336, 4174, 91637, 83171, 157149, 32822, 200639, 209733, 214061, 214062, 12892, 29094, 33316, 1818, 16737, 383/13, 5848, 50204, 10/12258, 22826, 18982, 20063/925, 9048, 5549, 2189, 16900, 72236, 2389, 41812, 5403, 7315, 18066, 139420, 494933-4-5-6, 29041, 26877, 6595, 404718, 410379, 55096, 12240

HORNBY'S ORIGINAL SYSTEM—FIRST PATENTED 1901



INSTRUCTIONS

FOR BUILDING No. 4 OUTFIT MODELS



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No. 31.3A

ENGLISH EDITION

OUR FUTURE
ENGINEERS

MECCANO

Real Engineering in Miniature

The Meccano No. 3A Accessory Outfit converts your No. 3 Outfit into a No. 4, and enables you to build the splendid models illustrated in this Manual. As a Meccano enthusiast, you will realise that our examples do not exhaust the possibilities of your Outfit. It is no exaggeration to say that the possibilities of Meccano are limitless—there is always something new that you can invent and build, and most models can be constructed in many alternative ways. In addition to the fascination and satisfaction obtained by building new models, you can enter them in the model-building competitions that are a regular feature of the "Meccano Magazine." These competitions are open to all Meccano boys, and valuable prizes are offered.

How to Progress

When you desire to build the bigger and better models that the No. 5 Outfit makes, it is only necessary for you to purchase a No. 4A Accessory Outfit. In turn, a No. 5A Accessory Outfit will convert your equipment into a No. 6, and so on. As you progress by these easy stages, you will obtain an increasing variety of perfectly-made engineering parts—Gear Wheels, Pulleys, Worms, Couplings, Cranks and many others—until ultimately you attain the ambition of every Meccano enthusiast and possess a No. 7 Outfit.

Every keen and inventive Meccano model-builder should possess copies of the special Manuals "How to use Meccano Parts" and "Meccano Standard Mechanisms." In the former the principal uses of Meccano parts are outlined, while the latter shows a large number of real engineering mechanisms, built of Meccano parts, that can be incorporated in various models. You can obtain copies of these Manuals from your dealer, or direct from Meccano Ltd., Liverpool.

A complete list showing the contents of each Meccano Outfit and Accessory Outfit will be supplied on application to Meccano Limited, Liverpool.

The "Meccano Magazine"

The "Meccano Magazine" is essential to the full enjoyment of the Meccano hobby. A section of it is devoted to the Editor's replies to his readers' enquiries; the progress of Meccano clubs throughout the world is reported; and full details are given of the latest model-building achievements. In addition, a wealth of informative articles on all subjects of interest to boys is included in every issue. The publishing date is the first of each month. If you are not already a reader of the "Meccano Magazine" write to the Editor for full particulars, or order a copy from your Meccano dealer or from any newsagent.

Meccano Service

The service of Meccano does not end with selling an Outfit and an Instruction Manual. When you want to know something more about engineering than is now shown in our books, or when you strike a tough problem of any kind, write to us. We receive over 200 letters from boys every day all the year round. Some write to us because they are in difficulty, others because they want advice on their work or pleasures, or about the choice of a career. Others, again, write to us just because they like to do so and we are glad to know that they regard us as their friends.

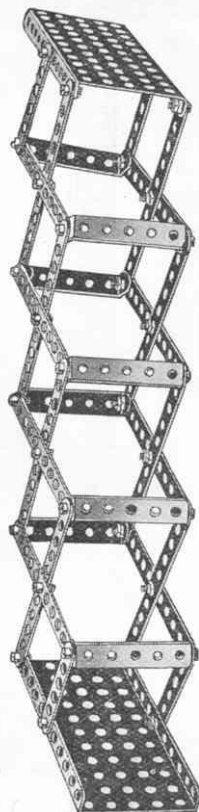
Although all kinds of queries are put to us on all manner of subjects, the main interest is, of course, engineering. The wonderful knowledge of engineering matters possessed by our staff of experts is unique. This vast store of knowledge, gained only by many years of hard-earned experience, is at your service. *We want the Meccano boy of to-day to be the famous engineer of to-morrow.*

IMPORTANT:—Meccano Parts may be bought separately at any time in any quantity from your Meccano dealer.

These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

1

Model No. 4.1 Periscope

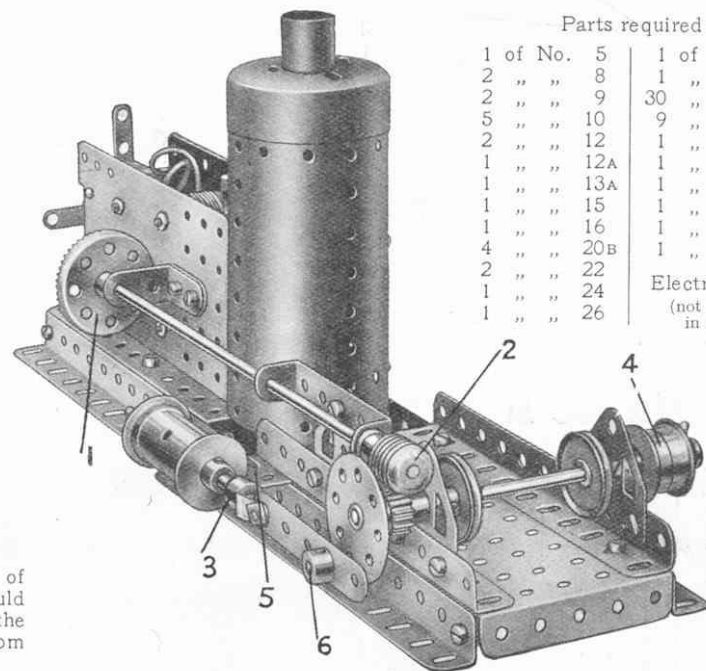


Parts required:

16 of No. 2	Small pieces of
4 " " 4	looking glass should
32 " " 37	be inserted in the
8 " " 48A	top and bottom
2 " " 52	plates.

Model No. 4.2 Steam Winch

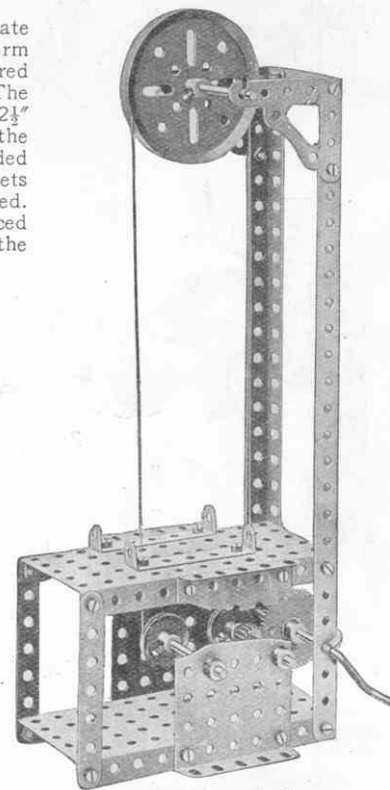
A $\frac{1}{2}$ " Pinion secured to the armature of the Electric Motor turns a $1\frac{1}{2}$ " Contrate Wheel 1 mounted on an 8" Axle Rod, to the opposite end of which is secured a Worm Wheel 2. The drum 4 of the winch consists of two $\frac{3}{4}$ " Flanged Wheels and is secured to the end of a $3\frac{1}{2}$ " Rod, which carries a $\frac{1}{2}$ " Pinion that is driven by the Worm 2. The cylinder is composed of a Sleeve Piece, secured by two Nuts and Bolts to the end of a $2\frac{1}{2}$ " Flat Girder 5, and two $\frac{3}{4}$ " Flanged Wheels. The piston rod is attached pivotally to the connecting rod by means of an End Bearing 3, and the crank pin 6 is formed by a Threaded Pin secured to the Bush Wheel. The Boiler is secured in place by two Angle Brackets bolted to its base and to the $5\frac{1}{2} \times 2\frac{1}{2}$ " Flanged Plates forming part of the engine bed. It will be noted that the $1" \times 1"$ Angle Bracket supporting one end of the 8" Rod is spaced away from the Motor by a Flat Bracket, in order to obtain proper clearance for the Contrate Wheel 1.



Parts required:

1 of No. 5	1 of No. 28
2 " " 8	1 " " 32
2 " " 9	30 " " 37
5 " " 10	9 " " 38
2 " " 12	1 " " 48A
1 " " 12A	1 " " 52
1 " " 13A	1 " " 59
1 " " 15	1 " " 103F
1 " " 16	1 " " 162
4 " " 20B	1 " " 163
2 " " 22	Electric Motor (not included in Outfit)
1 " " 24	
1 " " 26	

Model No. 4.3 Band Saw

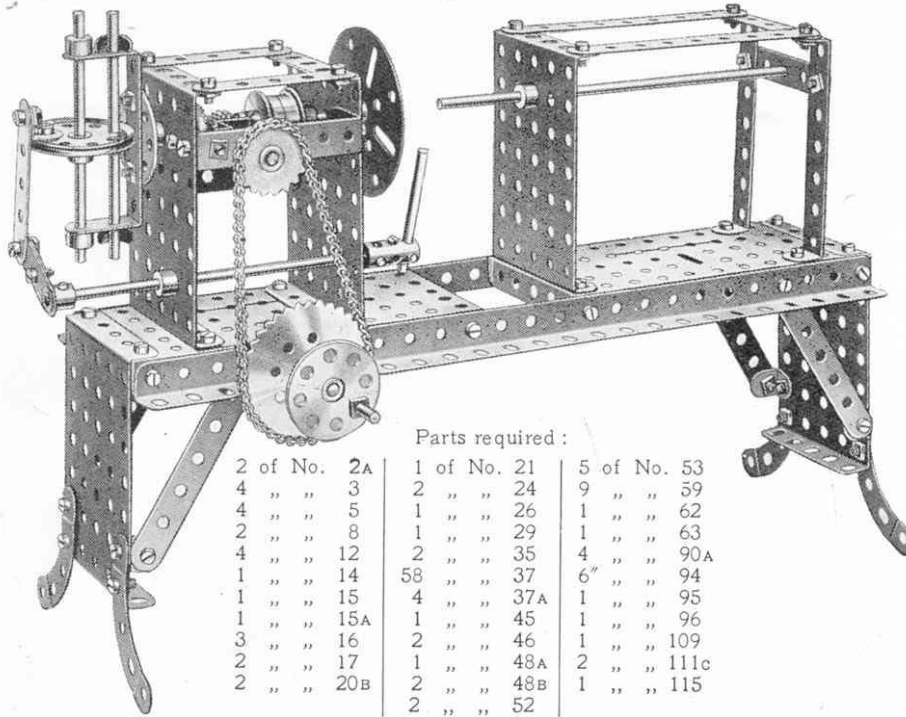


Parts required:

2 of No. 3	1 of No. 27A
1 " " 5	4 " " 35
2 " " 8	26 " " 37
3 " " 16	1 " " 40
1 " " 19	2 " " 48A
1 " " 19B	2 " " 52
2 " " 22	2 " " 53
1 " " 26	4 " " 59
2 of No. 108	

These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.4 Elliptical Lathe



Parts required :

2 of No. 2A	1 of No. 21	5 of No. 53
4 " " 3	2 " " 24	9 " " 59
4 " " 5	1 " " 26	1 " " 62
2 " " 8	1 " " 29	1 " " 63
4 " " 12	2 " " 35	4 " " 90A
1 " " 14	58 " " 37	6 " " 94
1 " " 15	4 " " 37A	1 " " 95
1 " " 15A	1 " " 45	1 " " 96
3 " " 16	2 " " 46	1 " " 109
2 " " 17	1 " " 48A	2 " " 111c
2 " " 20B	2 " " 48B	1 " " 115
	2 " " 52	

Model No. 4.5 Distance Indicator

Parts required :

1 of No. 4	16 of No. 37
4 " " 10	1 " " 37A
2 " " 12	3 " " 38
1 " " 15	1 " " 52
2 " " 16	3 " " 59
2 " " 17	2 " " 62
4 " " 20B	1 " " 63
2 " " 26	1 " " 65
1 " " 28	1 " " 95
1 " " 32	1 " " 96
4 of No. 126A	

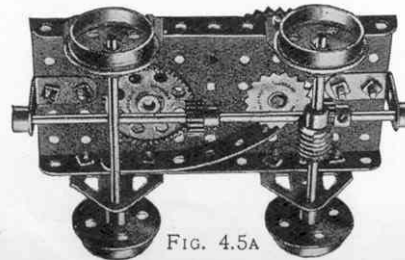
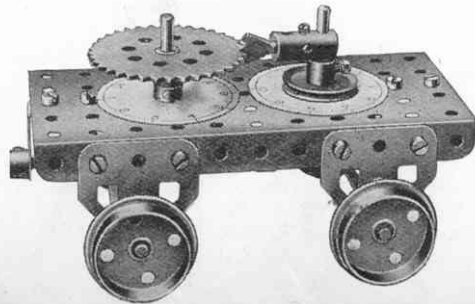


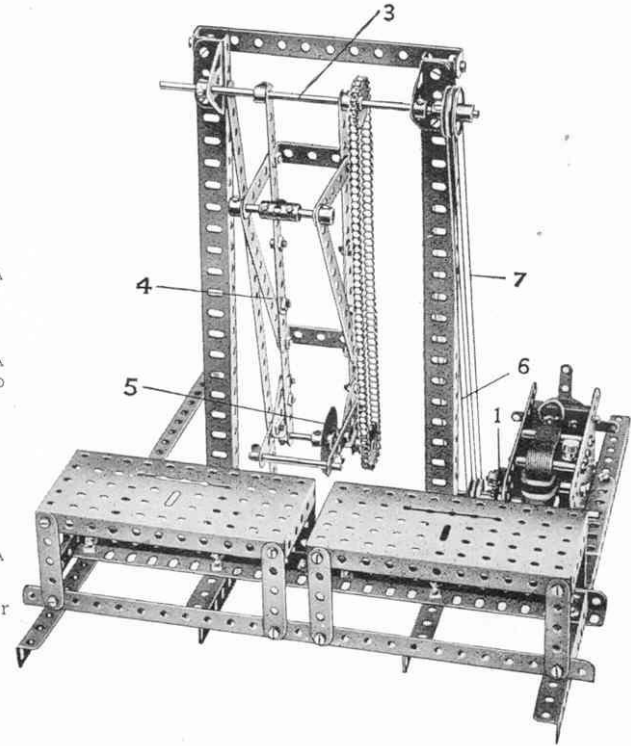
FIG. 4.5A

Model No. 4.6 Swing Saw

Parts required :

2 of No. 1	
6 " " 2	
12 " " 5	
8 " " 8	
2 " " 9	
1 " " 14	
1 " " 16	
3 " " 17	
4 " " 22	
1 " " 26	
1 " " 27A	
2 " " 35	
57 " " 37	
2 " " 48	
2 " " 48A	
1 " " 48D	
2 " " 52	
2 " " 53	
7 " " 59	
1 " " 63	
12 " " 94	
2 " " 96	
2 " " 126	
2 " " 126A	
1 " " 159	

Electric Motor
(not included
in Outfit)



(Model No. 4.6)

A $\frac{1}{2}$ " Pinion secured to the armature spindle of the Electric Motor engages with a 57-teeth Gear Wheel 1, the shaft of which carries two 1" Pulleys that transmit the drive by belts to the operating Rod 3. Two driving belts 6 and 7 are used side by side to obtain a more positive grip. The framework 4, carrying the Circular Saw 5, is free to swing about the Rod 3.

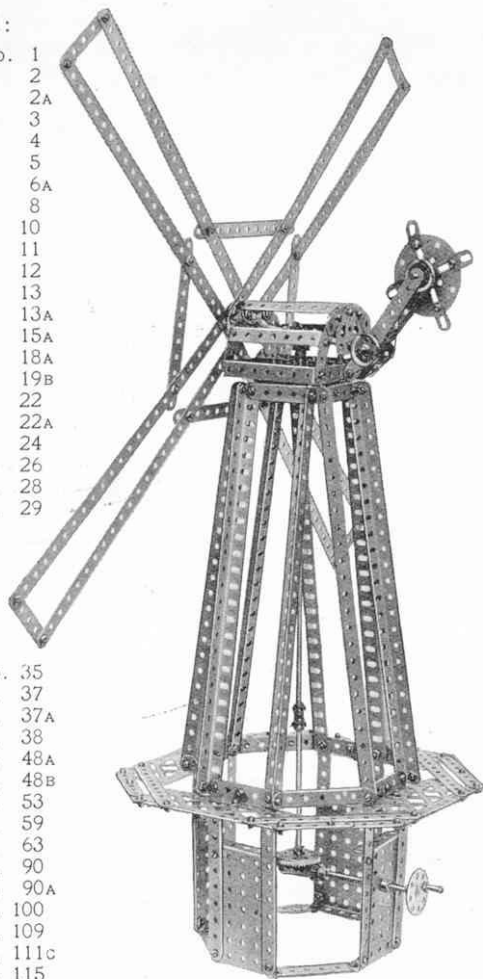
These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

3

Model No. 4.7 Windmill

Parts
required :

8	of No.	1
16	" "	2
2	" "	2A
6	" "	3
4	" "	4
16	" "	5
2	" "	6A
8	" "	8
5	" "	10
1	" "	11
12	" "	12
1	" "	13
1	" "	13A
2	" "	15A
2	" "	18A
2	" "	19B
1	" "	22
2	" "	22A
2	" "	24
2	" "	26
1	" "	28
1	" "	29



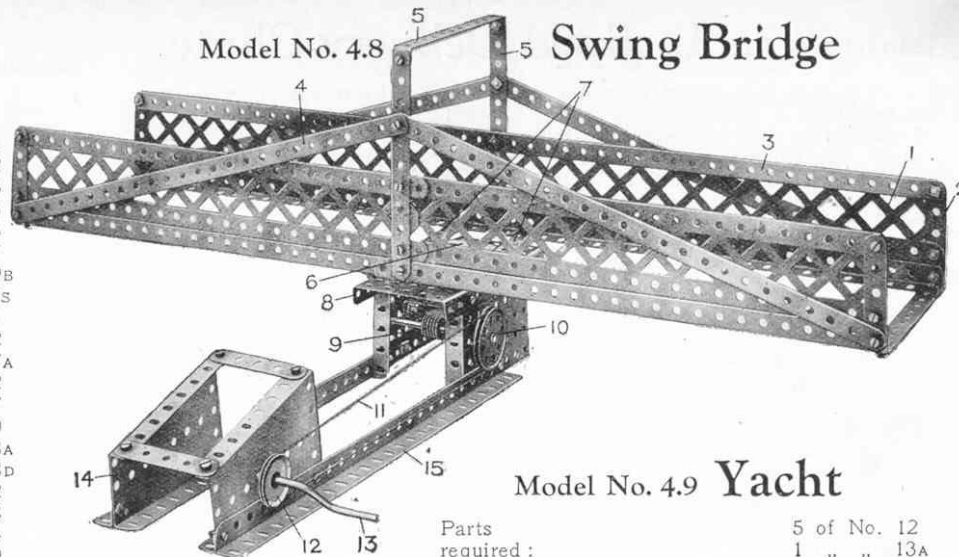
2	of No.	35
126	" "	37
6	" "	37A
10	" "	38
4	" "	48A
6	" "	48B
4	" "	53
9	" "	59
2	" "	63
4	" "	90
2	" "	90A
4	" "	100
1	" "	109
6	" "	111C
1	" "	115
1	" "	126A

Parts
required :

8	of No.	1
6	" "	2
6	" "	5
6	" "	8
1	" "	16
1	" "	17
1	" "	19B
1	" "	19S
1	" "	21
1	" "	22
1	" "	27A
1	" "	32
50	" "	37
1	" "	40
1	" "	48A
1	" "	48D
1	" "	52
2	" "	53
2	" "	54
2	" "	59
4	" "	99

The sides of this model, as shown in the illustration, are made of the Braced Girders 1 secured to the upright Strips 2 and reinforced by the inner Strips 3. Other diagonal Strips 4 brace the side Girders to the top structure 5 forming a stay for the sides 1. The swing base of the bridge is composed of a 3" Pulley Wheel 6 which is bolted to two cross 5½" Strips 7 which in turn are secured to the main base side Girders. The bridge swings on the Perforated Plate 8 on a short Rod, on the lower end of which is secured a Gear Wheel engaged and driven by a Worm 9 on the spindle of which is the grooved Pulley 10 driven by the Cord 11 which is operated from the smaller grooved Pulley 12 on the Crank Handle 13. The Crank Handle is journaled in two Sector Plates 14 secured to the base Angle Girder 15.

Model No. 4.8 Swing Bridge

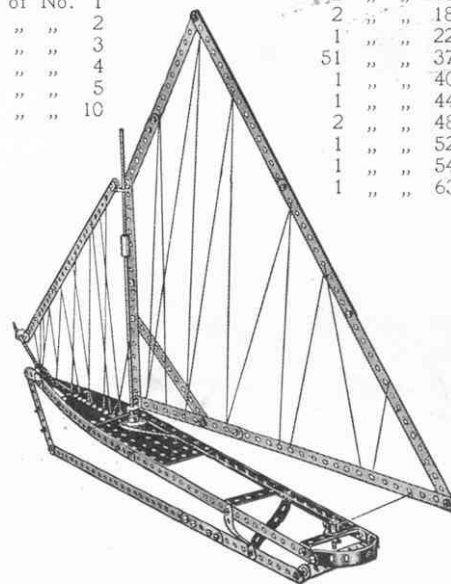


Parts
required :

9	of No.	1
7	" "	2
4	" "	3
2	" "	4
2	" "	5
1	" "	10

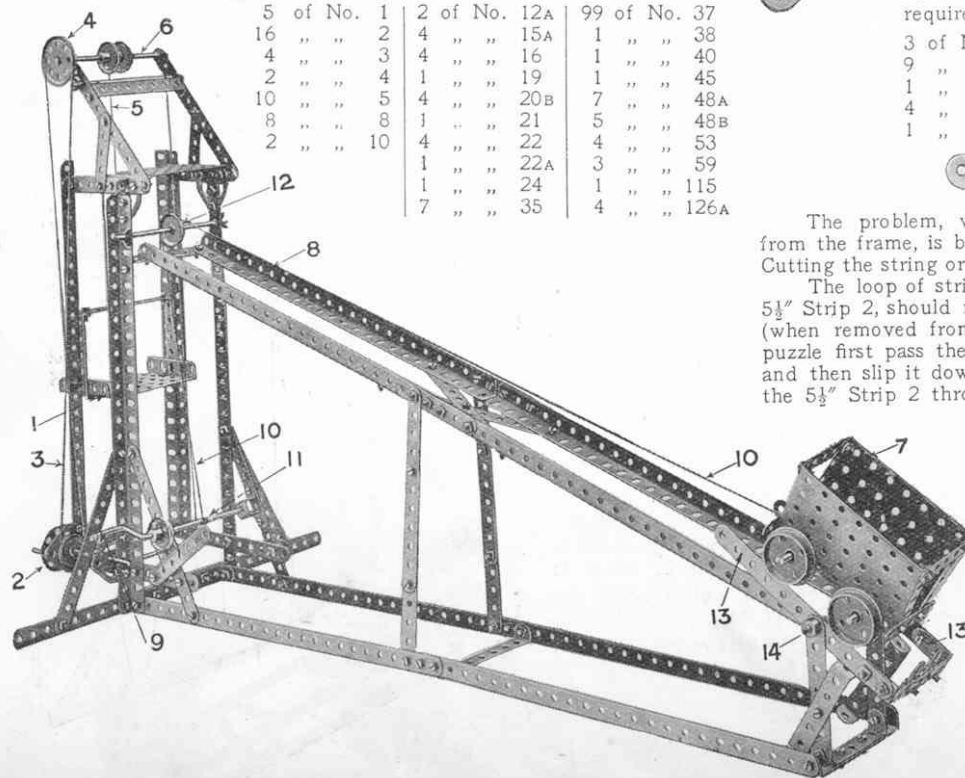
Model No. 4.9 Yacht

5	of No.	12
1	" "	13A
2	" "	15
2	" "	18A
1	" "	22
51	" "	37
1	" "	40
1	" "	44
2	" "	48A
1	" "	52
1	" "	54
1	" "	63



Model No. 4.10 Inclined Delivery Chute

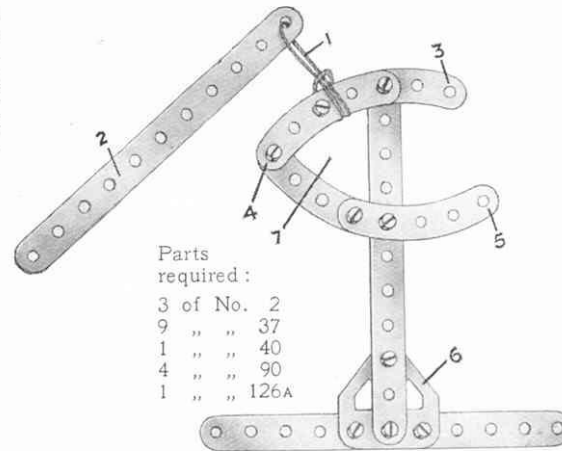
The cage 1 is raised from the hand wheel 2 by means of an endless Cord 3 which passes over the upper $1\frac{1}{2}$ " Pulley 4. A Cord 5 winding on Rod 6 between two 1" fast Pulleys raises or lowers the cage. The truck 7 is raised or lowered along the inclined rails 8 by a Crank Handle 9, a Cord 10 being wound on the Rod 11, passing over a Pulley 12, and connected to the truck 7. When the truck reaches the end of the inclined rails 8 it rests upon two $5\frac{1}{2}$ " Strips 13 pivoted at 14, the weight of the truck depressing these pivoted Strips and tipping the load.



Parts required :

5 of No. 1	2 of No. 12A	99 of No. 37
16 " " 2	4 " " 15A	1 " " 38
4 " " 3	4 " " 16	1 " " 40
2 " " 4	1 " " 19	1 " " 45
10 " " 5	4 " " 20B	7 " " 48A
8 " " 8	1 " " 21	5 " " 48B
2 " " 10	4 " " 22	4 " " 53
	1 " " 22A	3 " " 59
	1 " " 24	1 " " 115
	7 " " 35	4 " " 126A

Model No. 4.11 Puzzle



Parts required :

3 of No. 2
9 " " 37
1 " " 40
4 " " 90
1 " " 126A

The problem, which is to remove the Strip 2 from the frame, is by no means an easy one to solve. Cutting the string or undoing the knot is not allowed!

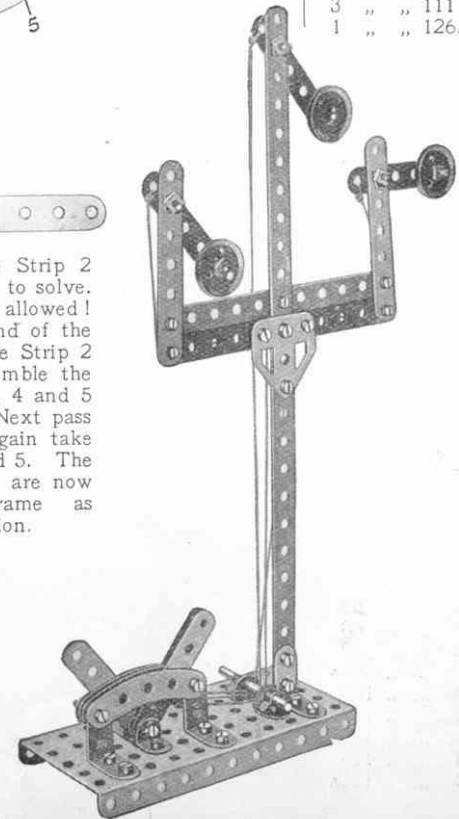
The loop of string 1, attached to the end of the $5\frac{1}{2}$ " Strip 2, should reach half way along the Strip 2 (when removed from the frame). To assemble the puzzle first pass the loop over the points 3, 4 and 5 and then slip it down to the Trunnion 6. Next pass the $5\frac{1}{2}$ " Strip 2 through the space 7 and again take the loop over 3, 4 and 5. The loop 1 and Strip 2 are now attached to the frame as shown in the illustration.

Model No. 4.12

Three-arm Signal

Parts required :

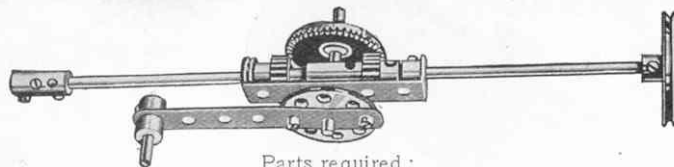
1 of No. 1	2 of No. 22A
2 " " 2	2 " " 35
2 " " 3	27 " " 37
6 " " 5	5 " " 37A
4 " " 12	11 " " 38
3 " " 12A	1 " " 40
1 " " 17	1 " " 52
1 " " 22	4 " " 90
	3 " " 111
	1 " " 126A



These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

5

Model No. 4.13 Breast Drill

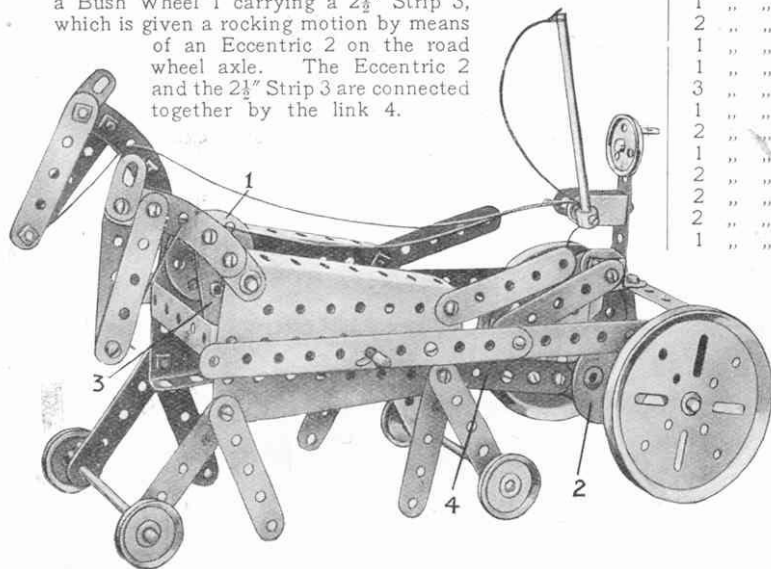


Parts required :

1 of No. 3	1 of No. 18A	1 of No. 24	2 of No. 37
2 " " 15	1 " " 21	2 " " 26	1 " " 48A
2 " " 17	1 " " 23	1 " " 28	3 " " 59
	2 of No. 63		

Model No. 4.14 Trotting Car

The only portion of this model requiring description is the mechanism operating the horses' heads. Each of the latter is secured by a Crank to one end of a $3\frac{1}{2}$ " Rod. To this Rod is also secured a Bush Wheel 1 carrying a $2\frac{1}{2}$ " Strip 3, which is given a rocking motion by means of an Eccentric 2 on the road wheel axle. The Eccentric 2 and the $2\frac{1}{2}$ " Strip 3 are connected together by the link 4.



Parts required :

6 of No. 2	2 of No. 19B
17 " " 5	4 " " 22
2 " " 10	1 " " 22A
1 " " 11	1 " " 24
2 " " 15A	4 " " 35
4 " " 16	42 " " 37
	1 " " 37A
	2 " " 38
	1 " " 40
	1 " " 44
	3 " " 48A
	1 " " 48B
	2 " " 54
	1 " " 59
	2 " " 62
	2 " " 90
	2 " " 126A
	1 " " 130

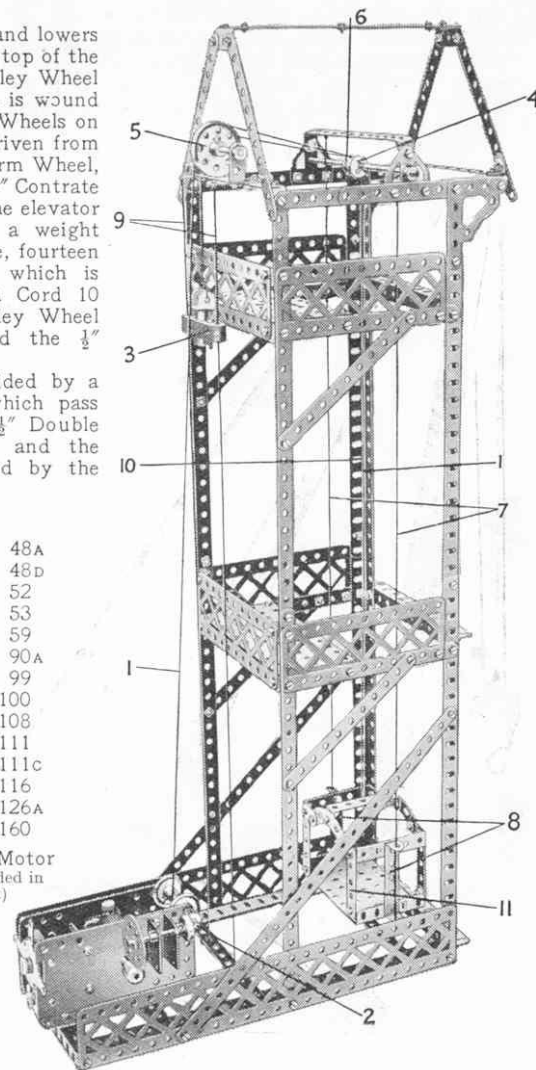
Model No. 4.15 Warehouse

The Cord 1 that raises and lowers the elevator passes from the top of the car 11 over the $\frac{1}{2}$ " loose Pulley Wheel 4 and the $1\frac{1}{2}$ " Pulley 5, and is wound between two $1\frac{1}{2}$ " fast Pulley Wheels on a 3" Axle Rod 2, which is driven from the Electric Motor via a Worm Wheel, a 57-toothed Gear Wheel, a $\frac{3}{4}$ " Contrate Wheel, and a $\frac{1}{2}$ " Pinion. The elevator car is counterbalanced by a weight 3, consisting of a Fork Piece, fourteen $2\frac{1}{2}$ " Strips, and a Collar, which is connected to the car by a Cord 10 passing over a $1\frac{1}{2}$ " fast Pulley Wheel (behind the Wheel 5) and the $\frac{1}{2}$ " loose Pulley Wheel 6.

The elevator car is guided by a pair of vertical Cords 7, which pass through holes in the $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strips 8 as shown, and the weight 3 is similarly guided by the cords 9.

Parts required :

6 of No. 1	5 of No. 48A
19 " " 2	1 " " 48D
18 " " 5	2 " " 52
2 " " 6A	1 " " 53
6 " " 8	6 " " 59
4 " " 9	2 " " 90A
4 " " 10	2 " " 99
16 " " 12	6 " " 100
1 " " 14	2 " " 108
2 " " 16	2 " " 111
2 " " 17	4 " " 111C
1 " " 21	1 " " 116
3 " " 22	2 " " 126A
2 " " 23	1 " " 160
1 " " 26	
1 " " 27A	Electric Motor
1 " " 29	(not included in
1 " " 32	Outfit)
2 " " 35	
126 " " 37	
6 " " 37A	
1 " " 38	
1 " " 40	
1 " " 46	



These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

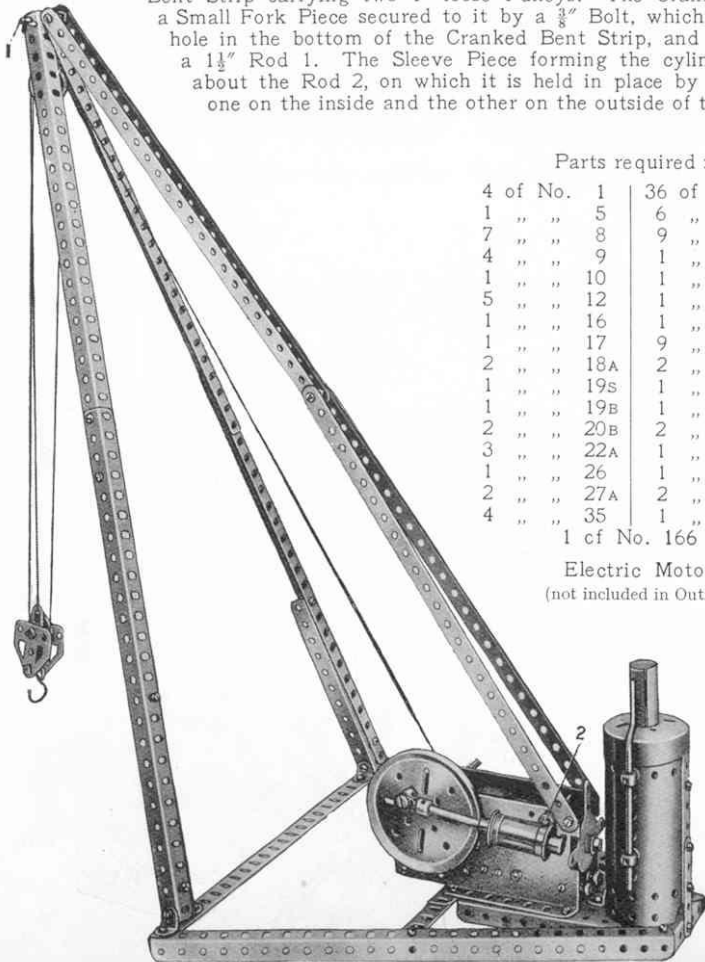
Model No. 4.16 Sheerlegs

The fixed pulley block at the top of the sheerlegs consists of a Cranked Bent Strip carrying two 1" loose Pulleys. The Cranked Bent Strip has a Small Fork Piece secured to it by a $\frac{3}{4}$ " Bolt, which passes through the hole in the bottom of the Cranked Bent Strip, and is held in place by a $1\frac{1}{2}$ " Rod 1. The Sleeve Piece forming the cylinder is free to turn about the Rod 2, on which it is held in place by two Collars secured one on the inside and the other on the outside of the Sleeve Piece.

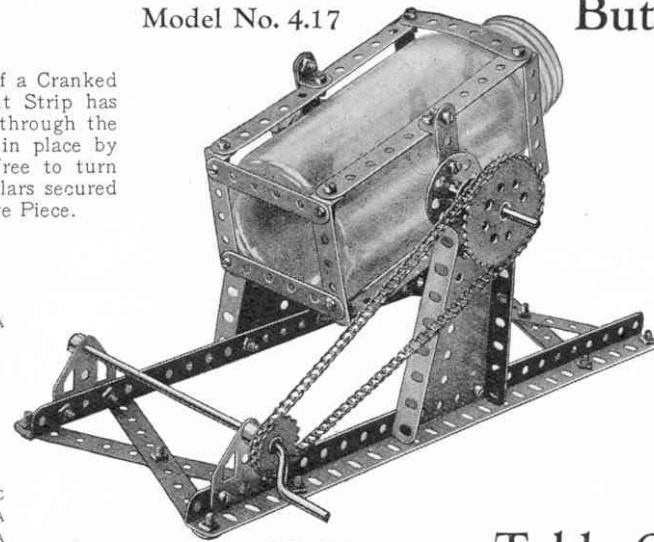
Parts required :

4 of No. 1	36 of No. 37
1 " " 5	6 " " 37A
7 " " 8	9 " " 38
4 " " 9	1 " " 40
1 " " 10	1 " " 44
5 " " 12	1 " " 52
1 " " 16	1 " " 57
1 " " 17	9 " " 59
2 " " 18A	2 " " 111
1 " " 19S	1 " " 111c
1 " " 19B	1 " " 116A
2 " " 20B	2 " " 126A
3 " " 22A	1 " " 147B
1 " " 26	1 " " 162
2 " " 27A	2 " " 163
4 " " 35	1 " " 164
1 of No. 166	

Electric Motor
(not included in Outfit)



Model No. 4.17



Butter Churn

Parts required :

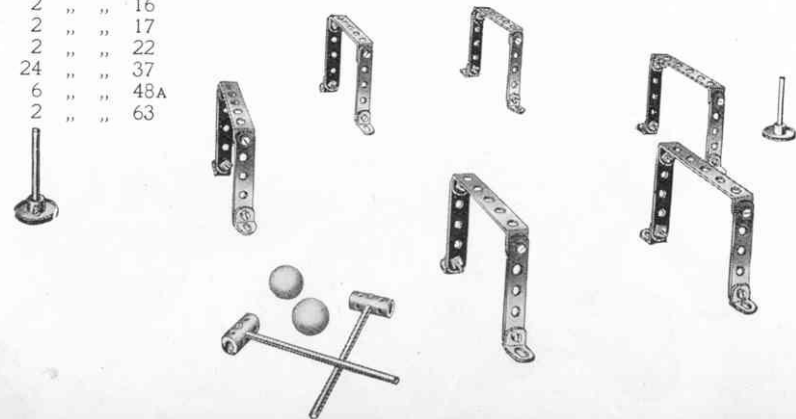
8 of No. 2	3
2 " " 4	4
2 " " 8	12
4 " " 17	19
1 " " 24	37
42 " " 48A	54
2 " " 59	62
16 " " 94	95
1 " " 96	126A

Model No. 4.18 Table Croquet

Parts required :

12 of No. 5	12
12 " " 16	17
2 " " 22	37
24 " " 48A	63

A most diverting game. Coloured marbles may be used for the balls. Full instructions for playing croquet may be obtained from any sports or games dealer.



These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

7

Model No. 4.19 Speed Indicator

A Crank fitted with a Threaded Pin to form a handle is secured on a $3\frac{1}{2}$ " Rod carrying a 57-teeth Gear that meshes with a $\frac{1}{2}$ " Pinion 1 on a $1\frac{1}{2}$ " Rod. The latter Rod carries a Contrate Wheel and is journaled in one of the holes of a $5\frac{1}{2}$ " Strip and a Double Bent Strip 2. A Pinion on the vertical 8" Rod which carries the governor is in engagement with the Contrate.

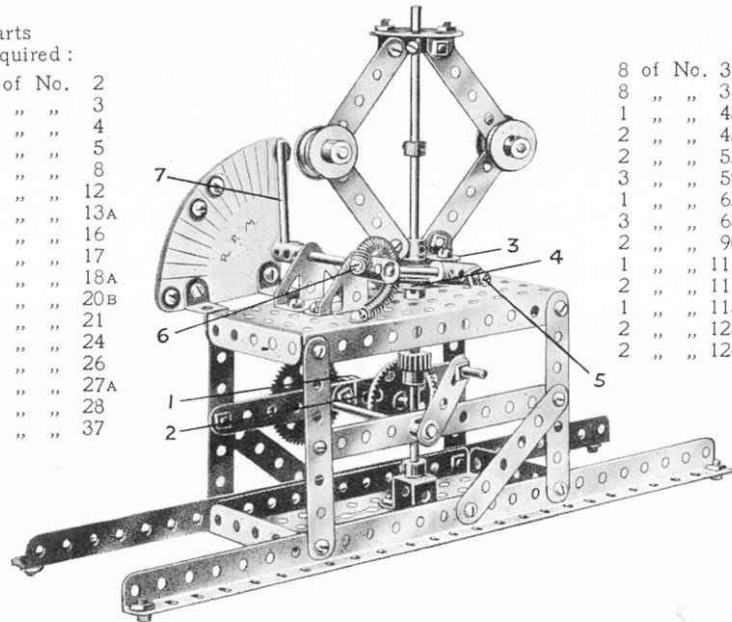
The $2\frac{1}{2}$ " Strips forming the governor arms are lock-nutted to Angle Brackets which in turn are secured rigidly to Bush Wheels. The upper Bush Wheel is secured to the Rod, while the lower wheel 3, which is free on the Rod, is connected to a $1\frac{1}{2}$ " Pulley 4 by $\frac{3}{8}$ " Bolts, but spaced therefrom by Nuts on the shanks of the Bolts. The $\frac{3}{4}$ " Bolt 5 is passed through the end tapped hole of the Coupling and locked in position by a Nut so that its shank protrudes into the space between the Bush Wheel and Pulley. As the weights of the governor fly outward under centrifugal force the Bush Wheel and Pulley unit 3 rises, carrying with it the Bolt 5 and its Coupling and so actuating the pointer (a 2" Rod 7). The extent of the movement of the latter over the graduated scale indicates the speed at which the vertical shaft rotates. A Spring secured to the $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate is fixed by the Bolt 6 in such a manner that the pointer tends to return to its original position as the motion decreases.

Parts
required:

2	of No.	2
4	" "	3
2	" "	4
6	" "	5
2	" "	8
4	" "	12
1	" "	13A
1	" "	16
2	" "	17
4	" "	18A
4	" "	20B
1	" "	21
2	" "	24
2	" "	26
1	" "	27A
1	" "	28
39	" "	37

8 of No. 37A

8	" "	38
1	" "	43
2	" "	45
2	" "	52
3	" "	59
1	" "	62
3	" "	63
2	" "	90
1	" "	111
2	" "	111c
1	" "	115
2	" "	125
2	" "	126



Model No. 4.20 Conductor's Punch

This is just the thing for your younger brother! He only needs a strap with which to hang it over his shoulder to make him into a conductor. The

Parts
required:

3	of No.	5
1	" "	11
1	" "	15A
1	" "	22
9	" "	37
2	" "	38
1	" "	43
2	" "	53
1	" "	59

$2\frac{1}{2}$ " Strip at the bottom is spaced by two Washers away from the body of the punch to allow the ticket to pass in to be punched. The punch Rod is passed completely through the Spring. The lower end of the latter presses against the Double Bracket and the upper end against a Collar secured to the Rod.



Model No. 4.21

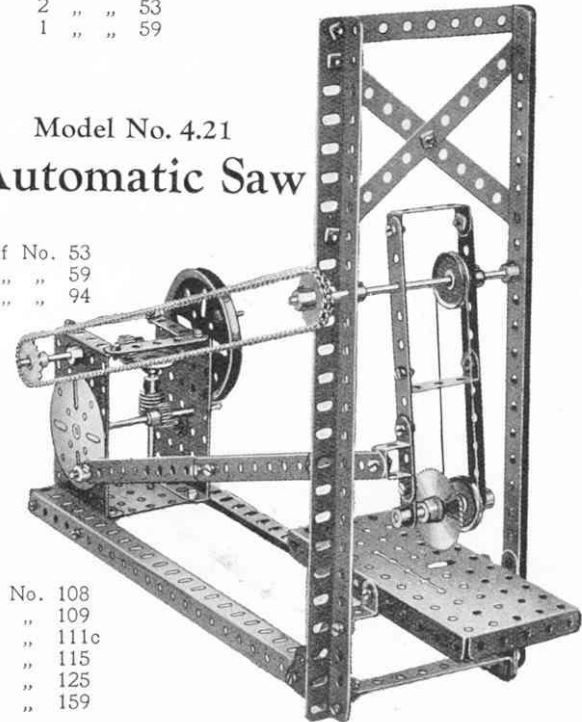
Automatic Saw

Parts
required:

7	of No.	2
1	" "	3
3	" "	5
4	" "	8
1	" "	15
1	" "	15A
2	" "	16
1	" "	17
1	" "	19B
2	" "	22
2	" "	26
1	" "	28
1	" "	32
41	" "	37
3	" "	37A
2	" "	38
1	" "	45
2	" "	48
1	" "	48A
1	" "	52

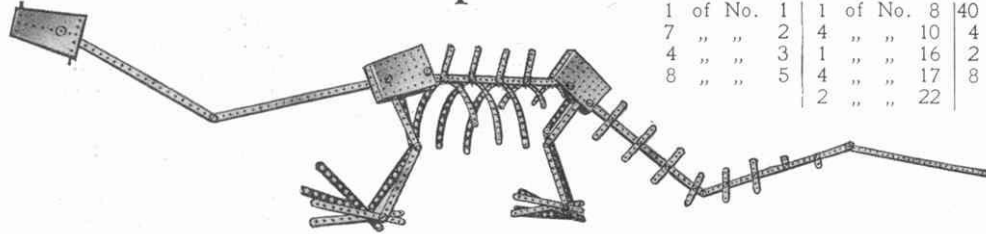
3	of No.	53
9	" "	59
24	" "	94

2	of No.	108
1	" "	109
1	" "	111c
2	" "	115
2	" "	125
1	" "	159



8 These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.22 Diplodocus



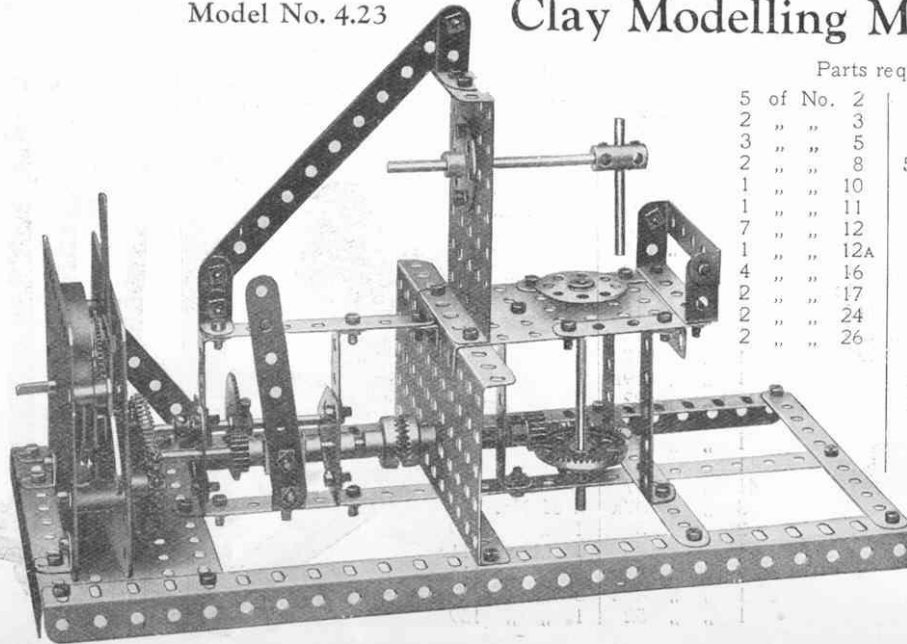
Parts required :

1 of No. 1	1 of No. 8	40 of No. 37
7 " " 2	4 " " 10	4 " " 53
4 " " 3	1 " " 16	2 " " 54
8 " " 5	4 " " 17	8 " " 59
	2 " " 22	

This representation of a prehistoric animal is a most extraordinary effort sent in by a young French boy to compete in one of the big Meccano Model-building Competitions. We could scarcely class it as an engineering model, but any boy with a brain clever enough and an imagination lively enough to conceive and construct such an animal as this from Meccano parts deserved a good prize, so we awarded him one. Screw the Nuts and Bolts up tightly because the Diplodocus looks most dejected when he droops.

Model No. 4.23

Clay Modelling Machine



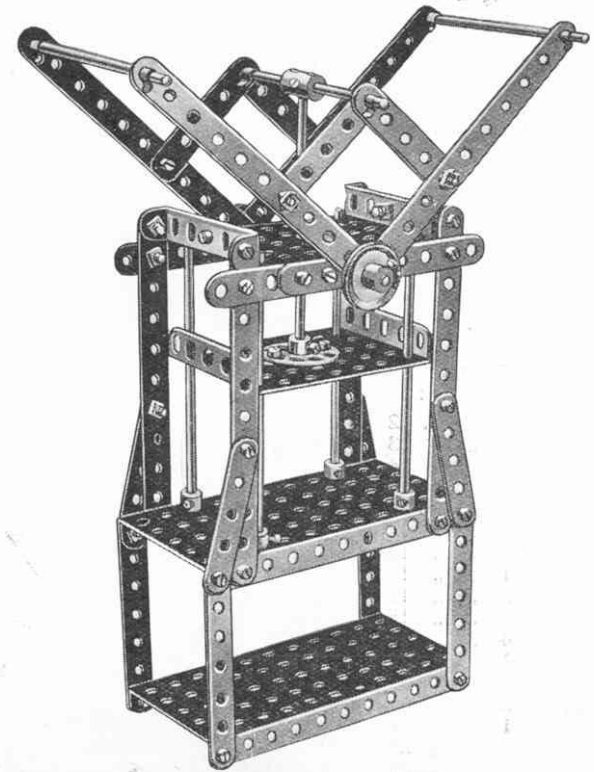
Parts required :

5 of No. 2	1 of No. 27A
2 " " 3	1 " " 28
3 " " 5	2 " " 29
2 " " 8	50 " " 37
1 " " 10	2 " " 37A
1 " " 11	2 " " 38
7 " " 12	1 " " 46
1 " " 12A	6 " " 48A
4 " " 16	2 " " 52
2 " " 17	2 " " 53
2 " " 24	4 " " 59
2 " " 26	1 " " 63
	6 " " 94
	2 " " 96
	2 " " 126A

Clockwork
Motor

(not included
in Outfit)

Model No. 4.24 Bale Press

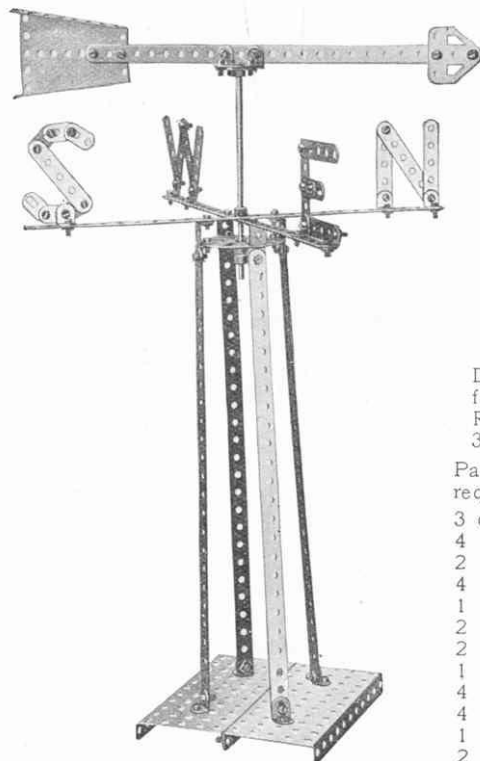


Parts required :

10 of No. 2	1 of No. 24	2 of No. 52
4 " " 3	8 " " 35	2 " " 53
8 " " 5	44 " " 37	4 " " 59
4 " " 15	14 " " 37A	1 " " 63
1 " " 15A	2 " " 38	2 " " 111
2 " " 17	2 " " 48A	

Parts required :

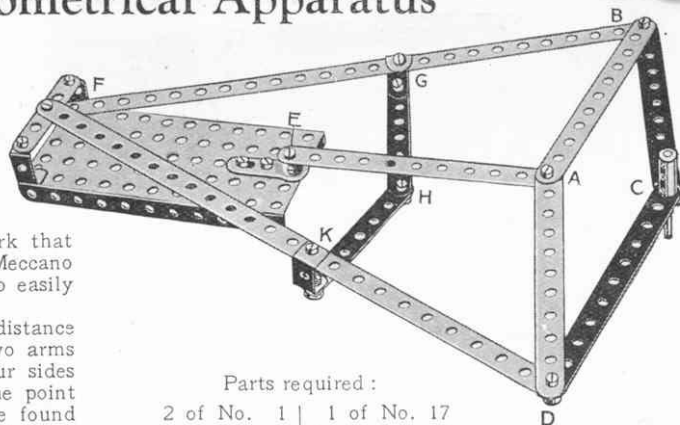
7 of No. 1	54 of No. 37
11 " " 5	2 " " 38
8 " " 10	2 " " 52
4 " " 11	1 " " 54
17 " " 12	2 " " 59
1 " " 14	1 " " 109
1 " " 24	1 " " 126A



This most ingenious model for transforming a circular movement into a rectilinear movement was designed by M. Pierre-Th. Dufour, who used it in his Thesis (presented to the Faculty of Science in Paris) to obtain his degree of Doctor of the University of Paris. He required an instrument which would transform a circular movement into a movement rigorously rectilinear and he states in his published work that he was able to do this "with the aid of Meccano parts, which permit of making experiments so easily in mechanisms of the most varied types."

The point F is fixed, and is situated at a distance from the fixed point E, equal to AE, the two arms FB and FD being together equal to the four sides of the lozenge ABCD. The trajectory of the point C is then at right angles to EF. It will be found that whilst the point C is moving in a straight line at right angles to EF, the point A is describing a circle round the fixed point E.

Every Meccano Boy should make up this very interesting model and experiment with it.



Parts required :

2 of No.	1	1 of No.	17
5 " "	2	16 " "	37
2 " "	3	1 " "	52
1 " "	5	7 " "	59
4 " "	11	1 " "	62
	1 of No.		63

Model No. 4.27 Cable Railway

The reversing lever 1 is pivoted near its centre to a Reversed Angle Bracket and at its lower end to a $2\frac{1}{2}" \times 1"$ Double Angle Strip 2. This Strip is kept in place on the Rod 3 by two Collars. The two $\frac{3}{4}"$ Contrate Wheels are fastened on this Rod in such a position that one or other can be brought into gear with a $\frac{1}{2}"$ Pinion secured to the Rod 4 by moving the reversing lever. This Rod 4 is journalled in one of the side plates of the gear box and in a $3\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip bolted between Plate 5 and the Strips.

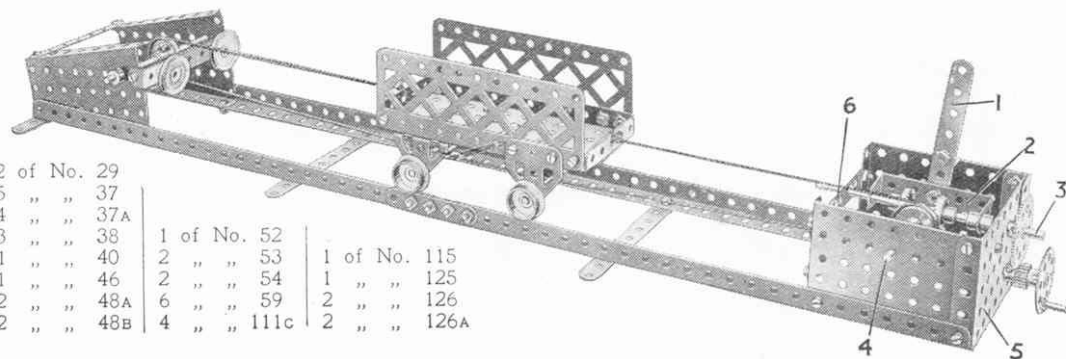
Parts
required :

3	of No.	2
4	" "	3
2	" "	5
4	" "	8
1	" "	15
2	" "	15 ^A
2	" "	16
1	" "	17
4	" "	20 ^B
4	" "	22
1	" "	24
2	" "	26
1	" "	27 ^A

2	of	No.	29
45	"	"	37
4	"	"	37A
3	"	"	38
1	"	"	40
1	"	"	46
2	"	"	48A
2	"	"	48B

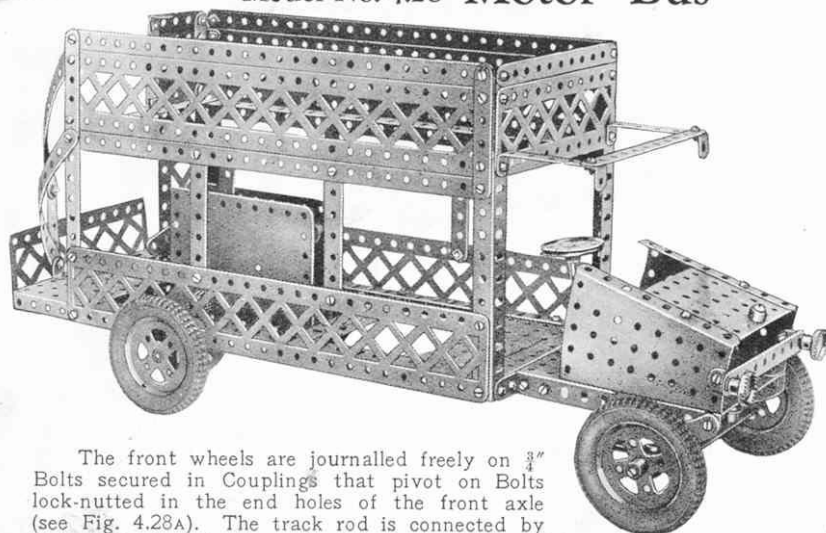
1	of No.	52
2	" "	53
2	" "	54
6	" "	59
4	" "	111c

1	of No.	115
1	" "	125
2	" "	126
2	" "	126A



These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.28 Motor 'Bus



The front wheels are journaled freely on $\frac{3}{4}$ " Bolts secured in Couplings that pivot on Bolts lock-nutted in the end holes of the front axle (see Fig. 4.28A). The track rod is connected by Swivel Bearings to the ends of Rods 1 and 2, which are secured in the inner transverse holes of the Couplings. Connection is made, in the manner shown, with a Crank 3 on the bottom end of the steering column, and the Rod 2.

The front springs are represented by a pair of $2\frac{1}{2}$ " small radius Curved Strips, to which the axle is attached by means of $\frac{1}{2} \times \frac{1}{8}$ " Angle Brackets, the axle being spaced therefrom by a Collar on each Bolt.

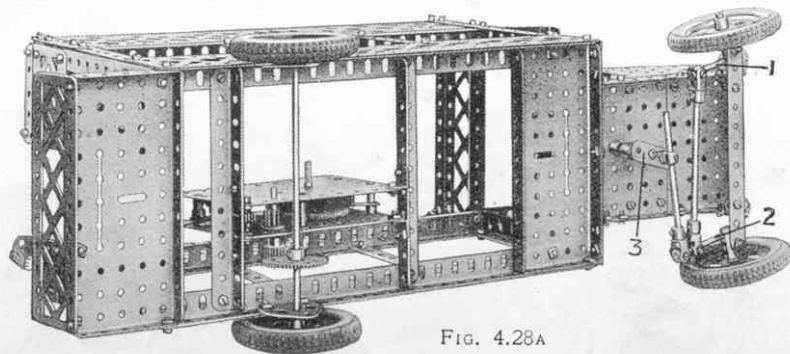


FIG. 4.28A

Parts
required :

2 of No.	1
9	2
1	2A
4	3
4	4
2	5
4	8
4	9
3	10
14	12
2	12A
1	14
1	15A
2	16
1	17
1	18A
4	20A
1	21
1	26
1	27A
2	29
9B	37
4	37A
3	38
3	48A
2	52
3	53
2	54
5	59
1	62
2	63
2	90A
1	98
4	99
3	100
3	111
3	111c
1	116A
1	125
2	126A
4	142A
1	147B
2	165

Clockwork
Motor
(not included
in Outfit)

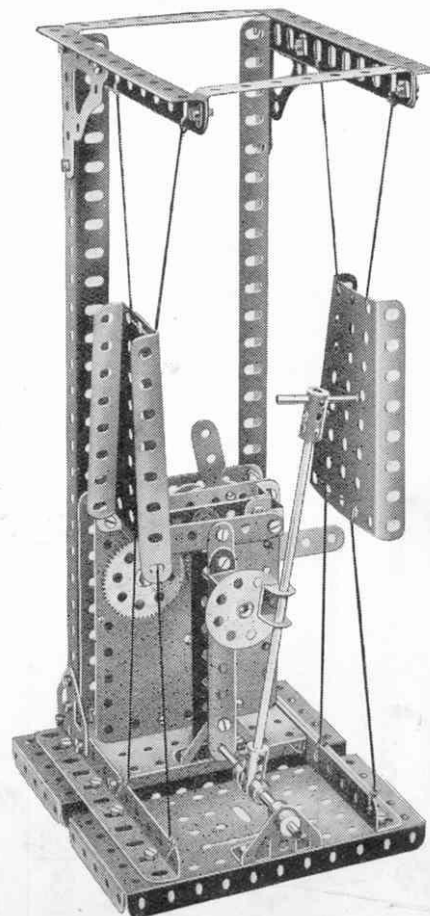
Model No. 4.29

Automatic Gong

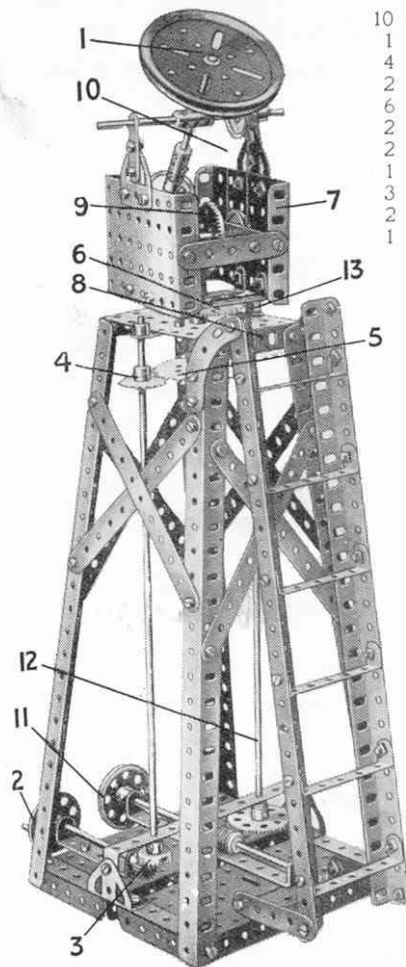
Parts
required :

2 of No.	2A
2	5
2	8
4	9
3	11
1	12
1	14
1	16
1	17
1	18A
1	24
1	26
1	27A
45	37
2	37A
2	38
1	40
1	45
2	48B
2	52
1	53
2	54
4	59
2	63
2	108
1	111c
2	125
2	126
2	126A

Clockwork
Motor
(not included
in Outfit)



Model No. 4.30 Searchlight



Parts required :

10 of No. 2	1 of No. 21	1 of No. 48B
1 " " 3	3 " " 22	2 " " 48D
4 " " 5	2 " " 24	2 " " 52
2 " " 6A	2 " " 26	3 " " 53
6 " " 8	1 " " 27A	4 " " 59
2 " " 12	1 " " 28	2 " " 63
2 " " 13	1 " " 29	2 " " 95
1 " " 14	1 " " 32	2 " " 96
3 " " 16	86 " " 37	2 " " 115
2 " " 17	7 " " 38	2 " " 126
1 " " 19B	1 " " 45	2 " " 126A
	9 " " 48A	

The elevation of the searchlight 1 is controlled by the hand wheel 2, the motion of which is transmitted by means of a $\frac{1}{2}$ " Pinion and $\frac{3}{4}$ " Contrate Wheel 3 and 1" Sprocket Wheel 4 to a 2" Sprocket Wheel 5. The latter is secured to a vertical Rod that is free to revolve in the boss of a second 2" Sprocket Wheel 6 bolted to two $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strips, which, in turn, are secured in the base of the rotating frame 7. This vertical Rod is journalled in a Double Bent Strip that is bolted beneath the Plate 8 to form an additional support, and it carries at its upper end a $\frac{1}{2}$ " Pinion that engages with the $1\frac{1}{2}$ " Contrate Wheel 9. The motion of the Contrate 9 is transmitted to the pivotal Rod of the searchlight by means of the Pulleys and belt 10. The searchlight is rotated by the second hand wheel 11, the drive from which is transmitted through Worm gearing to the vertical Rod 12, the upper end of which carries a 1" Sprocket Wheel 13, that engages with the 2" Sprocket Wheel 6.

Model No. 4.31 Alternating Swing

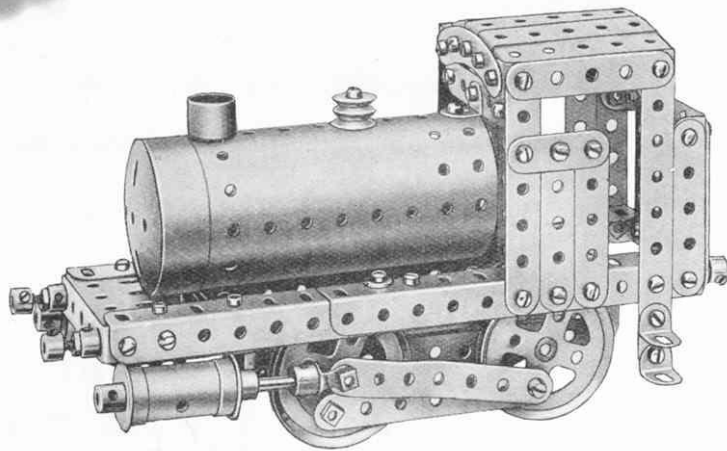


Parts required :

3 of No. 1	8 of No. 8	3 of No. 37A	4 of No. 90
8 " " 2	4 " " 12	10 " " 48A	4 " " 90A
2 " " 4	2 " " 14	2 " " 48D	3 " " 99
9 " " 5	2 " " 24	2 " " 54	1 " " 111c
2 " " 6A	2 " " 26	2 " " 59	1 " " 115
	72 " " 37	2 " " 62	

Clockwork Motor
(not included in Outfit)

This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)



The coupling Rods 7 are attached to the front pair of Wheels by Bolts and lock-nuts and to the back pair by $\frac{3}{8}$ " Bolts and lock-nuts. The connecting Rods 8, which are bent slightly as shown, are attached at one end to the Bolts 9 and at the other are connected to End Bearings, which carry the $1\frac{1}{2}$ " Rods forming the piston rods.

To assemble the model, the Bolts 5 are passed through the centre holes of the $2\frac{1}{2}$ " Strips 6, and through the Boiler, and are then secured by their Nuts (the Washers shown being used to space the Strips 6 from the $1\frac{1}{2}$ " Double Angle Strips).

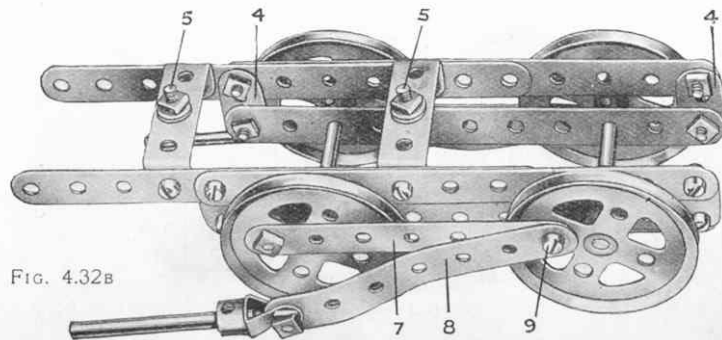


FIG. 4.32B

Model No. 4.32

0-4-0 Shunting Locomotive

The superstructure is shown in detail in Fig. 4.32A. Each of the two side members is built up from two $5\frac{1}{2}$ " Angle Girders overlapping five holes. The cab roof is composed of five $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips bolted to two $2\frac{1}{2}$ " Curved Strips and is attached to the frame of the cab by Angle Brackets. The front of the cab is composed of three $2\frac{1}{2}$ " Strips connected together so as to form three sides of a square and bolted to the Boiler by an Angle Bracket. The cylinders 2 are bolted to the side members by means of two Flat Brackets 3 which are bent slightly outward.

Each side of the frame that carries the wheels is composed of two $5\frac{1}{2}$ " Strips overlapping seven holes and one $5\frac{1}{2}$ " Strip attached by Flat Brackets 4 as shown in Fig. 4.32B.

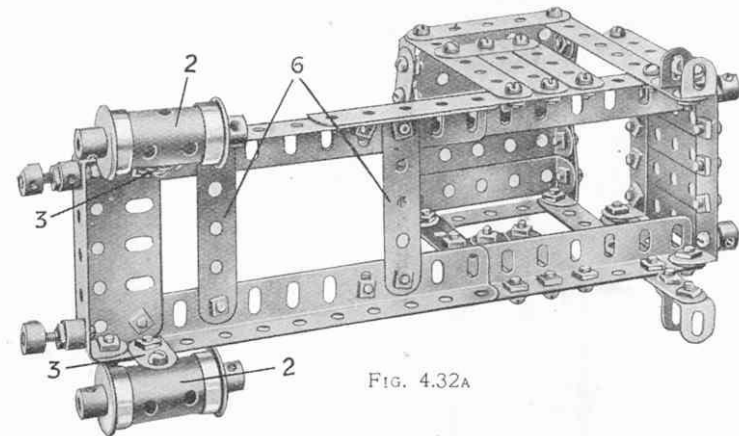


FIG. 4.32A

Parts required :

6 of No. 2	10 of No. 12	10 of No. 38	1 of No. 116A
2 " " 2A	4 " " 17	7 " " 48A	1 " " 162
6 " " 3	4 " " 20A	6 " " 59	2 " " 163
18 " " 5	4 " " 20B	2 " " 90	1 " " 164
2 " " 6A	2 " " 23	1 " " 103F	1 " " 166
4 " " 9	85 " " 37	2 " " 111	
6 " " 10	15 " " 37A	5 " " 111c	

These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

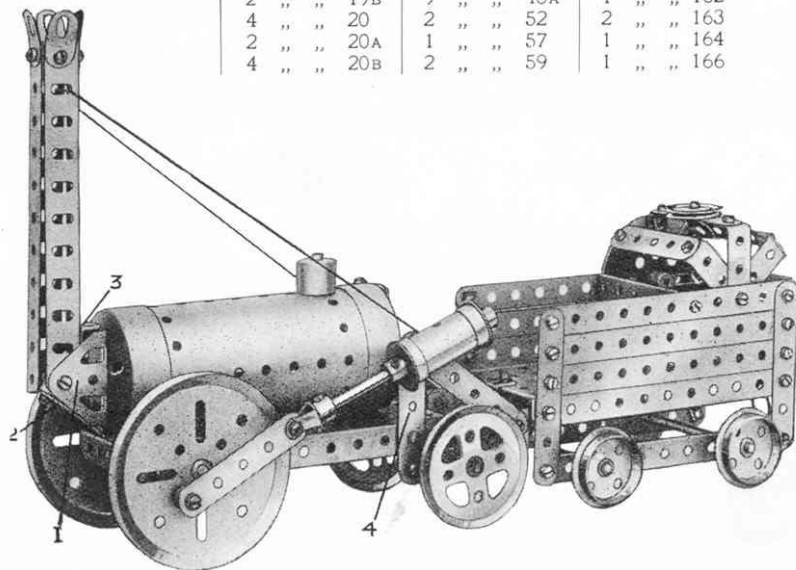
Model No. 4.37 Stephenson's "Rocket" Locomotive

The chimney is attached at its lower end to two Trunnions 1 that are bolted to the front of the boiler. A $1\frac{1}{2}$ " Strip 2 held in place by a $\frac{1}{2}$ " \times $\frac{1}{2}$ " Angle Bracket closes in the space between the Trunnions at the bottom, and a $\frac{1}{2}$ " \times $\frac{1}{2}$ " Angle Bracket 3 performs a similar function at the top.

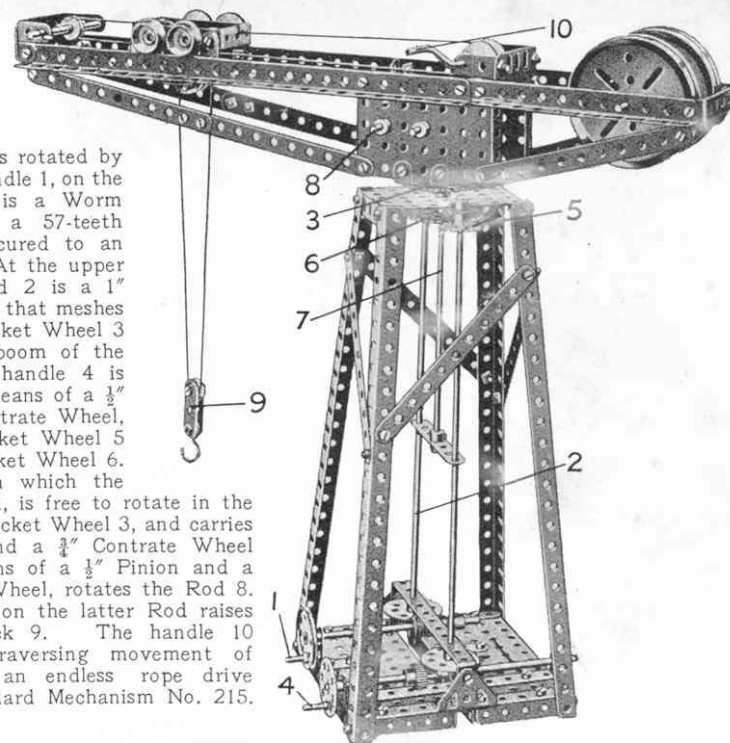
The trailing wheels are secured on an axle that is journalled in $2\frac{1}{2}$ " Strips attached to the bottom extremities of the $2\frac{1}{2}$ " Strips 4. The rearmost ends of the horizontal Strips are secured by Flat Brackets. The upper ends of the Strips 4 serve as mountings for the cylinders, which are secured rigidly thereon by $\frac{3}{8}$ " Bolts, on each of which are four Washers between the cylinder and the Strip.

Parts required :

8 of No. 2	2 of No. 9	1 of No. 22A	1 of No. 109
4 " " 3	6 " " 10	56 " " 37	1 " " 111
2 " " 4	10 " " 12	8 " " 37A	5 " " 111c
11 " " 5	4 " " 16	8 " " 38	1 " " 116A
1 " " 6A	2 " " 17	1 " " 40	2 " " 126
	2 " " 19B	9 " " 48A	1 " " 162
	4 " " 20	2 " " 52	2 " " 163
	2 " " 20A	1 " " 57	1 " " 164
	4 " " 20B	2 " " 59	1 " " 166



Model No. 4.38 Girder Crane



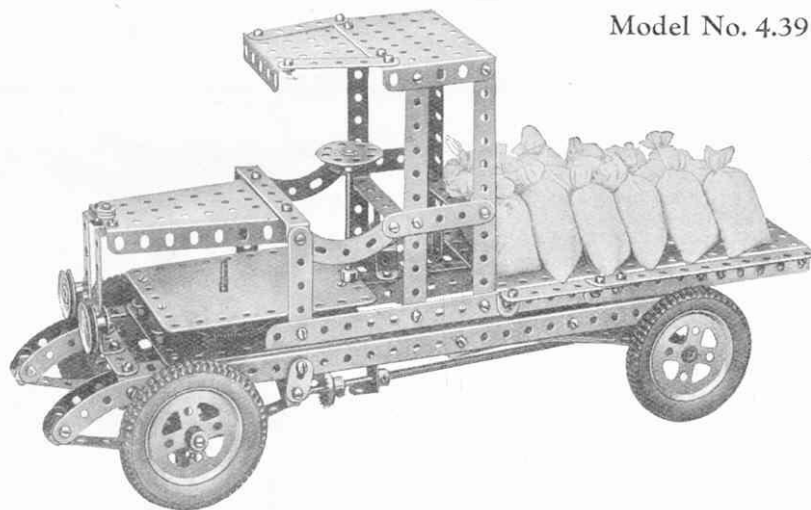
The boom is rotated by means of the handle 1, on the axle of which is a Worm engaging with a 57-teeth Gear Wheel secured to an $11\frac{1}{2}$ " Rod 2. At the upper end of the Rod 2 is a 1" Sprocket Wheel that meshes with a 2" Sprocket Wheel 3 bolted to the boom of the crane. The handle 4 is connected by means of a $\frac{1}{2}$ " Pinion, $1\frac{1}{2}$ " Contrate Wheel, and a 1" Sprocket Wheel 5 to the 2" Sprocket Wheel 6. The Rod 7, on which the latter is secured, is free to rotate in the boss of the Sprocket Wheel 3, and carries at its upper end a $\frac{3}{4}$ " Contrate Wheel which, by means of a $\frac{1}{2}$ " Pinion and a 57-teeth Gear Wheel, rotates the Rod 8. A Cord wound on the latter Rod raises the pulley block 9. The handle 10 controls the traversing movement of the trolley by an endless rope drive similar to Standard Mechanism No. 215.

Parts required :

12 of No. 2	4 of No. 16	2 of No. 27A	2 of No. 48D
2 " " 3	3 " " 17	1 " " 28	2 " " 52
2 " " 5	4 " " 19B	1 " " 29	3 " " 53
2 " " 6A	1 " " 19s	1 " " 32	1 " " 57
6 " " 8	4 " " 20B	8 " " 35	9 " " 59
2 " " 9	1 " " 21	76 " " 37	2 " " 90A
9 " " 10	1 " " 22	5 " " 37A	2 " " 95
2 " " 12A	2 " " 22A	2 " " 38	2 " " 96
2 " " 13	2 " " 23	1 " " 40	2 " " 103F
1 " " 13A	2 " " 24	2 " " 46	4 " " 111c
1 " " 14	2 " " 24	2 " " 48	2 " " 115
1 " " 15A	2 " " 26	4 " " 48A	2 " " 126

This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.39 Motor Lorry



Parts required :

6 of No. 2	1 of No. 13A	1 of No. 29	6 of No. 63
2 " " 2A	1 " " 15	95 " " 37	4 " " 90
5 " " 3	1 " " 15A	14 " " 37A	2 " " 90A
2 " " 4	1 " " 16	15 " " 38	2 " " 111
11 " " 5	3 " " 17	1 " " 48	6 " " 111c
1 " " 6A	4 " " 18A	2 " " 48A	1 " " 115
6 " " 8	4 " " 20A	3 " " 48B	1 " " 116A
4 " " 9	2 " " 22	5 " " 53	1 " " 125
4 " " 10	1 " " 24	1 " " 54	4 " " 142A
4 " " 11	2 " " 26	10 " " 59	1 " " 147B
8 " " 12	1 " " 28	1 " " 62	2 " " 165

Clockwork Motor and
Meccano Loaded Sacks
(not included in Outfit)

The front wheels are mounted on $\frac{3}{8}$ " Bolts, which form the stub axles, and are secured in Couplings 1 (Fig. 4.39A). Each of the latter carries in its centre transverse hole a $1\frac{1}{2}$ " Rod 2, which is passed through the end holes of two $4\frac{1}{2}$ " Strips laid one upon the other, and loosely clamped in place by Collars. The end transverse holes of the Couplings hold the Rods 3 and 4 which are connected pivotally together at their ends by Swivel Bearings and two short Rods joined by a Coupling. A 2" Rod 5 is held in another Coupling on the Rod 4 and is connected by means of a Swivel Bearing and $3\frac{1}{2}$ " Rod to a Crank on the lower end of the steering column. A Pivot Bolt is passed through the end transverse hole of the Coupling on the $3\frac{1}{2}$ " Rod and is secured to the Crank by two Nuts.

The bonnet is attached pivotally to the body by Bolts 6 and lock-nuts so that it may be raised to allow the winding key of the Motor to be inserted. The shanks of the Bolts 10 enter the top holes of the $2\frac{1}{2}$ " Double Angle Strips in the front of the chassis, but they are not secured to the Strips.

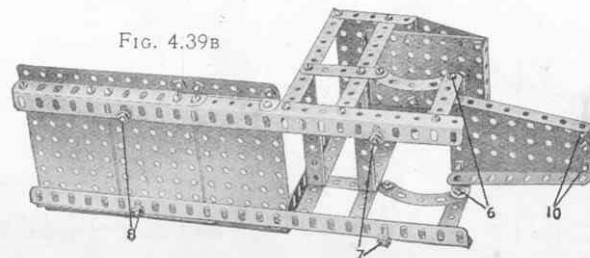


FIG. 4.39B

The complete body shown in Fig. 4.39B can be detached from the chassis (Fig. 4.39A) by undoing the $\frac{3}{8}$ " Bolts 7 and 8, which are passed through holes in the Angle Girders of the chassis and spaced therefrom by Washers. The Bolts 7 are inserted in the hole marked 9 (Fig. 4.39A) and the corresponding hole in the other side Girder, whilst Bolts 8 are passed through the end holes but one of the two side Girders.

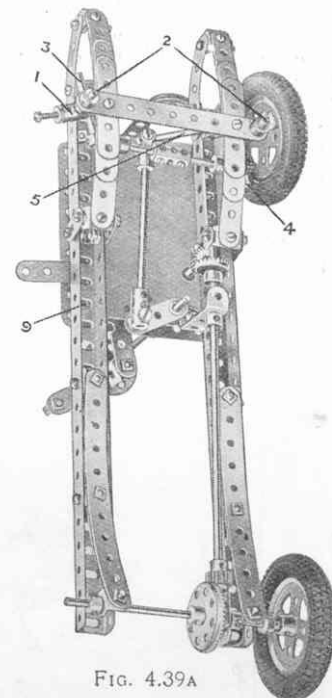


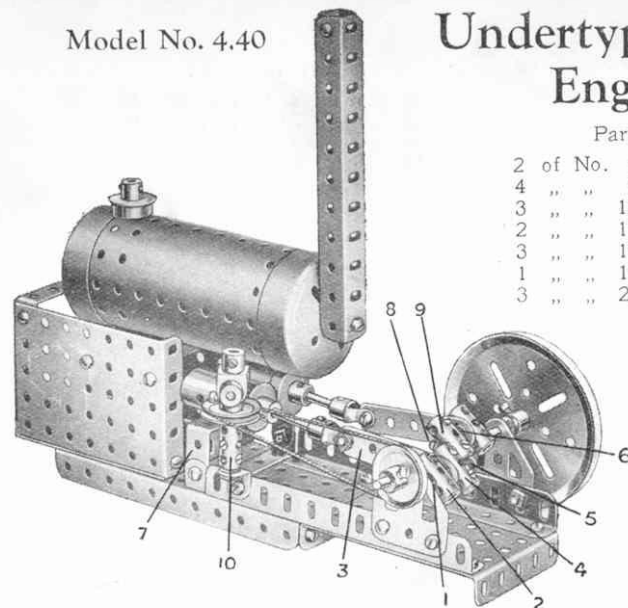
FIG. 4.39A

These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

17

Model No. 4.40

Undertype Steam Engine



Parts required :

2 of No. 5	2 of No. 22
4 " " 9	40 " " 37
3 " " 12	4 " " 37A
2 " " 17	6 " " 38
3 " " 18A	1 " " 40
1 " " 19B	1 " " 46
3 " " 20B	4 " " 48A
	1 " " 52
	4 " " 53
	4 " " 59
	5 " " 63
	2 " " 111
	4 " " 111c
	2 " " 115
	1 " " 116
	1 " " 116A
	2 " " 126A
	1 " " 162
	2 " " 163
	1 " " 166

The crankshaft is built up of four Couplings joined together by $\frac{3}{4}$ " Bolts. A $\frac{3}{4}$ " Bolt 1 is passed through the centre threaded hole of the Coupling 2 and screwed up as tightly as possible. The connecting Rod 3 is now slipped on and spaced by two Washers, one on each side of the Strip, after which the Coupling 4 is screwed on to the Bolt 1 so that the connecting Rod revolves easily in the intervening space. A $\frac{3}{8}$ " Bolt 5 is next screwed into the Coupling 4 until it strikes the end of Bolt 1. The second crank is assembled in the same way—that is, a $\frac{3}{4}$ " Bolt is passed through the centre threaded holes of two Couplings—but two Washers are placed at 6 and a $\frac{3}{8}$ " Bolt 8 is inserted in the Coupling 9 in the same way as the Bolt 5 in Coupling 4. A $\frac{3}{4}$ " Bolt is now passed through the inner transverse hole of Coupling 9 and through the corresponding hole in Coupling 4, and is gripped securely by the set-screws of both Couplings. The whole crankshaft is held rigid by the $\frac{3}{4}$ " Bolts, for the head of Bolt 5 engages with the hole in the end of Coupling 9 whilst the head of Bolt 8 engages the end of Coupling 4.

Two 2" Rods are used for the ends of the crankshaft, one carrying a 3" Pulley to represent a flywheel and the other a 1" Pulley round which a length of cord is passed which takes the drive to a 1" Pulley on the centrifugal governor. The latter is built up from a Large Fork Piece with Collars attached by means of $\frac{3}{8}$ " Bolts, to represent the governor weights. The Fork Piece and 1" Pulley are attached to a $1\frac{1}{2}$ " Rod that turns in the top of the Coupling 9, which is secured on a Threaded Pin and attached to the base by an Angle Bracket.

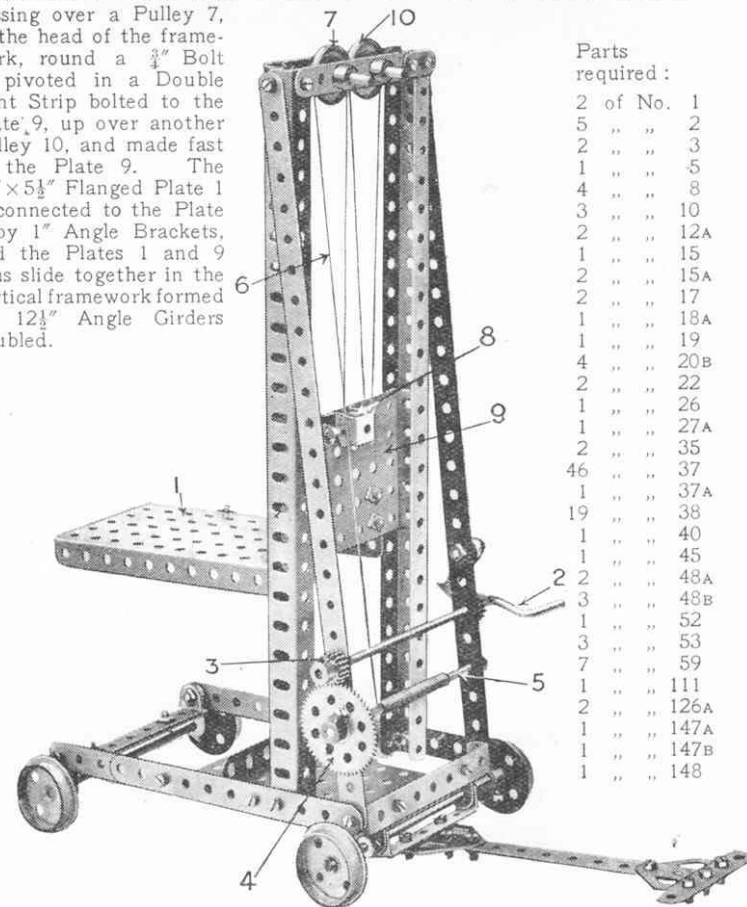
The cylinders are composed of two Sleeve Pieces, each fitted with one $\frac{3}{4}$ " Flanged Wheel, and are bolted to a $2\frac{1}{2}$ " x 1" Double Angle Strip 7.

Model No. 4.41 Bale Lifter

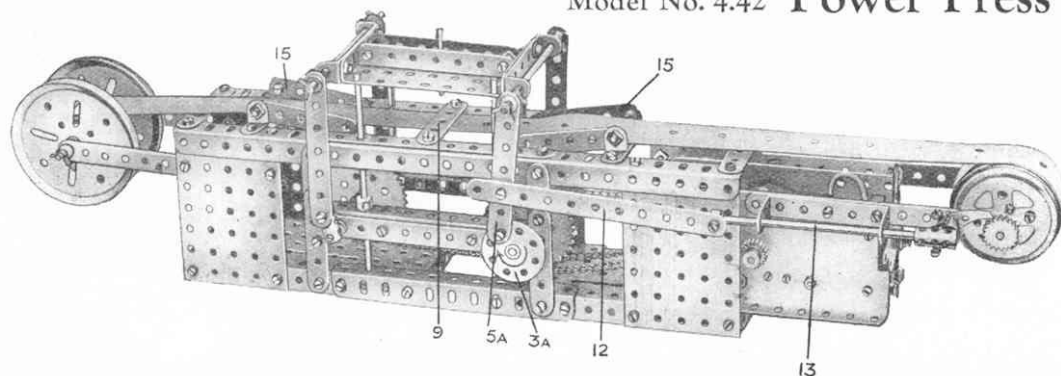
The bale platform 1, consisting of a $2\frac{1}{2}$ " x $5\frac{1}{2}$ " Flanged Plate, is raised by a Crank Handle 2, operating a Pinion 3 which engages with a 57-toothed Wheel 4 on a Rod 5. This Rod carries the Cord 6, passing over a Pulley 7, in the head of the framework, round a $\frac{3}{4}$ " Bolt 8, pivoted in a Double Bent Strip bolted to the Plate 9, up over another Pulley 10, and made fast to the Plate 9. The $2\frac{1}{2}$ " x $5\frac{1}{2}$ " Flanged Plate 1 is connected to the Plate 9 by 1" Angle Brackets, and the Plates 1 and 9 thus slide together in the vertical framework formed by 12 $\frac{1}{2}$ " Angle Girders doubled.

Parts required :

2 of No. 1	
5 " " 2	
2 " " 3	
1 " " 5	
4 " " 8	
3 " " 10	
2 " " 12A	
1 " " 15	
2 " " 15A	
2 " " 17	
1 " " 18A	
1 " " 19	
4 " " 20B	
2 " " 22	
1 " " 26	
1 " " 27A	
2 " " 35	
46 " " 37	
1 " " 37A	
19 " " 38	
1 " " 40	
1 " " 45	
2 " " 48A	
3 " " 48B	
1 " " 52	
3 " " 53	
7 " " 59	
1 " " 111	
2 " " 126A	
1 " " 147A	
1 " " 147B	
1 " " 148	



Model No. 4.42 Power Press



The model shown in the illustration represents a type of automatic press used in factories for stamping out small metal parts. Although the model does not stamp out steel parts, it will cut neat round holes in a strip of paper with great rapidity.

The drive from the Electric Motor is transmitted via the $\frac{1}{2}$ " Pinion on the armature shaft to a 57-teeth Gear on the Rod 1A, and from another $\frac{1}{2}$ " Pinion on this Rod to a second 57-teeth Gear on the Rod 1. Two 1" Sprocket Wheels on the latter Rod are connected by Sprocket Chain to 2" Sprocket Wheels on the "crankshafts" 2. One crankshaft is formed from a $3\frac{1}{2}$ " Rod and two Bush Wheels 3, 3A, and the other from a $3\frac{1}{2}$ " Rod carrying two Couplings 4 placed at exactly similar angles. Four Strips 5, which form connecting links between the "die platten" 6 and the crankshafts, are lock-nutted to the Bush Wheels and attached pivotally to the Couplings by $\frac{3}{8}$ " Bolts. They are pivoted to the die platten by means of two $4\frac{1}{2}$ " Rods and retained in place by Spring Clips.

The $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate forming the die platten is strengthened with two $3\frac{1}{2}$ " Strips 7 bolted to the Plate by Double Brackets. The die 8, a $1\frac{1}{2}$ " Rod, is secured rigidly to the platten by means of a Crank. Two $2\frac{1}{2}$ " Strips 9 bolted to the frame of the model and spaced apart by Washers form the "sink," through which passes the paper strip. Guides 15 are provided to keep the material in correct alignment.

The feed drum is composed of two Boiler Ends attached to the Rod 10 by means of

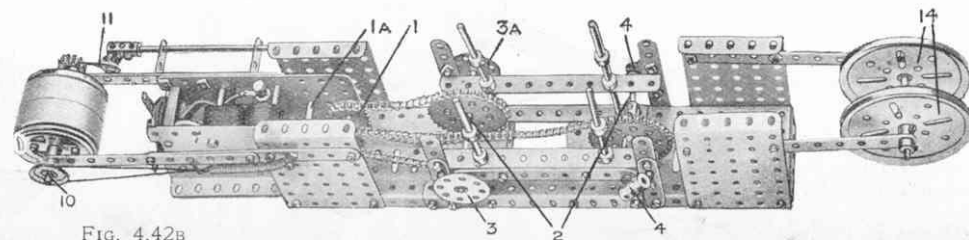


FIG. 4.42B

Parts required :

8 of No. 2	1 of No. 43
2 " " 2A	1 " " 46
6 " " 3	2 " " 48
18 " " 5	2 " " 48A
2 " " 8	2 " " 52
4 " " 9	5 " " 53
2 " " 11	10 " " 59
1 " " 15	1 " " 62
5 " " 15A	3 " " 63
5 " " 16	30" " 94
2 " " 17	2 " " 95
1 " " 18A	2 " " 96
2 " " 19B	2 " " 111C
2 " " 20A	1 " " 147A
2 " " 24	1 " " 147B
1 " " 26	1 " " 148
2 " " 27A	2 " " 162A
13 " " 35	Electric Motor
102 " " 37	(not included in
19 " " 38	Outfit)

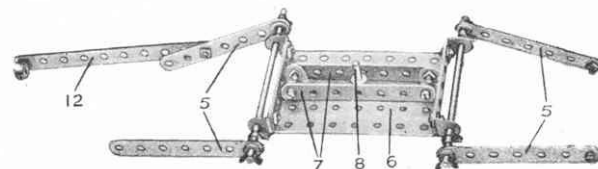


FIG. 4.42A

two 2" Pulleys. At one end of this Rod is affixed a 1" Pulley on which works a spring-controlled brake, and on the other end is attached a Ratchet Wheel that engages with a Pawl 11, which is retained in constant engagement by means of a piece of Spring Cord or elastic. The Pawl is attached to a $4\frac{1}{2}$ " Rod 13 by means of a Coupling and the Rod is pivotally connected by a $5\frac{1}{2}$ " Strip 12 to the Strip 5A.

The arrow on the Bush Wheel 3A shows the direction of travel, this being very important as the feed drum must only turn when the die platten is at the top of its stroke. The paper to be stamped is first wound on to the drum 14, then passed through the guides 15 and through the guide 9 and its end is stuck to the feed drum at the other end of the model.

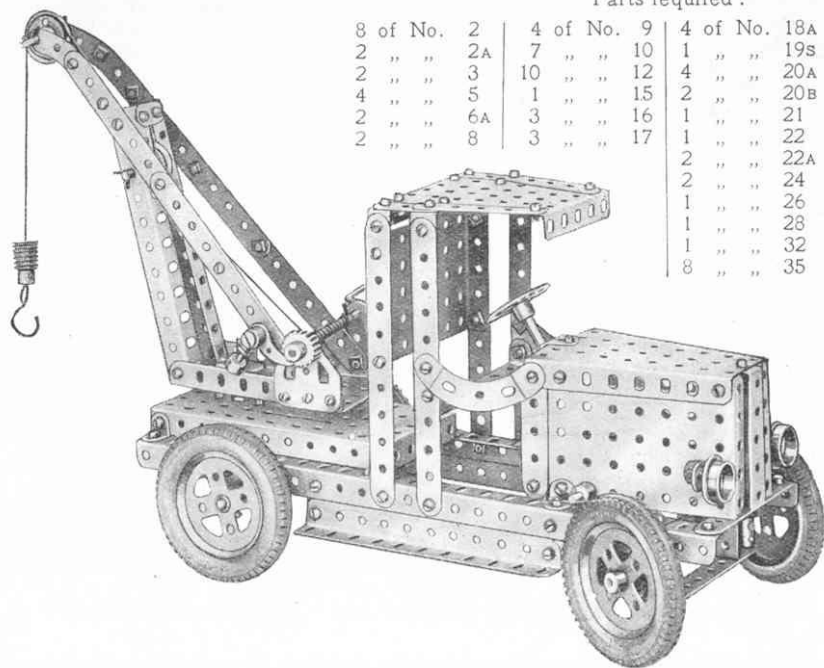
These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

19

Model No. 4.43 Motor Breakdown Crane

Parts required :

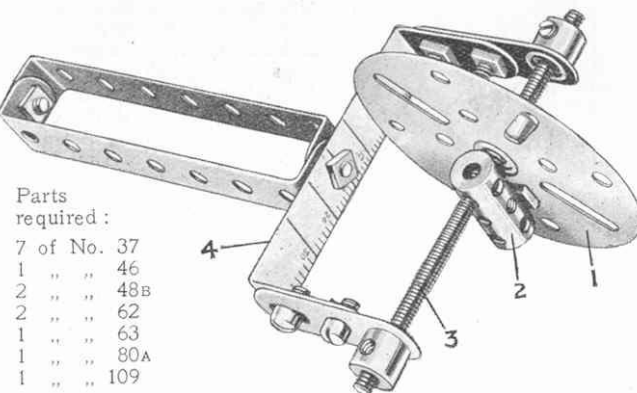
8 of No. 2	4 of No. 9	4 of No. 18A	94 of No. 37
2 " " 2A	7 " " 10	1 " " 19s	7 " " 38
2 " " 3	10 " " 12	4 " " 20A	1 " " 40
4 " " 5	1 " " 15	2 " " 20B	2 " " 48
2 " " 6A	3 " " 16	1 " " 21	1 " " 48A
2 " " 8	3 " " 17	1 " " 22	3 " " 48B
		1 " " 22A	1 " " 52
		2 " " 24	4 " " 53
		1 " " 26	2 " " 54
		1 " " 28	1 " " 57
		1 " " 32	10 " " 59
		8 " " 35	1 " " 62
			3 " " 63
			2 " " 77
			2 " " 90
			2 " " 90A
			4 " " 111C
			1 " " 115
			1 " " 116A
			2 " " 126A
			4 " " 142A
			1 " " 147A
			1 " " 147B
			1 " " 148
			2 " " 165



Bearings for the steering column 1 (Fig. 4.43A) are formed by a Flat Bracket and Coupling 2. A $3\frac{1}{2}$ " Rod passes through the centre transverse hole of the latter and carries a $1\frac{1}{2}$ " Contrate Wheel which is spaced by means of three Washers from the Coupling. The teeth of the Contrate are engaged by a $\frac{1}{2}$ " Pinion on the Rod 1. The Crank 3 carries a Flat Bracket bolted so that its round hole is over the elongated perforation of the Crank, and a bolt passed through both is screwed into the tapped bore of a Collar on a 2" Rod. This Rod is attached pivotally to the inner end of a stub axle by means of a swivel bearing formed from a Collar and Small Fork Piece.

The front road wheels rotate freely on the $1\frac{1}{2}$ " Rods, and are held in position by Collars. The Couplings 4 are pivoted by means of $\frac{3}{4}$ " Bolts to the extremities of two $4\frac{1}{2}$ " Strips that are bolted together face to face to form the front axle. Two $1\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strips 5 secure the $4\frac{1}{2}$ " Strips to the side Girders of the model.

Model No. 4.44 Opisometer



Parts required :

7 of No. 37
1 " " 46
2 " " 48B
2 " " 62
1 " " 63
1 " " 80A
1 " " 109

This instrument can be put to practical use for measuring curved lines, the perimeter of bodies, map routes, etc. The Face Plate 1 is free on the Screwed Rod 3, but is attached by a Bolt to a Coupling 2, the end transverse tapped hole of which engages with the thread of the Rod. The scale 4 may be graduated by running the Face Plate along a line of given length and marking its position in relation to the scale for every inch. The Screwed Rod is of course immovable, being gripped by the set-screws of the two Cranks.

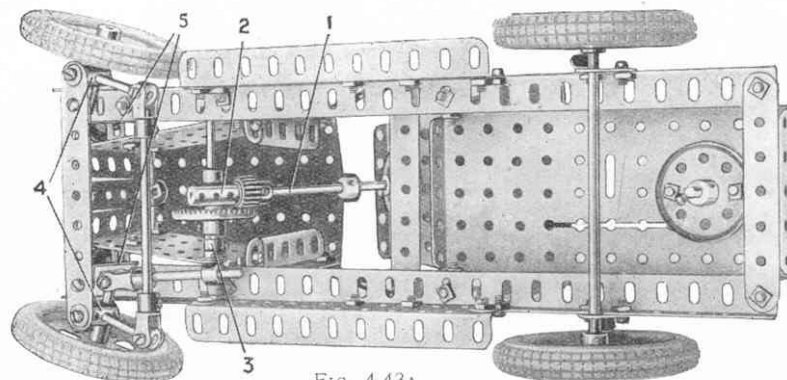


FIG. 4.43A

This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.45 Level Luffing Jib Crane

The side plates of the gear box ($5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plates) are connected together at each end by $2\frac{1}{2}"$ Strips, the front also being fitted with a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip 1, which forms a bearing for the jib pivot. A 3" Pulley 2 bolted to the bottom of the gear box slides on the rim of a second 3" Pulley 3, which is fixed to the travelling base, and a 2" Rod is secured in the boss of Pulley 3 and passed through the boss of Pulley 2. A $1\frac{1}{2}"$ Contrate 4 (Fig. 4.45A) is next secured to the Rod, together with a Coupling 5, the latter being spaced from the Contrate by Washers and held in place by a Collar. A $3\frac{1}{2}"$ Rod, on which is fixed a $\frac{1}{2}"$ Pinion engaging with the Contrate, is journaled in the Coupling 5 and in the $2\frac{1}{2}"$ Strip 6. A handle consisting of a Bush Wheel and a Threaded Pin attached to this Rod manipulates the slewing movement.

The Crank Handle 7 carrying a $\frac{1}{2}"$ Pinion slides in the side plates of the gear box, so that the Pinion may be engaged with either of the two 57-teeth Gears 8 and 9. The Gear 8 is attached to a $3\frac{1}{2}"$ Rod on which are fixed two drums consisting of four small Flanged Wheels. These form the luffing barrel. Two lengths of cord are attached to the jib head, passes over the 1" Pulleys 10, and are then wound four times round the luffing barrel. From here they are carried over the two $1\frac{1}{2}"$ Rods 11 and the $4\frac{1}{2}"$ Rod 12, and finally are secured to the moving carriage 13. When the model is working the Boiler End on the carriage should be weighed until it exactly counterbalances the jib.

The 57-teeth Gear 9 is fixed to the $3\frac{1}{2}"$ Rod forming the hoisting barrel. A length of cord attached to this is passed over one of the remaining 1" loose Pulleys on the Rod 14, round one of the $\frac{1}{2}"$ loose Pulleys at the jib head, back to the remaining 1" loose Pulley at 14, and finally over the other $\frac{1}{2}"$ loose Pulley at the jib head and down to the hook. When a load is put on the hook the cords between the jib head and the top of the superstructure tend to contract, thus taking all the load off the luffing cords.

The rails of the carriage 13 should be kept well oiled, so that the carriage slides easily.

Parts required:

10 of No. 1	2 of No. 27A
20 " " 2	9 " " 35
5 " " 3	105 " " 37
5 " " 5	1 " " 37A
2 " " 6A	24 " " 38
6 " " 8	2 " " 40
1 " " 11	2 " " 46
2 " " 12	2 " " 48
2 " " 14	2 " " 48A
1 " " 15A	3 " " 48B
5 " " 16	1 " " 52
2 " " 17	2 " " 57
2 " " 18A	7 " " 59
1 " " 19S	3 " " 63
2 " " 19B	1 " " 111
4 " " 20	6 " " 111C
4 " " 20B	2 " " 115
2 " " 22	1 " " 147B
2 " " 22A	1 " " 162A
2 " " 23	
2 " " 24	
1 " " 26	

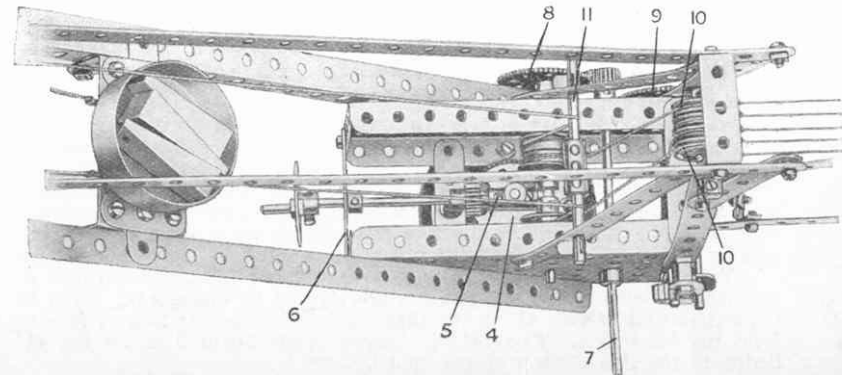
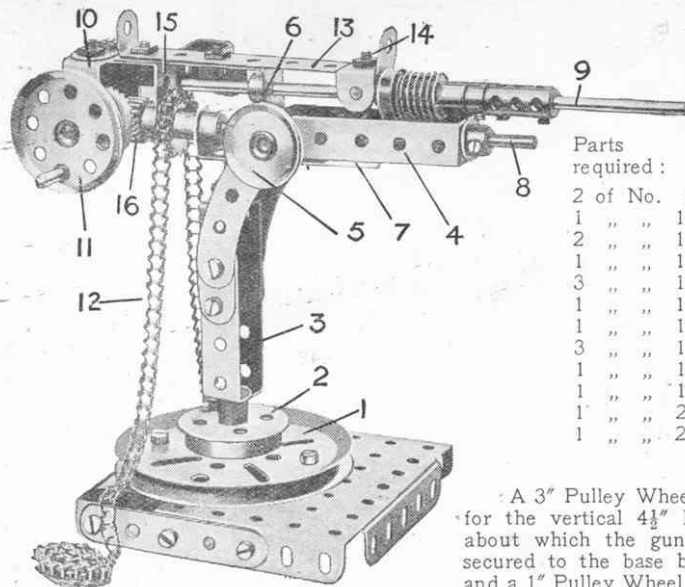


FIG. 4.45A. Plan view of gear box.

These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

21

Model No. 4.46 Naval Quick-firing Gun

Parts
required :

2 of No.	5
1	10
2	11
1	12
3	12A
1	14
1	15A
3	17
1	18A
1	19B
1	20B
1	21
2 of No.	22
1	23
1	26
1	29
1	32
2	35
24	37
2	38
1	45
1	46
5	48A
2	48B
2	53
8	59
1	63
4	90
40	94
1	96A
2	111C
1	115
1	125

A 3" Pulley Wheel 1 provides a bearing for the vertical 4½" Rod forming the axis about which the gun pivots. The Rod is secured to the base by a Flanged Wheel 2 and a 1" Pulley Wheel attached to it beneath the larger Wheel 1. Two Double Angle

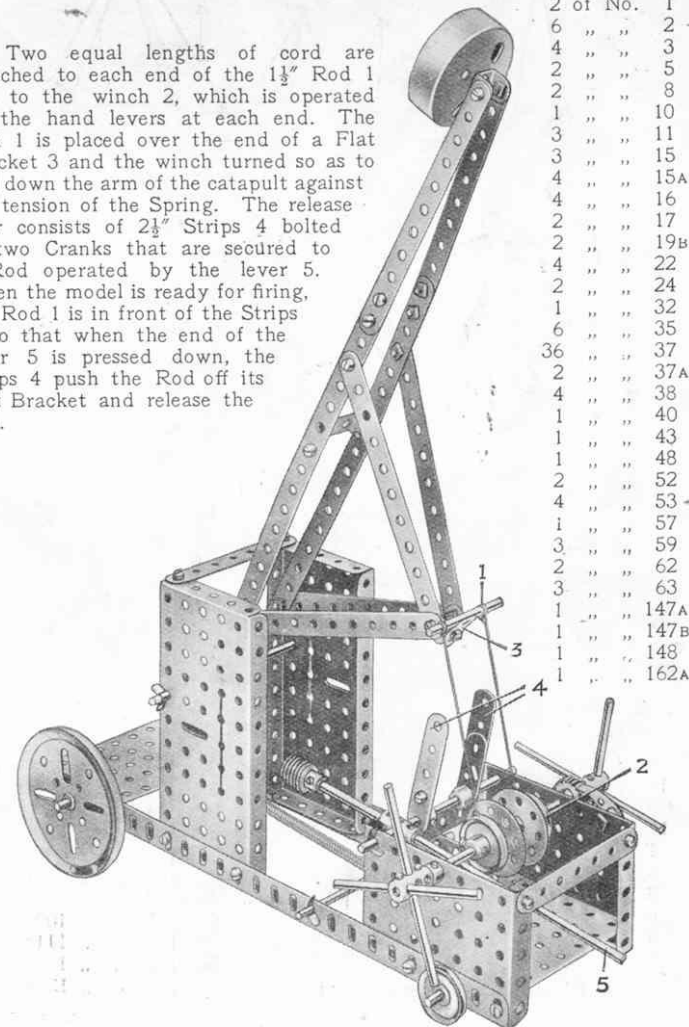
Strips 3, spaced apart by a Double Bracket, are mounted upon this vertical Rod and held in place by a Collar secured to its upper end. Two 2½" Curved Strips overlapped 4 holes are bolted to each of the Double Angle Strips 3, and their upper holes form bearings for a short Rod passing through the ends of further Double Angle Strips 4, and carrying a hand wheel 5. Two Spring Clips are mounted on this Rod inside the Strips 4 to secure it to the pivoting portion of the gun, the elevation of which may be altered on turning the Wheel 5. The Strips 4 are bolted to the end of a Double Angle Strip 6, and the same Bolt secures an Angle Bracket which in turn is bolted to the Double Angle Strip 7. The Rod 8 passes through the end holes of the Strips 4 and 7 and is held in place by two Collars. On the top of the Strip 6 is bolted a 3½" Double Angle Strip 13, the upturned ends of which form the sighting apertures. The Bolt 14 secures a Double Bracket and an Angle Bracket, the latter together with one of the holes in the Strip 6 forming bearings for the barrel 9. A 1" x 1" Angle Bracket 15, bolted beneath the Strip 6, and the end of the Strip 7 provide bearings for the short Rod carrying a ¾" Sprocket Wheel and ½" Pinion 16. Two 1" x 1" Angle Brackets 10 form bearings for a 2" Rod carrying the hand Wheel 11. This Rod is fitted with a ¾" Contrate Wheel which engages with the Pinion 16. On rotation of the Wheel 11, the small Sprocket Wheel actuates the Sprocket Chain 12 which represents the cartridge belt.

Model No. 4.47 Catapult

Two equal lengths of cord are attached to each end of the 1½" Rod 1 and to the winch 2, which is operated by the hand levers at each end. The Rod 1 is placed over the end of a Flat Bracket 3 and the winch turned so as to pull down the arm of the catapult against the tension of the Spring. The release gear consists of 2½" Strips 4 bolted to two Cranks that are secured to a Rod operated by the lever 5. When the model is ready for firing, the Rod 1 is in front of the Strips 4, so that when the end of the lever 5 is pressed down, the Strips 4 push the Rod off its Flat Bracket and release the arm.

Parts
required :

2 of No.	1
6	2
4	3
2	5
2	8
1	10
3	11
3	15
4	15A
4	16
2	17
2	19B
4	22
2	24
1	32
6	35
36	37
2	37A
4	38
1	40
1	43
1	48
2	52
4	53
1	57
3	59
2	62
3	63
1	147A
1	147B
1	148
1	162A



This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.48 Flying Machine

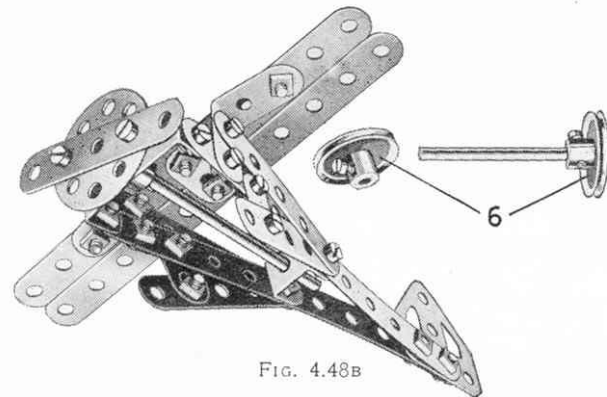
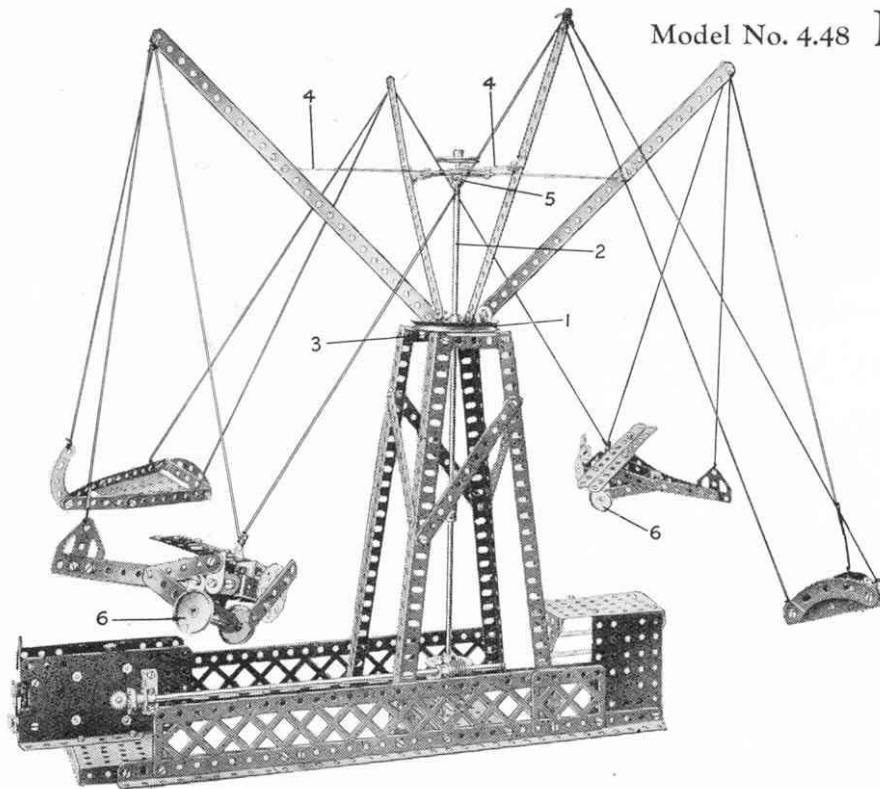


FIG. 4.48B

In Fig. 4.48 the model is shown equipped with a Meccano Electric Motor. Fig. 4.48A, which shows the base of the model only, indicates an alternative arrangement by which the model may be operated by hand if a Motor is not available. The revolving portion of the model consists of four $12\frac{1}{2}$ " Strips bolted to the 3" Pulley Wheel 1 (Fig. 4.48) which is secured to the main vertical shaft 2 and rests directly on the $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate 3. The $12\frac{1}{2}$ " Strips are supported by two further $12\frac{1}{2}$ " Strips 4, crossed and bolted to a Face Plate 5 secured to the Rod 2. One of the aeroplanes attached to the model is shown in detail in Fig. 4.48B. The Wheels 6 are shown removed from their bearings.

Parts required :

6 of No. 1	4 of No. 12A	1 of No. 27A	3 of No. 53
16 " " 2	2 " " 13	1 " " 29	2 " " 54
2 " " 2A	1 " " 14	1 " " 32	3 " " 59
11 " " 5	2 " " 16	122 " " 37	1 " " 63
1 " " 6A	2 " " 17	2 " " 37A	4 " " 90A
6 " " 8	1 " " 19B	2 " " 40	1 " " 98
3 " " 9	1 " " 21	1 " " 46	2 " " 99
6 " " 10	4 " " 22	2 " " 48	1 " " 109
3 " " 11	2 " " 24	6 " " 48A	2 " " 111c
2 " " 12	1 " " 26	2 " " 52	2 " " 126
			2 " " 126A

Electric Motor (not included in Outfit)

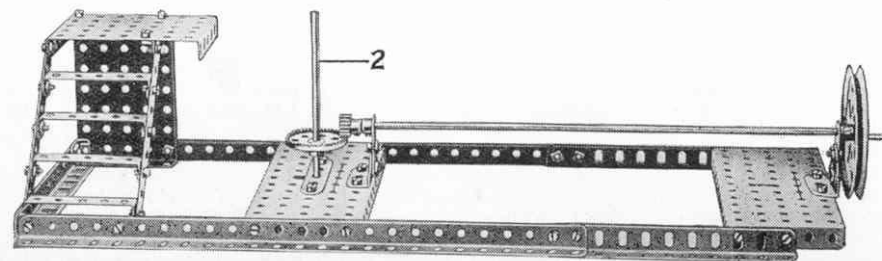
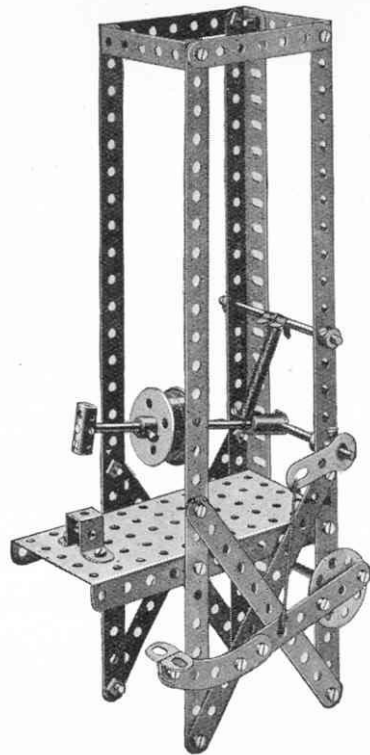


FIG. 4.48A

These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.49 Treadle Hammer



Parts required :

2 of No. 1	3 of No. 16	1 of No. 45
4 " " 2	2 " " 20B	1 " " 48A
3 " " 3	1 " " 24	1 " " 52
1 " " 5	2 " " 35	5 " " 59
2 " " 8	23 " " 37	1 " " 62
2 " " 12	2 " " 38	2 " " 63
1 " " 15A	1 " " 43	1 " " 90

Model No. 4.50 Ancient Motor Car

This model performs very amusing antics, all its movements being derived from a Clockwork Motor in the chassis. When the Motor is set in motion the model wobbles violently along the floor, while the driver seems to be endeavouring to keep it in a straight line and the passenger (who seems to have fallen on to the floor!) appears in constant danger of being thrown completely out of the car!

A $\frac{1}{2}$ " Pinion on the Motor shaft engages with the $1\frac{1}{2}$ " Contrate Wheel 1 attached to the back axle 2. The latter is journalled in two $2\frac{1}{2}$ " Flat Girders bolted to two $5\frac{1}{2}$ " Angle Girders to which the Clockwork Motor is attached. Two Couplings 3 are fixed to each extremity of the Rod 2, and the road wheels are attached to their centre threaded holes by Threaded Pins. The Couplings are set at an angle of 180 degrees to one another and so cause the car to wobble in a most peculiar manner when it is running.

A 57-teeth Gear 4 is fixed to a $4\frac{1}{2}$ " Rod 5 that carries at one end a Bush Wheel. This is connected to the front wheels by a link built up of $3\frac{1}{2}$ " and $4\frac{1}{2}$ " Strips and attached by an Angle Bracket 7 to the $2\frac{1}{2}$ " Double Angle Strip 8 that forms a bearing for the front axle. This results in the front road wheels being turned alternately from side to side. The $1\frac{1}{2}$ " Rod forming the pivot for the steering should be kept fairly loose to allow for the rolling of the chassis.

A $4\frac{1}{2}$ " Strip 6 is lock-nutted to the Double Angle Strip 8 at one end and at the other to a Crank 9 which is fixed to a $3\frac{1}{2}$ " Rod. This is journalled in the holes of the Clockwork Motor and at its top a Bush Wheel is secured. The driver is attached pivotally to the Bush Wheel by an Angle Bracket and $2\frac{1}{2}$ " Strip, so that when the Motor is in motion he steers quite realistically. The passenger at the back is attached to the frame by a Spring clamped between two $1\frac{1}{2}$ " Strips.

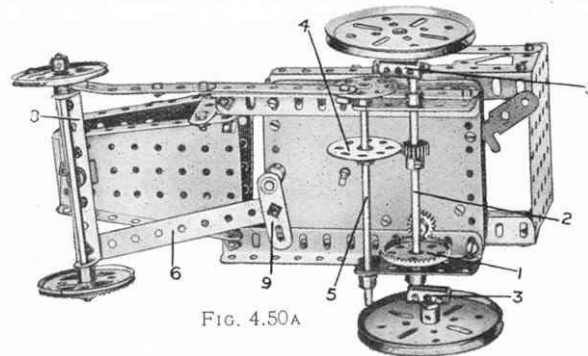
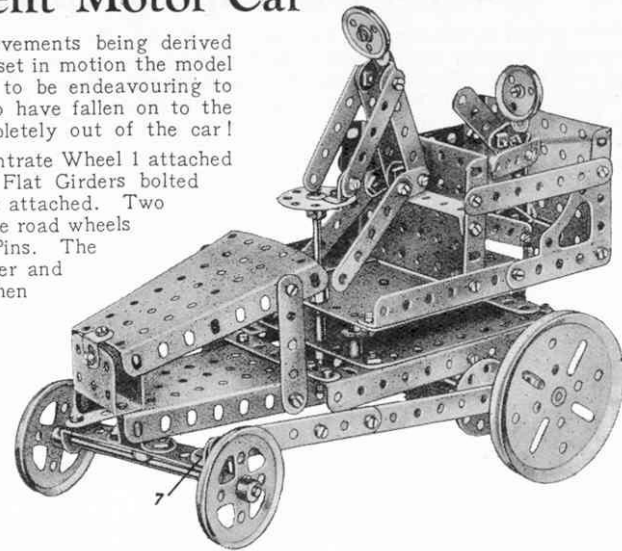


FIG. 4.50A



Parts required :

2 of No. 2A	3 of No. 12	8 of No. 38
3 " " 3	1 " " 15	1 " " 43
13 " " 5	2 " " 15A	1 " " 45
2 " " 6A	1 " " 16	2 " " 48B
4 " " 9	1 " " 17	2 " " 53
4 " " 10	2 " " 19B	2 " " 54
4 " " 11	2 " " 20A	10 " " 59
	2 " " 22A	1 " " 62
	2 " " 24	2 " " 63
	2 " " 26	2 " " 103F
	1 " " 27A	2 " " 108
	1 " " 28	5 " " 111c
	57 " " 37	2 " " 115
	14 " " 37A	1 " " 160

Clockwork Motor
(not included in Outfit)

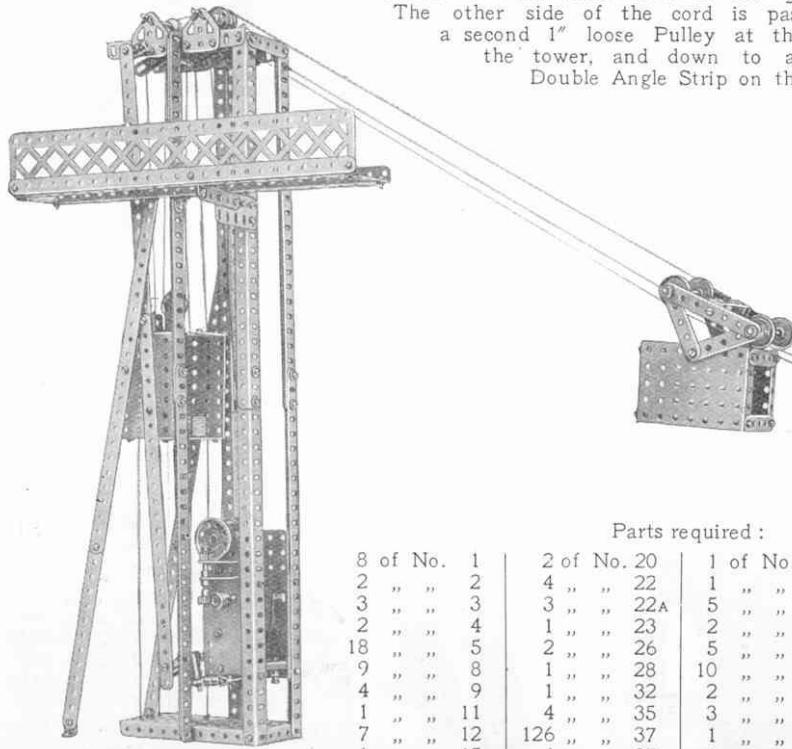


These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.51 Telpher Span

A Worm Wheel on the armature spindle of the Electric Motor engages with a $\frac{1}{2}$ " Pinion that is secured, together with a second $\frac{1}{2}$ " Pinion, on a vertical 2" Rod. This Rod is journalled in a Channel Bearing secured to the Motor side plates. The second $\frac{1}{2}$ " Pinion engages with a $1\frac{1}{2}$ " Contrate Wheel carried on the hoisting drum, the latter being formed by a $2\frac{1}{2}$ " Rod journalled in the end holes of the Motor side plates. The lift and telpher hoisting rope, which is continuous, is wound round the hoisting drum three turns, and is then connected to the lift and telpher in the following manner.

One side of the cord is passed over 1" and $\frac{1}{2}$ " loose Pulleys at the top of the tower, then over a 1" fast Pulley attached to the cage, and is finally attached to a Flat Bracket that is carried on the same Rod as the $\frac{1}{2}$ " Pulley. The other side of the cord is passed over a second 1" loose Pulley at the top of the tower, and down to a $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip on the telpher.

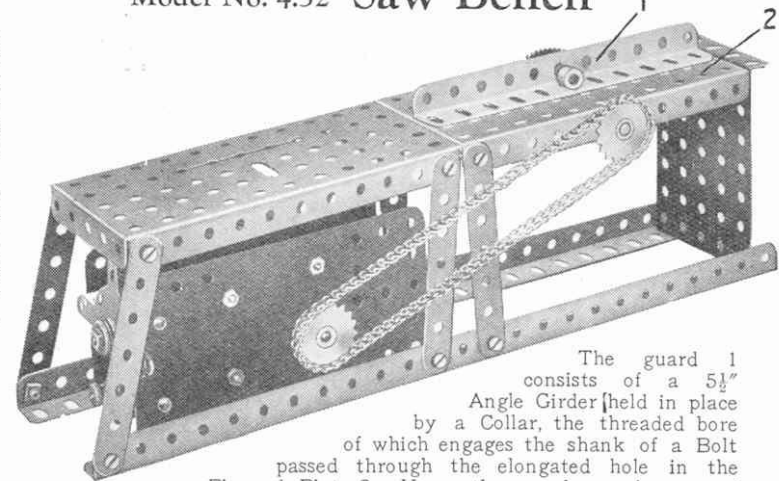


Parts required :

8 of No. 1	2 of No. 20	1 of No. 44	1 of No. 115
2 " " 2	4 " " 22	1 " " 45	4 " " 126A
3 " " 3	3 " " 22A	5 " " 48A	1 " " 160
2 " " 4	1 " " 23	2 " " 52	1 " " 162A
18 " " 5	2 " " 26	5 " " 53	1 " " 165
9 " " 8	1 " " 28	10 " " 59	1 " " 166
4 " " 9	1 " " 32	2 " " 62	
1 " " 11	4 " " 35	3 " " 63	
7 " " 12	126 " " 37	1 " " 98	
1 " " 15A	6 " " 37A	1 " " 99	
5 " " 16	24 " " 38	2 " " 103F	
2 " " 18A	1 " " 40	4 " " 111c	

Electric
Motor
(not included
in Outfit)

Model No. 4.52 Saw Bench

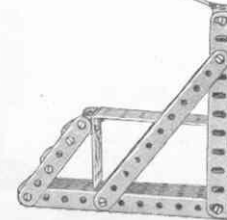


The guard 1 consists of a $5\frac{1}{2}$ " Angle Girder held in place by a Collar, the threaded bore of which engages the shank of a Bolt passed through the elongated hole in the Flanged Plate 2. Hence the guard may be moved nearer or further from the Circular Saw as required to allow for different thicknesses of material.

Parts
required :

6 of No. 3
2 " " 8
1 " " 9
1 " " 16
22 " " 37
2 " " 52
1 " " 53
1 " " 59
15" " 94
2 " " 96
1 " " 111c
1 " " 159
1 " " 160

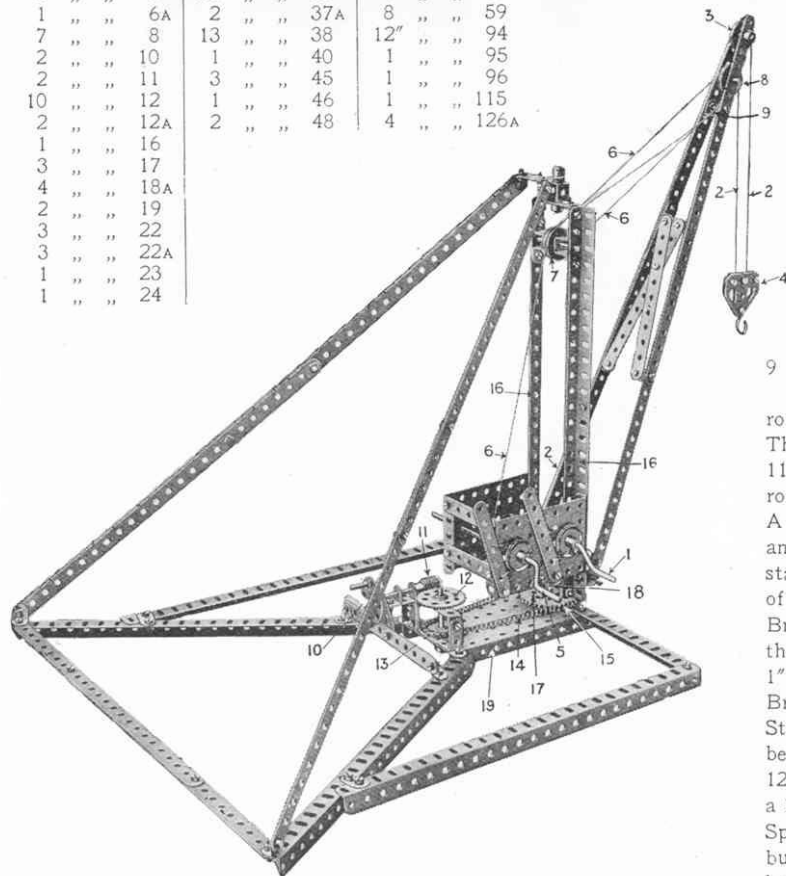
Electric
Motor
(not included
in Outfit)



Model No. 4.53 Swivelling and Luffing Jib Crane

Parts required :

10 of No.	1	1 of No.	27A	3 of No.	48A
3	2	1	32	1	52
3	3	2	35	2	53
2	5	80	37	1	57
1	6A	2	37A	8	59
7	8	13	38	12	94
2	10	1	40	1	95
2	11	3	45	1	96
10	12	1	46	1	115
2	12A	2	48	4	126A
1	16				
3	17				
4	18A				
2	19				
3	22				
3	22A				
1	23				
1	24				



In this model three separate actions are provided, for raising the load, raising the jib, and swivelling the jib. The load is raised by means of a Crank Handle 1 on which the Cord 2 is wound and passes over the 1" Pulley 3, thence round the $\frac{1}{2}$ " Pulley in the block 4 (spacing Washers being used to give clearance to the $\frac{1}{2}$ " Pulley), the end of the Cord 2 being made fast to the top of the jib. By turning the Handle 1 the load is raised or lowered. The jib itself is raised or lowered by the operation of the Crank Handle 5 on the rod of which a cord is wound, and passes over one of two Pulleys 7 to and round another 1" Pulley 8 in the jib, whence it returns to and passes round the other Pulley 7, being finally made fast to the Double Bracket 9 bolted to the jib.

As the Handle 5 is turned the Cord 6 is wound round the pulleys and the angle of the jib varied. The jib is swivelled by the hand wheel 10, a Worm 11 on which engages a 57-toothed Wheel 12 on the rod of which a 1" Sprocket Wheel 13 is mounted. A Sprocket Chain 14 passes round this Wheel 13 and round a 2" Sprocket Wheel 15 secured to the standard 16 of the crane. The bearing for the Rod of the Worm 11 is made by bolting a 1" Angle Bracket 20 to the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate 19, and to the Angle Bracket 20 is secured a $1\frac{1}{2}"$ Strip 21 and a 1" Bracket 22. To the Bracket 22 is bolted a Double Bracket 23. A Flat Trunnion 24 is bolted to the $5\frac{1}{2}"$ Strip 25 which forms with the Bracket 23 the front bearing for the Rod. The standard is built up of two $12\frac{1}{2}"$ Girders 16 which are connected at the base by a $1\frac{1}{2}"$ Double Angle Strip 17 which is bolted to the 2" Sprocket Wheel 15. The 1" Rod 18 is secured in the bush of the Sprocket Wheel 15 and fitted with a Collar below the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate 19, Fig. 4.53b.

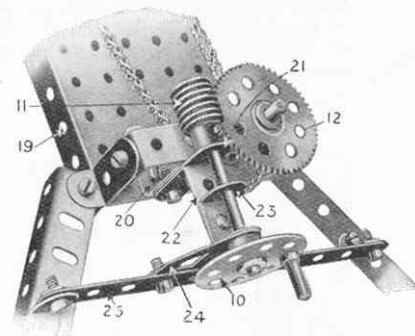


Fig. 4.53A

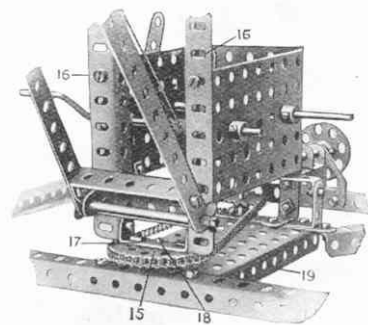
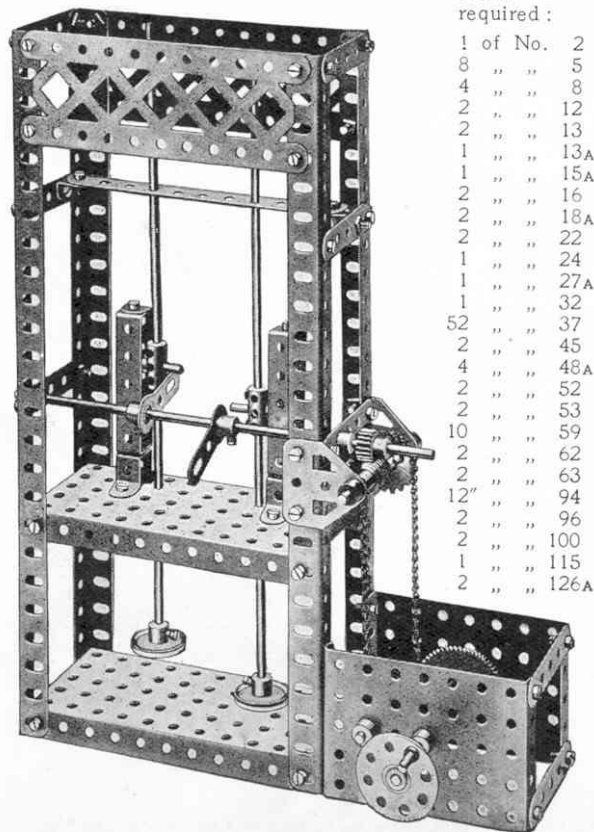


Fig. 4.53B

These Models can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.54 Trip Hammer

The shafts carrying the hammers are prevented from rotating in their bearings by means of $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips bolted in pairs to form guides, in which slide the heads of Bolts or short Rods secured to the Couplings in the centre of the hammer shafts. As the Rod carrying the Cranks slowly rotates the hammers rise and fall alternately.



Parts
required :

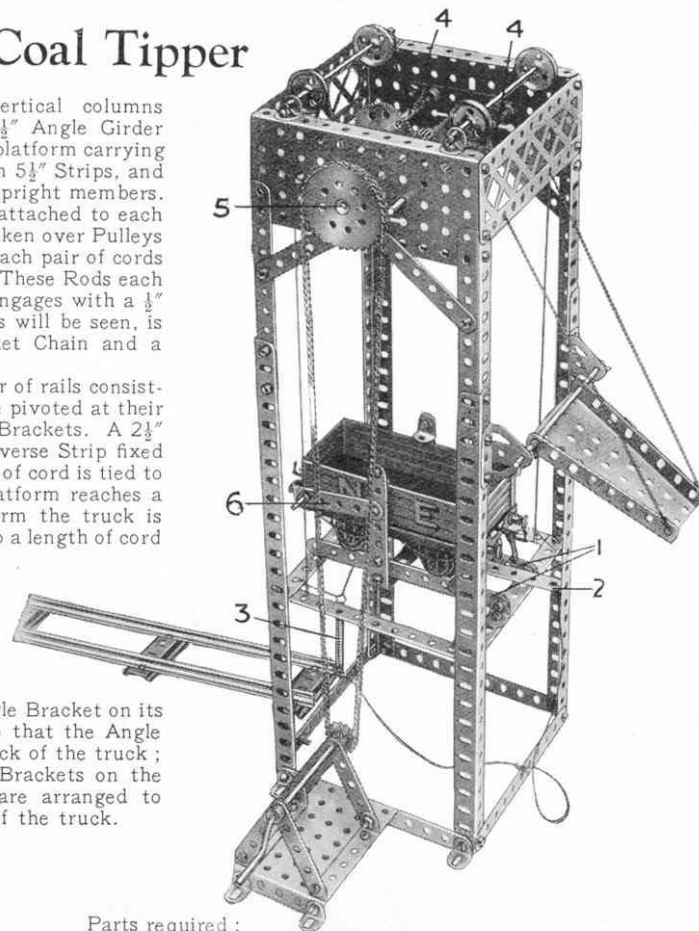
1	of No.	2
8	" "	5
4	" "	8
2	" "	12
2	" "	13
1	" "	13A
1	" "	15A
2	" "	16
2	" "	18A
2	" "	22
1	" "	24
1	" "	27A
1	" "	32
52	" "	37
2	" "	45
4	" "	48A
2	" "	52
2	" "	53
10	" "	59
2	" "	62
2	" "	63
12"	" "	94
2	" "	96
2	" "	100
1	" "	115
2	" "	126A

Model No. 4.55 Coal Tipper

Each of the main vertical columns consists of a $12\frac{1}{2}"$ and a $5\frac{1}{2}"$ Angle Girder overlapped three holes. The platform carrying the truck is constructed from $5\frac{1}{2}"$ Strips, and it slides freely between the upright members. Four cords of equal length, attached to each corner of the platform, are taken over Pulleys at the top of the structure, each pair of cords being wound on to a Rod 4. These Rods each carry a 57-teeth Gear that engages with a $\frac{1}{2}"$ Pinion on a Rod 5. This, as will be seen, is driven by means of Sprocket Chain and a Crank Handle.

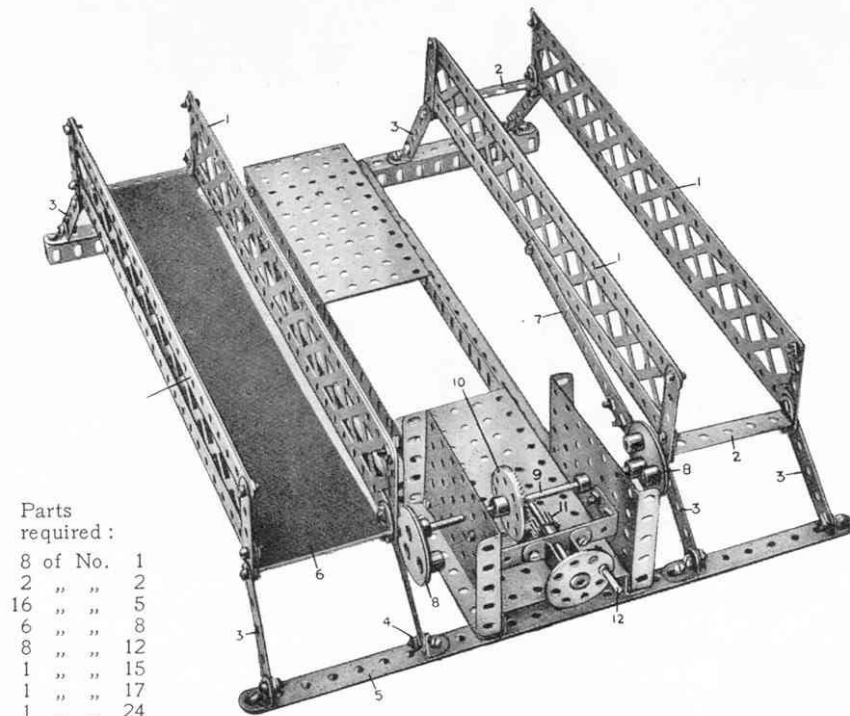
The truck rests on a pair of rails consisting of $5\frac{1}{2}"$ Strips 1, which are pivoted at their front ends on $\frac{1}{2}" \times \frac{1}{2}"$ Angle Brackets. A $2\frac{1}{2}"$ Strip 2 is secured to a transverse Strip fixed across the rails, and a length of cord is tied to its end so that when the platform reaches a certain height of the platform the truck is tipped. A Spring 3 secured to a length of cord is attached to the rear end of the platform, in order to keep the platform in a horizontal plane when the truck tips.

To keep the truck in place on the rails, a pivoted Strip 6, with a $\frac{1}{2}" \times \frac{1}{2}"$ Angle Bracket on its end, can be swung round so that the Angle Bracket engages with the back of the truck ; while further $\frac{1}{2}" \times \frac{1}{2}"$ Angle Brackets on the top of the vertical Strips are arranged to engage with the top edges of the truck.



Parts required :

10 of No.	2	3 of No.	14	12 of No.	35	3 of No.	48A	1 of No.	96A
2	" "	3	" "	85	" "	2	" "	2	" "
6	" "	4	" "	9	" "	1	" "	2	" "
9	" "	5	" "	6	" "	1	" "	1	" "
4	" "	8	" "	1	" "	9	" "	2	" "
4	" "	9	" "	1	" "	30"	" "		
21	" "	12	" "	1	" "	1	" "		
				37		52		100	
				37A		53		111	
				38		54		115	
				40		59		126	
				43		94			
				46		95			

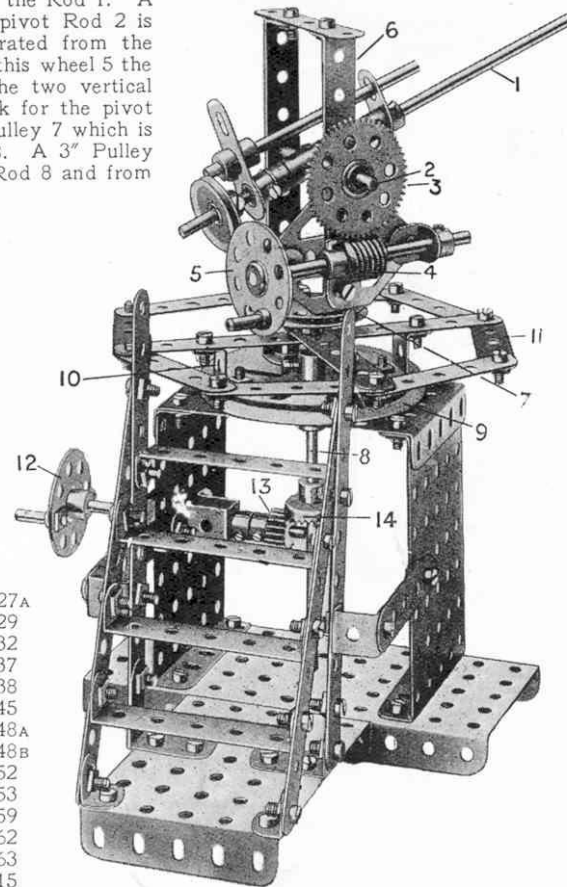
Model No. 4.56 **Cake Walk**Parts
required :

8 of No.	1
2 "	2
16 "	5
6 "	8
1 "	12
1 "	15
1 "	17
1 "	24
1 "	26
1 "	28
66 "	37
1 "	38
1 "	45
1 "	46
4 "	48A
2 "	52
2 "	53
2 "	59
4 "	99
1 "	115
2 "	130

The rocking platforms are built up of Braced Girders 1 connected by the end Strips 2 and pivotally bolted and lock-nutted to the Strips 3 forming rocking links. These latter are bolted and lock-nutted at 4 to the Angle Girders 5. Strips 6 of cardboard are secured to the end Strips 2. The platforms are rocked by means of Strips 7, one of which is connected to each rocking platform and to Eccentrics 8 fixed on the Rod 9 on which is secured a Contrate Wheel 10 driven by a Pinion 11 from the handle 12. As the handle 12 is turned the platforms are rocked to and fro on the Strips 3. The eccentrics 8 should be so arranged that the platforms rock in opposite directions.

Model No. 4.57 **Anti-Aircraft Gun**

The gun represented by the Rod 1 is pivoted upon a transverse Rod 2 which passes through a Coupling on the Rod 1. A 57-toothed Wheel 3 on the pivot Rod 2 is engaged by a Worm 4 operated from the hand wheel 5. By turning this wheel 5 the gun is lifted or lowered. The two vertical Strips forming the framework for the pivot Rod 2 are bolted to a $1\frac{1}{2}$ " Pulley 7 which is secured on a vertical Rod 8. A 3" Pulley Wheel 9 is also bolted to a Rod 8 and from the Pulley Wheel is carried by reversed Angle Brackets 10 a framework 11. The Rod 8 with the framework is rotated from the hand wheel 12, a Pinion 13 on the spindle of which engages a $\frac{3}{4}$ " Contrate Wheel 14 on the Rod 8. By turning the wheel 12 the gun is swivelled round.

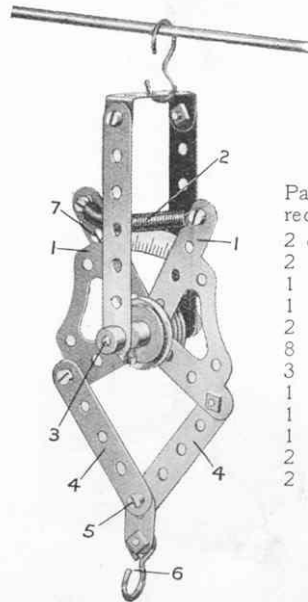


Parts required :

6 of No.	2	1 of No.	27A
11 "	5	1 "	29
1 "	10	1 "	32
2 "	11	64 "	37
4 "	12	12 "	38
2 "	12A	2 "	45
1 "	15	4 "	48A
1 "	15A	2 "	48B
4 "	16	1 "	52
1 "	17	4 "	53
1 "	19B	8 "	59
1 "	21	1 "	62
2 "	22	2 "	63
2 "	24	2 "	115
1 "	26	4 "	125
2 of No. 126A			

Model No. 4.58 Spring Balance

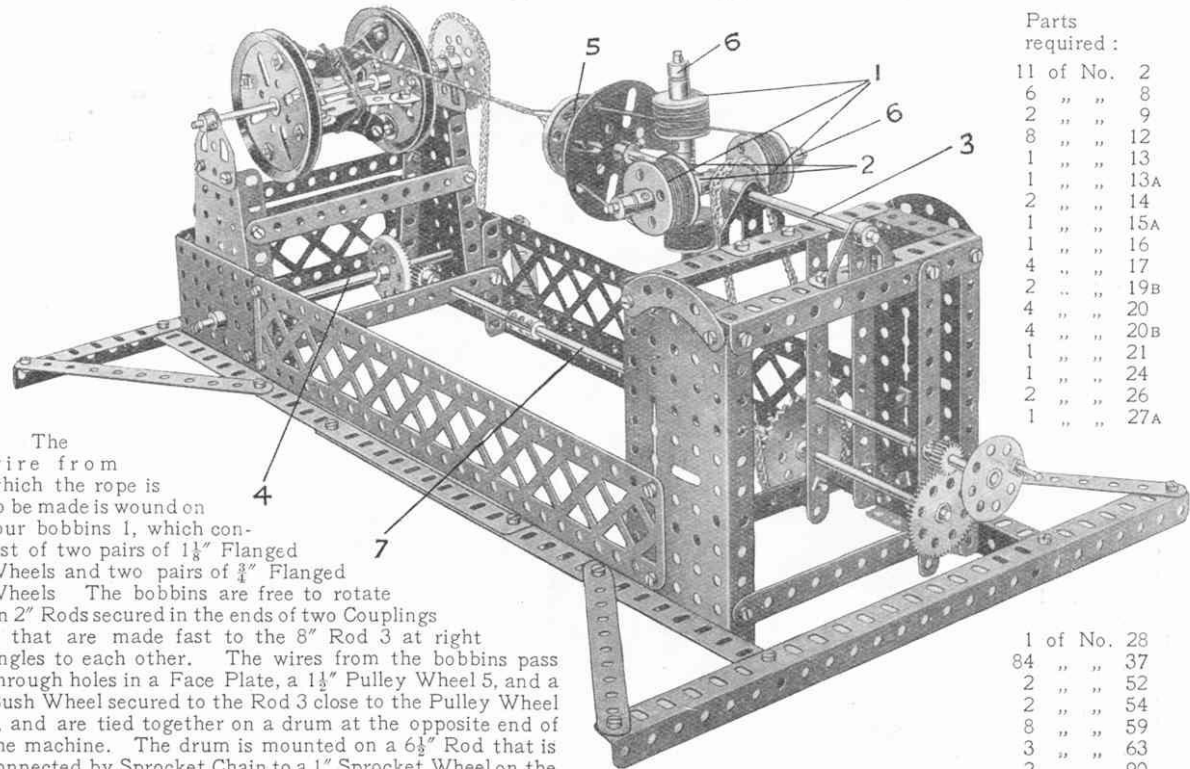
The architraves 1 are pivoted on the Rod 3 and secured at their upper ends to a Spring 2. Two 2½" Strips 4 are attached pivotally to their lower ends by Bolts and lock-nuts and connected together in a similar manner. The Hook 6 suspended from a Flat Bracket receives the article to be weighed, which causes the upper ends of the Architraves to move outward, and the weight may be ascertained from the scale that is bolted in position at 7.



Parts
required:

2 of No.	3
2 "	5
1 "	10
1 "	17
2 "	22
8 "	37
3 "	37A
1 "	43
1 "	48
1 "	57
2 "	59
2 "	108

Model No. 4.59 Wire Rope-Making Machine



The wire from which the rope is to be made is wound on four bobbins 1, which consist of two pairs of 1½" Flanged Wheels and two pairs of ¾" Flanged Wheels. The bobbins are free to rotate on 2" Rods secured in the ends of two Couplings 2 that are made fast to the 8" Rod 3 at right angles to each other. The wires from the bobbins pass through holes in a Face Plate, a 1½" Pulley Wheel 5, and a Bush Wheel secured to the Rod 3 close to the Pulley Wheel 5, and are tied together on a drum at the opposite end of the machine. The drum is mounted on a 6½" Rod that is connected by Sprocket Chain to a 1" Sprocket Wheel on the Rod 4, which is revolved slowly from the hand wheel through the gearing shown.

The Rod 3, together with the bobbins, Face Plate, Pulley Wheel 5, and the Bush Wheel, are rotated from the main driving shaft 7 by means of 2" and 1" Sprocket Wheels. The wires are thus twisted together between the Pulley Wheel 5 and the drum, and are wound on the latter in the form of a cable. In order to prevent the wire from unwinding too rapidly, Washers are placed on the 2" Rods between the Couplings and the bosses of the Flanged Wheels 1, and the Collars 6 are pressed hard against the wheels before being secured to the 2" Rods.

A considerable amount of tension is essential to the production of good wire rope, and for this reason the 1½" Pulley Wheel 5 and the Bush Wheel behind it are secured close together on the Rod 3 in such a manner that the friction generated by the wires in passing through the holes in the wheels keeps the cable taut while it is being twisted. String or thin wire may be used in the model.

Parts
required:

11 of No.	2
6 "	8
2 "	9
8 "	12
1 "	13
1 "	13A
2 "	14
1 "	15A
1 "	16
4 "	17
2 "	19B
4 "	20
4 "	20B
1 "	21
2 "	24
2 "	26
1 "	27A

1 of No.	28
84 "	37
2 "	52
2 "	54
8 "	59
3 "	63
2 "	90
4 "	90A
15 "	94
2 "	95
2 "	96
2 "	99
1 "	100
1 "	109
1 "	115
2 "	126
2 "	126A

This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

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Model No. 4.60 Elevated Jib Crane

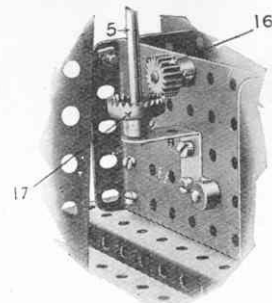


FIG. 4.60A

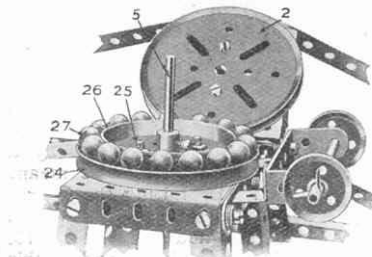


FIG. 4.60B

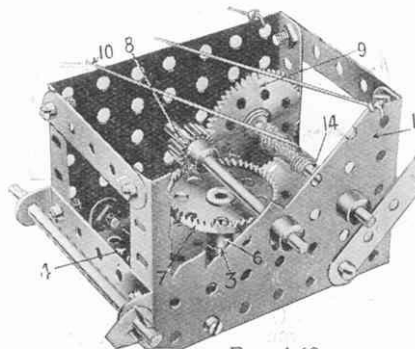


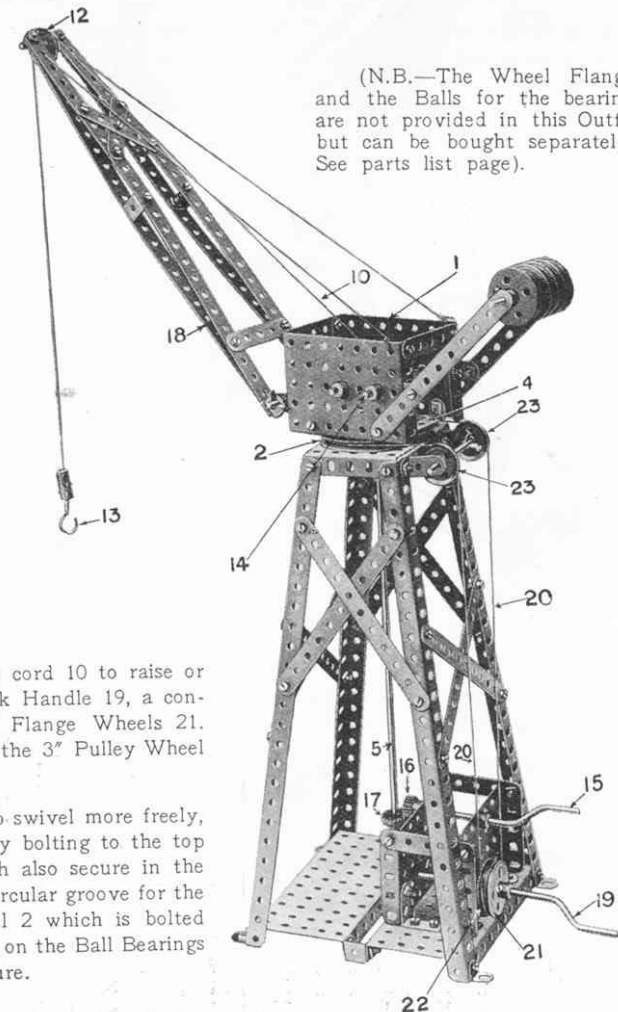
FIG. 4.60C

Parts required :

4 of No. 1	1 of No. 19	1 of No. 29
10 " " 2	1 " " 19B	4 " " 35
1 " " 3	1 " " 19S	85 " " 37
8 " " 5	4 " " 20	1 " " 40
4 " " 8	2 " " 20B	1 " " 46
4 " " 11	1 " " 21	3 " " 48A
14 " " 12	1 " " 22	2 " " 52
3 " " 12A	2 " " 22A	5 " " 53
1 " " 13	2 " " 26	1 " " 57
5 " " 16	1 " " 27A	6 " " 59
1 " " 18A	1 " " 28	1 " " 63

The gear-box 1 is secured to a 3" Pulley Wheel 2 (the boss 3 of which is upward) by means of two 2½" × ½" Double Angle Strips 4. The 11½" Rod 5 passes up through the boss 3, a Collar 6 being placed on top of the boss. The Contrate Wheel 7 is then secured to the top of the Rod 5. A ½" Pinion 8 engages the Contrate Wheel 7 and also a 57-toothed Wheel 9 on the Rod 14 on which latter the hoisting cord 10 is wound, passing over the 1" Pulley 12 to the Hook 13. The Rod 5 is actuated from the Crank Handle 15 by the Pinion 16 engaging a ¾" Contrate Wheel 17 and through the Gear Wheels 7, 8, and 9, and operates the cord 10 to raise or lower the load. The jib 18 is swivelled from the Crank Handle 19, a continuous cord 20 being wound twice round the ¾" Flange Wheels 21. The cord 20 passes over 1" guide Pulleys 23 and round the 3" Pulley Wheel 2. By turning the handle 19 the jib is swivelled.

Alternative Construction. In order to make the jib swivel more freely, a ball-race, Fig. 4.60B, may be fitted. This is made by bolting to the top of the frame a 3" Pulley Wheel 24 by Bolts 25 which also secure in the Pulley Wheel 24 a Wheel Flange 26. This provides a circular groove for the reception of the Ball Bearings 27. The Pulley Wheel 2 which is bolted to the gear-box 1 is then placed over the Rod 5 and rests on the Ball Bearings 27, which thus support the weight of the superstructure.



(N.B.—The Wheel Flange and the Balls for the bearing are not provided in this Outfit but can be bought separately. See parts list page).

This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

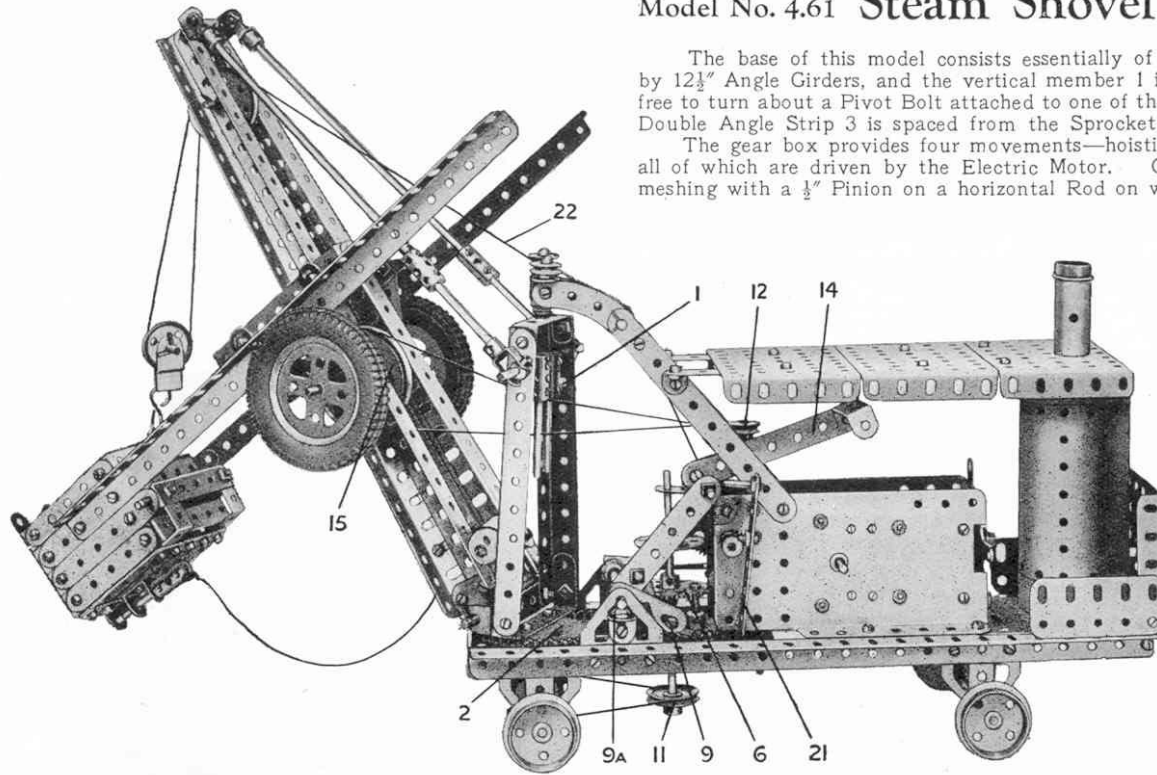
Model No. 4.61 Steam Shovel

The base of this model consists essentially of two $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates connected together by $12\frac{1}{2}''$ Angle Girders, and the vertical member 1 is secured firmly to a 2" Sprocket Wheel 2 that is free to turn about a Pivot Bolt attached to one of the base plates. It should be noted that the $2\frac{1}{2}'' \times 1''$ Double Angle Strip 3 is spaced from the Sprocket 2 by the thickness of two Washers.

The gear box provides four movements—hoisting and lowering, racking, slewing, and travelling, all of which are driven by the Electric Motor. On the armature spindle of the Motor is a Worm meshing with a $\frac{1}{2}''$ Pinion on a horizontal Rod on which is secured also a $\frac{3}{4}''$ Contrate. The latter is

in constant mesh with a $\frac{1}{2}''$ Pinion 4 on a short Rod that is journaled in the Motor side plates and carries a Worm 5.

The slewing and travelling motions are actuated through a novel form of clutch, shown in Figs. 4.61 and 4.61c. A 57-teeth Gear 6 meshes with the Worm 5. It is loose on its Rod 10 and may be raised or lowered by means of two Cranks 9, which are secured to a Rod and have in their end holes Bolts the shanks of which engage with the underside of the Gear. When the Gear is moved downwards, one of two $\frac{3}{4}''$ Bolts 6A secured to it, engages with one of the holes in a 2" Sprocket 7, which is loose on the Rod 10 and is connected to the Sprocket 2 by a length of Sprocket Chain. By this means the model is slewed. By raising the Gear 6 the second $\frac{3}{4}''$ Bolt engages with a Bush Wheel 8, which is fastened to the Rod 10. A 1" fast Pulley 11 on the lower end of this shaft is connected by a short belt of cord to a similar Pulley on the front axle.



Parts required :

6 of No. 2	3 of No. 14	3 of No. 23	1 of No. 44	3 of No. 90	1 of No. 162
2 " " 2A	1 " " 15	1 " " 23A	1 " " 45	11 " " 94	1 " " 163
6 " " 3	5 " " 15A	2 " " 24	1 " " 46	2 " " 95	1 " " 164
4 " " 4	5 " " 16	2 " " 26	2 " " 48	2 " " 103F	2 " " 165
18 " " 5	5 " " 17	2 " " 27A	10 " " 48A	2 " " 111	1 " " 166
2 " " 6A	4 " " 18A	1 " " 29	2 " " 52	3 " " 111c	
8 " " 8	4 " " 20	2 " " 32	4 " " 53	2 " " 115	Electric
2 " " 9	3 " " 20A	10 " " 35	1 " " 57	1 " " 116A	Motor
3 " " 10	1 " " 20B	125 " " 37	10 " " 59	3 " " 126	(not included
1 " " 11	1 " " 21	7 " " 37A	2 " " 62	4 " " 126A	in Outfit)
12 " " 12	2 " " 22	21 " " 38	6 " " 63	2 " " 142A	
4 " " 12A	1 " " 22A	1 " " 40	2 " " 77	1 " " 147B	

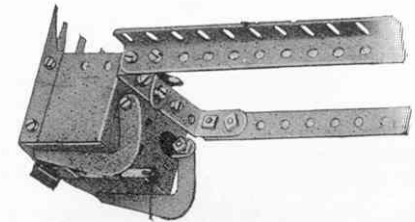


FIG. 4.61A. If available, the Meccano Digger Bucket (part No. 169) may be used with advantage in place of the built-up Bucket, as shown.

This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

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Model No. 4.61 Steam Shovel (continued)

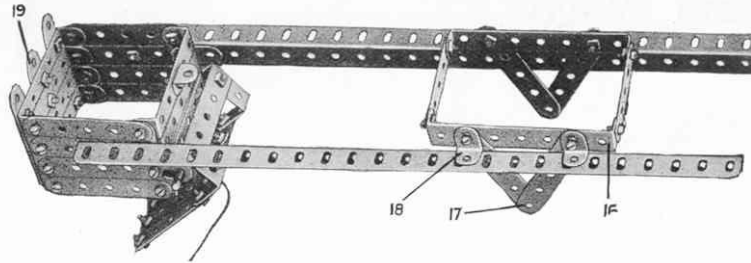


FIG. 4.61B. The Bucket Arm, with Bucket and Guide Frame in position.

secured to the top end of a Rod that carries a $\frac{1}{2}$ " Pinion 13, which may be brought into mesh with the Worm 5 by sliding the Rod downward with the aid of the lever 14. A belt of cord connects the Pulley 12 with a 2" Pulley 15 secured on a Rod that is journaled in the sides of the jib and which carries two other 2" Pulleys shod with Dunlop Tyres. The frame 16 (Fig. 4.61B) also is mounted on this Rod in the holes 17, and the Girders of the bucket arm engage between the $\frac{1}{2} \times \frac{1}{2}$ " Angle Brackets 18 and the tyre-shod Pulleys. The Brackets 18 should press the bucket arm only lightly into contact with the Tyres, and the driving belt should be taken several times round the Pulleys 12 and 15.

The construction of the bucket itself should be fairly obvious from Fig. 4.61B, with the exception of the catch for releasing the hinged bottom. The catch consists of a $1\frac{1}{2}$ " Rod free to slide in a Double Bracket that is bolted rigidly to the underneath of the bucket. One end of the Rod is fitted with a Coupling, to which the release cord is attached, and the other end fits into the lower hole of a 3" Strip 19.

The hoisting barrel consists of a $3\frac{1}{2}$ " Rod 20 that is free to slide in the Motor side plates and is controlled by the lever 21, so that the 57-teeth Gear on its extremity may be thrown into or out of engagement with the $\frac{1}{2}$ " Pinion 4. When out of gear the projecting shank of a Bolt on the Motor side plate engages with one of the holes of the 57-teeth Gear and thus prevents the unwinding of the barrel. The grub-screw in the boss of the Pinion 4 should be filed, if necessary, so that it does not foul the teeth of the 57-teeth Gear.

The pair of $\frac{1}{2}$ " loose Pulleys mounted at the top of the vertical member form guides round which the hoisting cord 22 passes when the jib is slewed round. The Boiler is retained in position by a $6\frac{1}{2}$ " Rod, which passes completely through it, and through the base plate, and is secured by a Bush Wheel on its lower end, and at its upper extremity by a $\frac{3}{4}$ " Flanged Wheel that forms the chimney cap.

It is an advantage to fill the Boiler with heavy objects so as to prevent the machine from tipping forward. Also, when working cross-track, it is advisable to provide "out-riggers." These should take the form of arms pivoted to the truck so that they may be swung out at right angles, and by having their ends packed up, used to relieve the wheels and axles from strain.

Much fun may be had with this model, not only during its construction but afterwards when it is set to work. Also, it may easily be converted into a crane by detaching the bucket arm and unhooking the bucket from the Pulley Block.

It should be borne in mind that the Gear 6 must be always in mesh with the Worm 5, unless it is required to throw it out of gear entirely, when it is only necessary to slide it up the Rod to its fullest extent. To prevent the Gear coming out of mesh with the Worm when in the slewing position, a Collar is fixed on the lower $\frac{3}{4}$ " Bolt, and in order to maintain the operating lever in position after movement, a Spring Clip 9A is mounted on the end of the Rod carrying the Cranks 9, and prevented from rotation by its ends engaging with a $\frac{1}{2} \times \frac{1}{2}$ " Angle Bracket bolted to the Flat Trunnion. Hence the required stiffness in the movement of the lever is obtained.

The drive for the racking movement is taken off a $\frac{1}{2}$ " fast Pulley 12

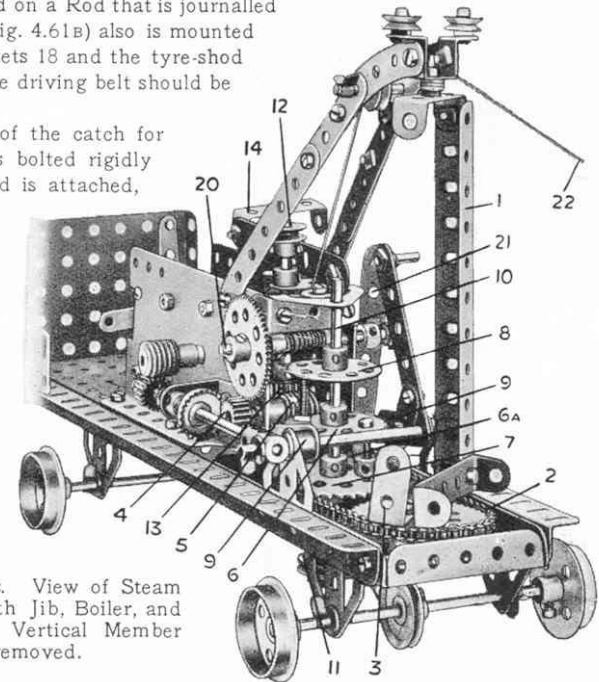
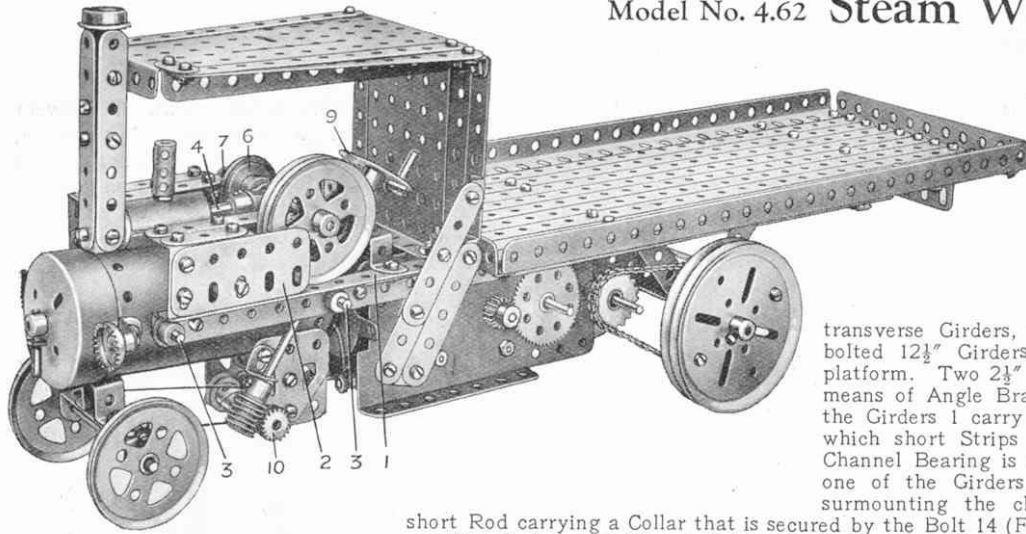


FIG. 4.61C. View of Steam Shovel with Jib, Boiler, and portion of Vertical Member removed.

This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.62 Steam Wagon



The main frame and the bodywork (Fig. 4.62B) should first be constructed. The frame consists essentially of two Girders 1 each formed from two $12\frac{1}{2}$ " Angle Girders overlapped and bolted together. The Girders 1 are spaced apart by $5\frac{1}{2}$ " transverse Girders, to the ends of which are bolted $12\frac{1}{2}$ " Girders forming the sides of the platform. Two $2\frac{1}{2}$ " Flat Girders 2 secured by means of Angle Brackets to the front ends of the Girders 1 carry $1" \times 1"$ Angle Brackets, to which short Strips are bolted as shown. A Channel Bearing is also secured in position to one of the Girders. The $\frac{3}{4}"$ Flanged Wheel surmounting the chimney is mounted on a

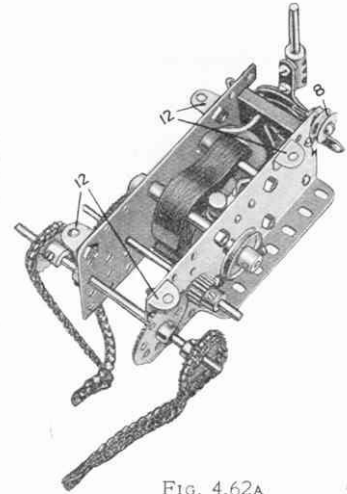


FIG. 4.62A

short Rod carrying a Collar that is secured by the Bolt 14 (Fig. 4.62B).

The boiler unit (Fig. 4.62C) is held in position by two $3\frac{1}{2}"$ Rods 3 that are passed through holes in the Girders 1, $5\frac{1}{2}"$ Strips being bolted to the Girders to cover the elongated holes. A Sleeve Piece represents the cylinder, on the inside of which an Angle Bracket is secured to hold a short Rod 4 representing the piston connecting Rod. A small Fork Piece is carried on the Rod so that its fork engages with the $3"$ Rod 5, journals for which are provided by a Double Bracket secured to the Boiler and by a Flat Bracket 7 that is bolted to the Channel Bearing on the frame. Two $2"$ Pulleys serve as a flywheel while a $1"$ Pulley 6 on the Rod takes up the drive from the armature spindle of the Electric Motor.

Parts required :

9 of No. 1	5 of No. 16	1 of No. 35	2 of No. 96
6 " " 2	3 " " 17	127 " " 37	2 " " 103F
6 " " 3	2 " " 18A	5 " " 37A	2 " " 111
10 " " 5	4 " " 19B	24 " " 38	6 " " 111c
1 " " 6A	4 " " 20A	1 " " 45	2 " " 115
6 " " 8	1 " " 20B	2 " " 48	1 " " 116A
3 " " 9	2 " " 22	3 " " 48A	1 " " 125
4 " " 10	3 " " 23	1 " " 52	4 " " 126A
5 " " 11	1 " " 24	1 " " 53	1 " " 160
19 " " 12	2 " " 26	10 " " 59	1 " " 162A
4 " " 12A	2 " " 27A	2 " " 63	1 " " 162B
1 " " 15	2 " " 29	19 " " 94	1 " " 163
2 " " 15A	1 " " 32	2 " " 95	1 " " 164

Electric Motor
(not included in Outfit)

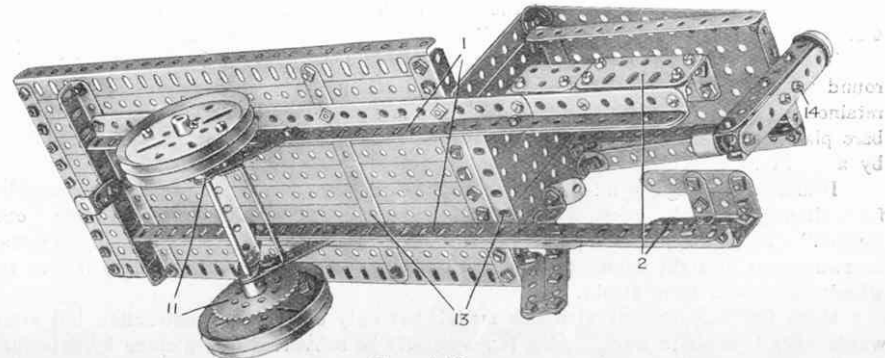


FIG. 4.62B

Model No. 4.62 Steam Wagon (continued)

The "firebox" is formed by two pairs of Flat Trunnions held together by $1\frac{1}{2}'' \times \frac{1}{4}''$ Double Angle Strips, one of which is secured to the Boiler. The frame so formed holds the steering mechanism, which is operated by the hand wheel 9, the Rod of which carries a Worm engaging the $\frac{1}{2}''$ Pinion 10. This Pinion is secured on the end of a 2" Rod carrying a Coupling between two $\frac{1}{2}''$ Pulleys, and a length of cord wound round the Coupling, has its ends secured to the Double Angle Strip carrying the front axle. The Double Angle Strip is bolted to a Double Bent Strip, which is pivoted by a Bolt and two Nuts to the underside of the Boiler.

Fig. 4.62A shows the arrangement of the gearing for the drive to the rear axle. A $\frac{1}{2}''$ Pinion on the Motor armature spindle engages a 57-teeth Gear on a Rod that carries a further Pinion engaging a second Gear. The Rod of the latter carries two $\frac{1}{2}''$ Sprockets from which the drive is led by means of chain to the Sprockets 11 (Fig. 4.62B). The armature shaft of the Motor also carries a 1" Pulley which transmits the drive via a belt to the Rod carrying the flywheel. The belt after passing round the Pulley 6 is crossed, passed on either side of the Pulley 8 (Fig. 4.62A), and again crossed before being led round the Pulley on the Motor spindle. The Motor is held in position by the Angle Brackets 12, the bolts of which pass through the holes 13 (Fig. 4.62B) and corresponding holes on the opposite side of the wagon.

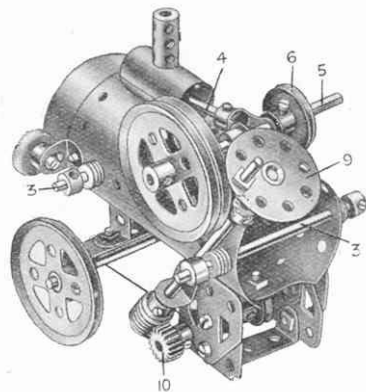


FIG. 4.62c

The switch arm of the Motor is extended by means of a short Rod held in a Coupling, to facilitate control from the cab. The Coupling is secured by two bolts passed through holes in the switch arm and screwed into the tapped holes of the Coupling. Each of the bolts carries a nut for spacing purposes.

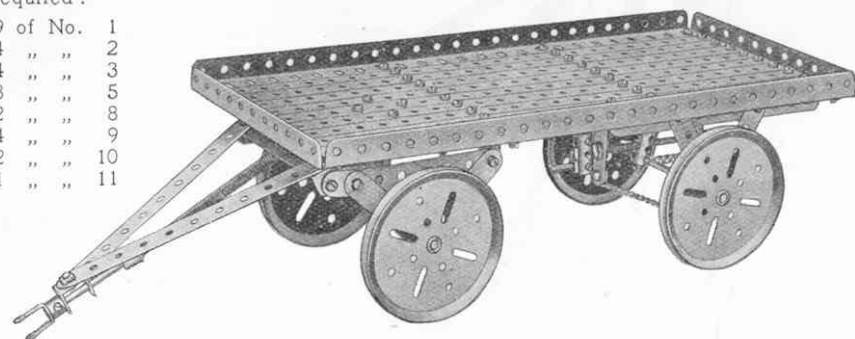
When the three units, Figs. 4.62A, 4.62B, and 4.62c have been assembled and fitted together to form the complete model, all moving parts should be examined to see if they work freely. Rotating shafts should be oiled, and for this purpose Meccano Lubricating Oil is excellent.

Rubber covered wire is used for connecting the Accumulator and Motor.

Model No. 4.63 Trailer (for Lorry or Traction Engine)

Parts
required:

9 of No.	1
4 " "	2
4 " "	3
8 " "	5
2 " "	8
4 " "	9
2 " "	10
1 " "	11



2 of No.	15A
1 " "	17
1 " "	18A
4 " "	19B
1 " "	20
1 " "	24
68 " "	37
7 " "	37A
6 " "	38
1 " "	43
1 " "	46
3 " "	48B
3 " "	59
2 " "	63
1 " "	80A
7 " "	94
1 " "	109
2 " "	111
1 " "	111c
1 " "	115
1 " "	116
1 " "	162A
1 " "	166

A Face Plate 1 (Fig. 4.63A) is bolted to the Strips of the platform and a $1\frac{1}{2}''$ Rod 2 secured in its boss passes through the centre hole of a Boiler End, which is held in position on the Rod by a Collar. Two $3\frac{1}{2}''$ Strips are bolted to the Boiler End and to these $3\frac{1}{2}'' \times \frac{1}{4}''$ Double Angle Strips are secured but spaced by means of Collars and Washers. A further Double Angle Strip, to which the drawbar is connected, is attached loosely by lock-nutted Bolts 3.

A brake is provided by the Sprocket Chain 4, which passes over a drum formed from a Flanged Wheel and Bush Wheel on the back axle. The tension on the Chain is varied by operating the hand Wheel 5 on a Threaded Rod, along which travels a Coupling carrying one end of the Chain.

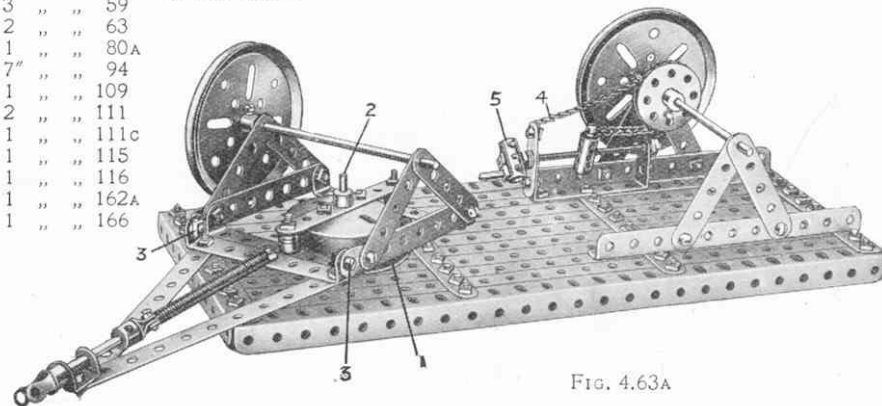
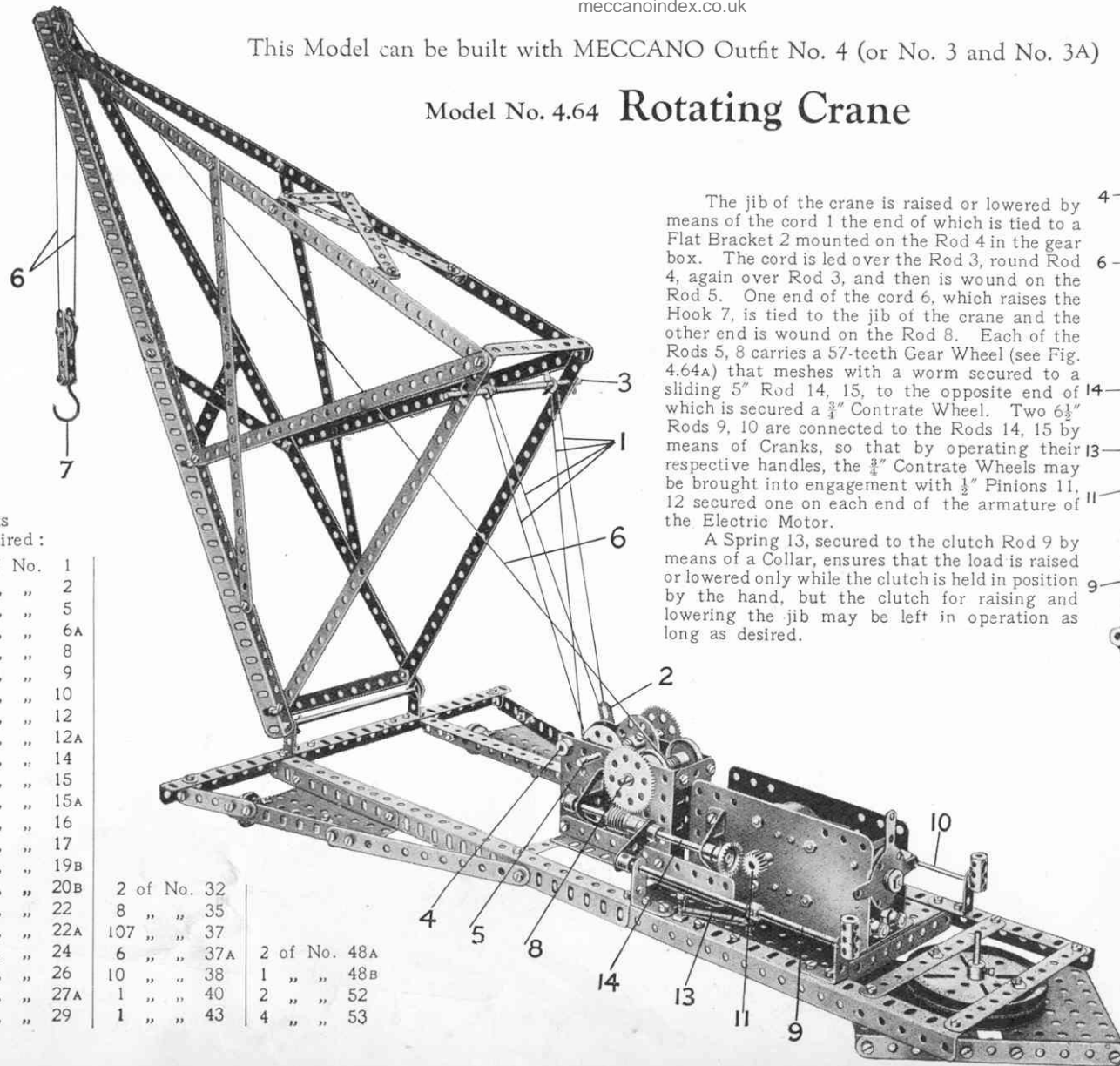


FIG. 4.63A

This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)

Model No. 4.64 Rotating Crane



Parts
required:

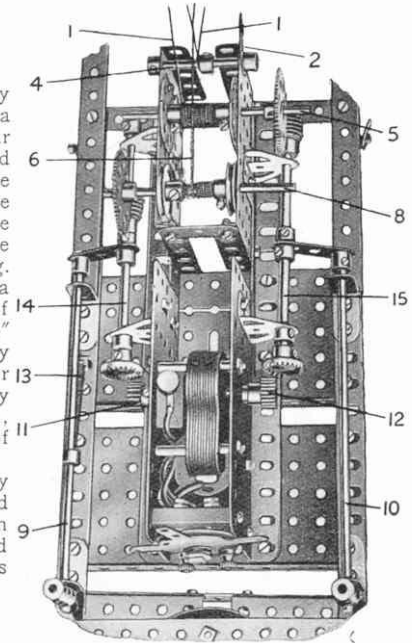
10 of No.	1
12 " "	2
5 " "	5
1 " "	6A
9 " "	8
2 " "	9
1 " "	10
6 " "	12
6 " "	12A
2 " "	14
4 " "	15
2 " "	15A
2 " "	16
2 " "	17
2 " "	19B
2 " "	20B
2 " "	22
2 " "	22A
2 " "	24
2 " "	26
2 " "	27A
2 " "	29

2 of No.	32
8 " "	35
107 " "	37
6 " "	37A
10 " "	38
1 " "	40
1 " "	43

2 of No.	48A
1 " "	48B
2 " "	52
4 " "	53

The jib of the crane is raised or lowered by means of the cord 1 the end of which is tied to a Flat Bracket 2 mounted on the Rod 4 in the gear box. The cord is led over the Rod 3, round Rod 4, again over Rod 3, and then is wound on the Rod 5. One end of the cord 6, which raises the Hook 7, is tied to the jib of the crane and the other end is wound on the Rod 8. Each of the Rods 5, 8 carries a 57-teeth Gear Wheel (see Fig. 4.64A) that meshes with a worm secured to a sliding 5" Rod 14, 15, to the opposite end of which is secured a $\frac{3}{4}$ " Contrate Wheel. Two $6\frac{1}{2}$ " Rods 9, 10 are connected to the Rods 14, 15 by means of Cranks, so that by operating their respective handles, the $\frac{3}{4}$ " Contrate Wheels may be brought into engagement with $\frac{1}{2}$ " Pinions 11, 12 secured one on each end of the armature of the Electric Motor.

A Spring 13, secured to the clutch Rod 9 by means of a Collar, ensures that the load is raised or lowered only while the clutch is held in position by the hand, but the clutch for raising and lowering the jib may be left in operation as long as desired.



Parts
required

(continued):

2 of No.	54
1 " "	57
10 " "	59
2 " "	62
2 " "	63
2 " "	111
5 " "	111c
4 " "	126
1 " "	147B
Electric Motor	
(not included in Outfit)	

Model No. 4.65 Submarine

Parts required :

8 of No. 1	2 of No. 35
7 " " 2	111 " " 37
6 " " 4	1 " " 40
2 " " 5	9 " " 48A
2 " " 9	5 " " 48B
4 " " 10	2 " " 52
11 " " 12	3 " " 53
1 " " 13A	6 " " 59
1 " " 14	2 " " 63
2 " " 15	3 " " 90A
1 " " 15A	4 " " 99
2 " " 16	2 " " 100
2 " " 17	2 " " 103F
4 " " 20B	2 " " 115
1 " " 21	1 " " 126A
3 " " 22	
2 " " 24	
1 " " 32	

This model represents a large submarine of the latest type. It is equipped with wireless mast, periscope, quick-firing gun, and a workable steering gear controlled from the conning-tower.

Figure 4.65A is a sectional view of the conning-tower, and shows the helm. The cord 1, after passing over the 1" fast Pulley 7, is carried round a pair of 1" loose Pulley Wheels on the 5" Rod 2, and is given a complete turn round the 1" fixed Pulley Wheel 3 secured to the rudder head. The rudder consists of two 2½" Flat Girders, which are bolted by means of Angle Brackets to a pair of Cranks mounted on the Rod 4. The short Rod carrying the Pulley 7 is journaled in a 2½" × ½" Double Angle Strip 8, and is held in place by a Collar and set-screw on its end. Washers should be placed between the Pulley 7 and Strip 8.

The 5½" × 2½" Flanged Plates that form the deck of the submarine are bolted together by means of 5½" Angle Girders, which, in turn, are bolted to 3½" × ½" Double Angle Strips secured transversely in the hull of the vessel. The hull itself is strengthened by vertical 3" Strips 5. The sides of the conning-tower are represented by two 3½" × 2½" Flanged Plates, the forward part being composed of a 2½" small radius Curved Strip and five 2½" × ½" Double Angle Strips. The periscope consists of a Coupling and a 5" Rod, which is supported in a further 2½" × ½" Double Angle Strip 6.

The vertical Rod supporting the quick-firing gun is free to turn in a Bush Wheel bolted to the deck. Two Collars should be placed on the Rod, one on each side of the Bush Wheel, to maintain the gun in position. The model is arranged to travel on two pairs of ¾" Flanged Wheels secured to 3½" Axle Rods.

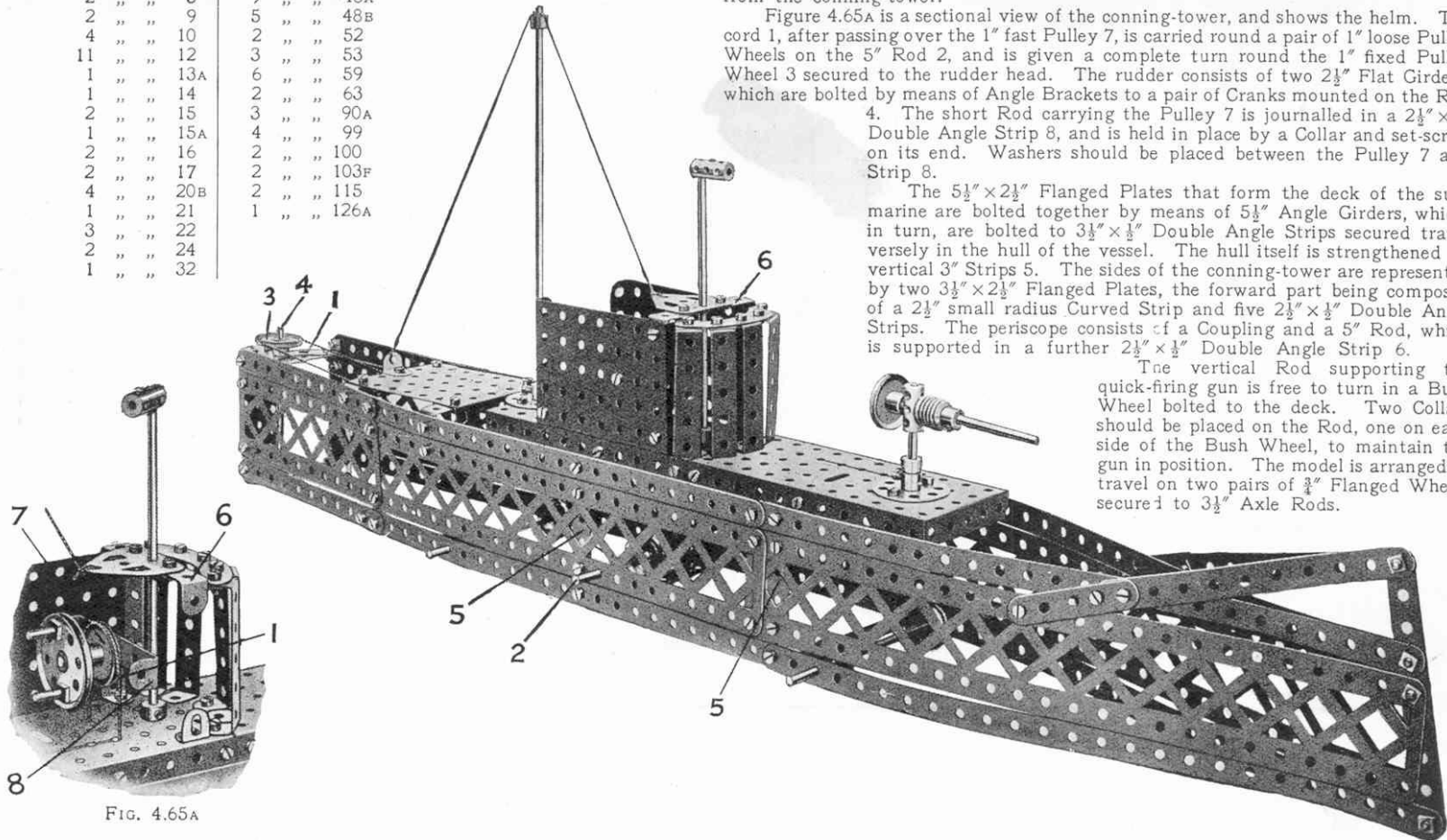
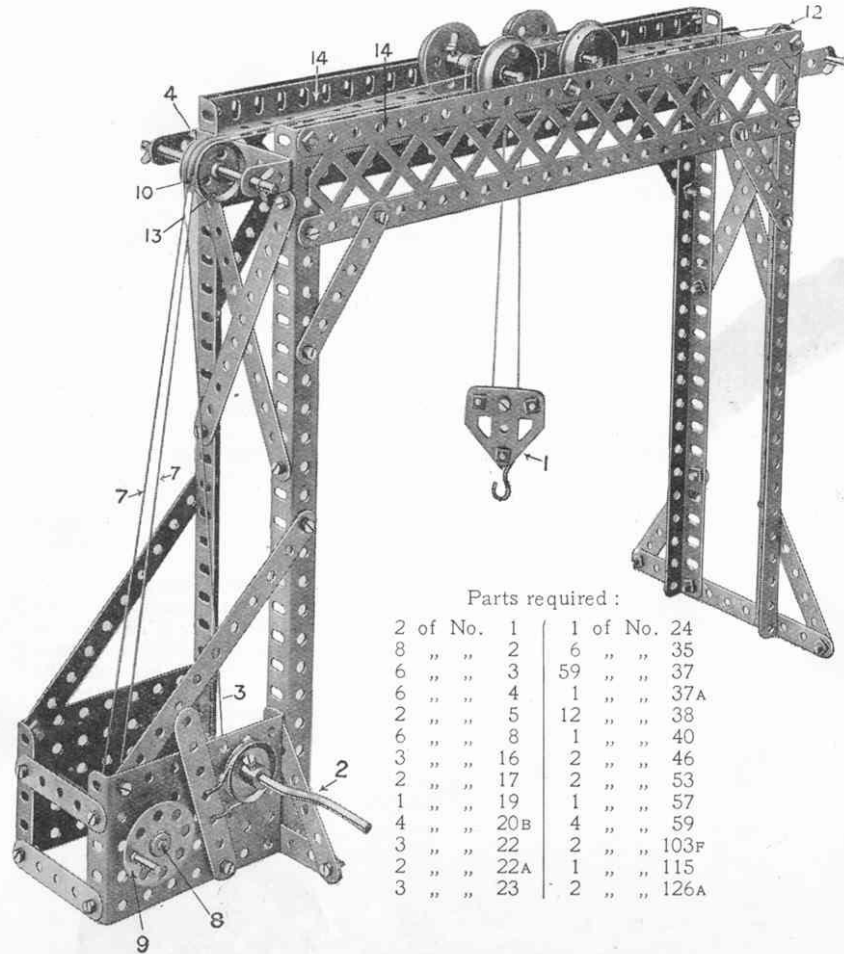


FIG. 4.65A

This Model can be built with MECCANO Outfit No. 4 (or No. 3 and No. 3A)



Parts required :

2 of No. 1	1 of No. 24
8 " " 2	6 " " 35
6 " " 3	59 " " 37
6 " " 4	1 " " 37A
2 " " 5	12 " " 38
6 " " 8	1 " " 40
3 " " 16	2 " " 46
2 " " 17	2 " " 53
1 " " 19	1 " " 57
4 " " 20B	4 " " 59
3 " " 22	2 " " 103F
2 " " 22A	1 " " 115
3 " " 23	2 " " 126A

Model No. 4.66 Gantry Crane

The Pulley 1 is capable of being hoisted to raise the load, or traversed. In order to raise the load the Crank Handle 2 is operated, which winds the Cord 3 passing over the rear Pulley Wheel 4 round the $\frac{1}{2}$ " Pulley 5 and a corresponding Pulley in the block, thence round another $\frac{1}{2}$ " Pulley 6 and is made fast at the end of the gantry. For traversing a continuous Cord 7 is wound several turns on the $3\frac{1}{2}$ " Rod 8 to which is secured a hand wheel 9. The cord passes over the Pulley Wheel 10 and is secured to one of the side Plates 11, and continues round the Pulley 12 returning to and passing over the nearest Pulley Wheel 13 back to the Rod 8. Consequently by turning the hand wheel 8 in one or other direction, the carriage is traversed to and fro along the top Angle Girders 14, which form the travelling rails. The construction of the travelling carriage is shown in Fig. 4.66A, three Washers 15 being placed on each of the outer Bolts, passed through the two Plates 11; and $\frac{1}{2}$ " Pulley Wheels 5, 6, on the inner Bolts. The outer plates being then bolted together, the Rods 16 of the Flanged Wheels are passed through both plates in the end elongated holes, and Collars 17 secured on the exterior, after which the remaining Flanged Wheels 18 are secured on the ends of the Rods 16.

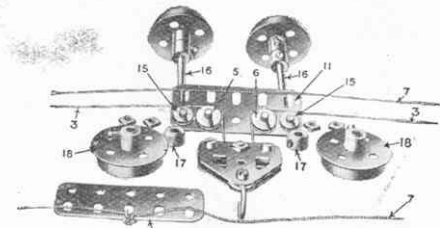


FIG. 4.66A

HOW TO CONTINUE

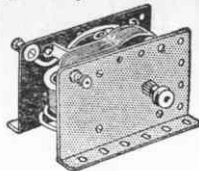
This completes our examples of models that may be made with MECCANO Outfit No. 4 (or No. 3 and No. 3A). The next models are a little more advanced, requiring extra parts to construct them. The necessary parts are all contained in a No. 4A Accessory Outfit, the price of which may be obtained from any Meccano dealer.

MECCANO

MECCANO ELECTRIC MOTOR

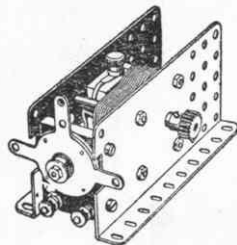
No. E. 1 (6-volt)

This is a highly efficient electric motor (non-reversing) that will give excellent service. A 6-volt Accumulator will operate it, but it may also be driven from the main (alternating current only) through the Transformer described on this page.



MECCANO ELECTRIC MOTOR

No. E. 6 (6-volt)



This powerful and reliable 6-volt Motor may be run from a 6-volt accumulator or, by employing the Transformer described on this page, from the main. It is fitted with a control mechanism that enables the motor to be started, stopped or reversed as desired.

NOTE.—The above Electric Motors will not run satisfactorily from dry cells.

MECCANO ACCUMULATOR

(6-volt, 20 amps.)

The Meccano Accumulator is of substantial construction and is specially recommended for running the Meccano 6-volt Electric Motors.

MECCANO RESISTANCE CONTROLLER

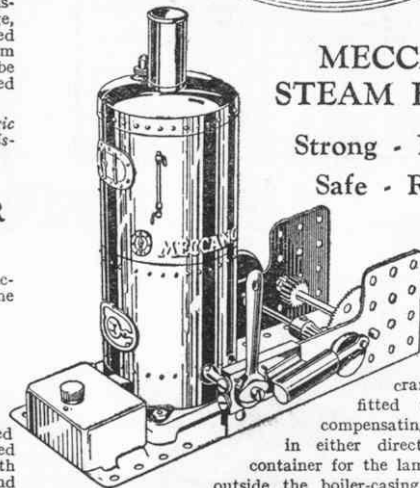
By employing this variable resistance the speed of the Meccano 6-volt Electric Motors may be regulated as desired. The controller is connected in series with the motor and accumulator, or with the motor and transformer if a transformer is used as the source of power. It will not regulate the speed of a high-voltage motor connected to the main.

MOTORS AND ACCESSORIES

In order to obtain the fullest possible enjoyment from the Meccano hobby the models should be operated with a Meccano power unit. The side plates and bases are pierced with the standard Meccano equidistant holes, which enable the motors or the steam engine to be built into any Meccano model in the position that is most suitable.

MECCANO STEAM ENGINE

Strong - Powerful
Safe - Reliable



On actual test this powerful steam unit has lifted over 56 lbs. Operation of the reversing lever enables the crankshaft, which is

fitted with a special compensating flywheel, to run in either direction. The spirit container for the lamp is placed well outside the boiler-casing, eliminating all risk of the spirit becoming heated. There is no danger whatever of the boiler exploding. A special Manual of Instructions is supplied with each engine.

TRANSFORMER

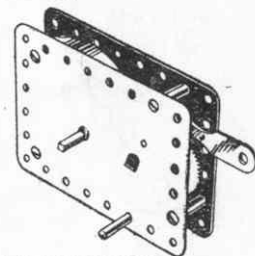


By means of this transformer the Meccano 6-volt Electric Motors may be driven from the main supply (alternating current only). It is available for all standard supply voltages, from 100 to 250 inclusive, at all standard frequencies. The supply voltage and frequency must be specified when ordering.

MECCANO CLOCKWORK MOTOR No. 1

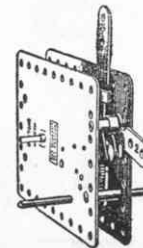
(Non-Reversing)

A long-running and highly efficient clockwork motor (non-reversing), fitted with a brake lever by means of which it may be stopped and started, as desired.



MECCANO CLOCKWORK MOTOR No. 2

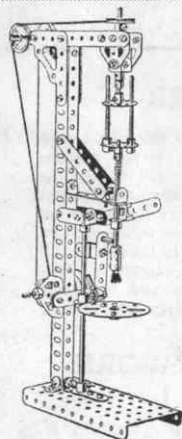
(Reversing)



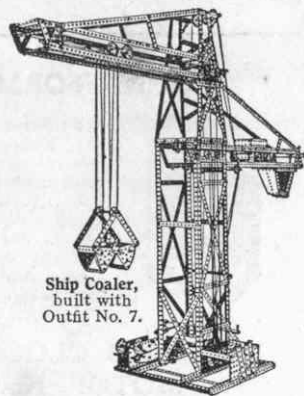
This strongly-built clockwork motor is a compact self-contained power unit. An efficient governor controls the powerful spring that is fitted on the motor, and ensures a long steady run at each winding. Brake and reverse levers enable the motor to be stopped, started and reversed, as required.

Ask your dealer for a Meccano price list, and keep it by you for reference.

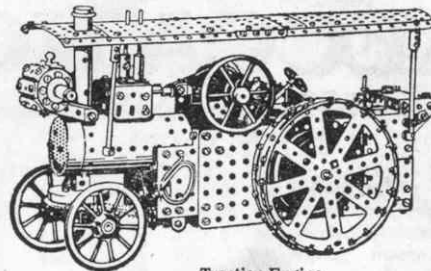
Build Bigger and Better Models



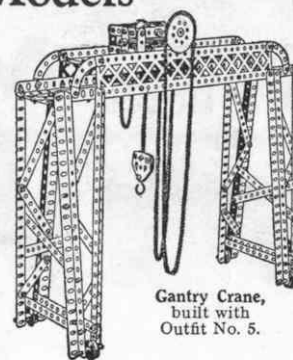
Vertical Drill,
built with
Outfit No. 5.



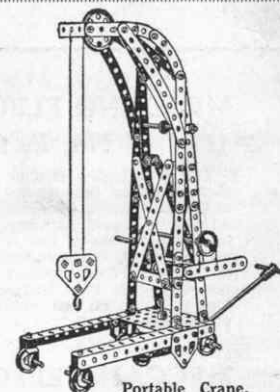
Ship Coaler,
built with
Outfit No. 7.



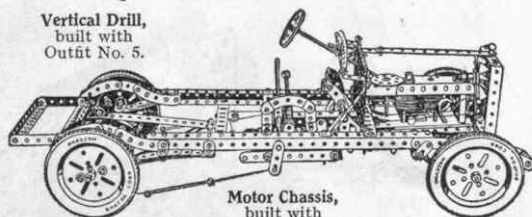
Traction Engine,
built with
Outfit No. 7.



Gantry Crane,
built with
Outfit No. 5.



Portable Crane,
built with
Outfit No. 6.



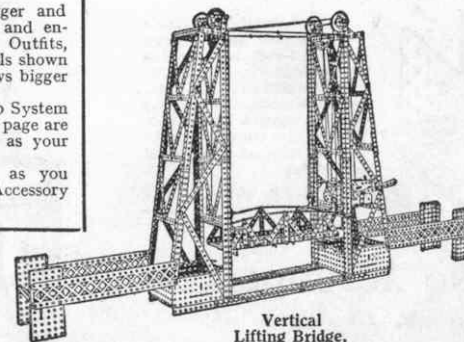
Motor Chassis,
built with
Outfit No. 7.

Keep Adding to Your Outfit

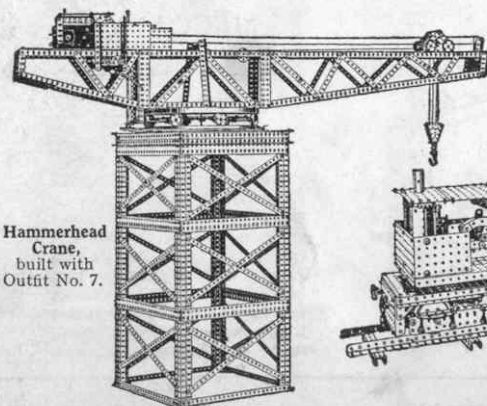
The more Meccano parts you have the bigger and better the models you are able to build. Keen and enthusiastic model-builders keep adding to their Outfits, until they are able to build all the wonderful models shown in the Meccano Manuals. As your equipment grows bigger and bigger, so will the fun and enjoyment increase.

The model-building possibilities of the Meccano System are limitless. All the fine models illustrated on this page are examples of the types you will be able to build as your Outfit develops.

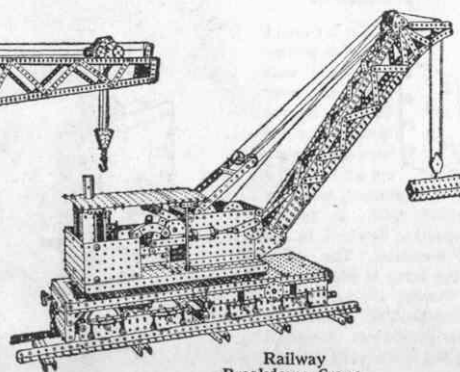
You can purchase separate Meccano parts as you require them, or, if you prefer, you can purchase Accessory Outfits that connect all the main Outfits.



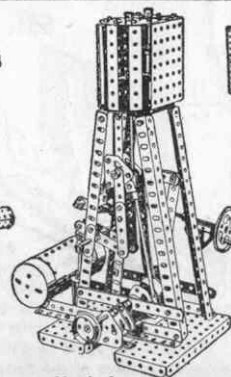
Vertical
Lifting Bridge,
built with
Outfit No. 6.



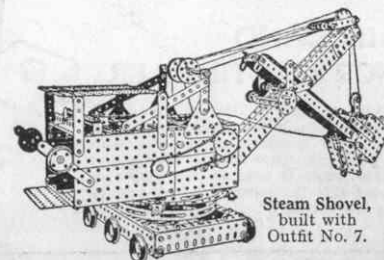
Hammerhead
Crane,
built with
Outfit No. 7.



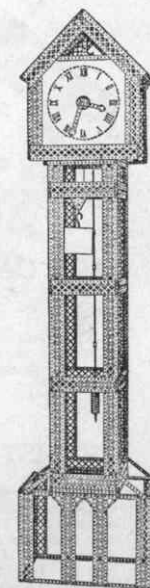
Railway
Breakdown Crane,
built with
Outfit No. 7.



Vertical
Marine Engine,
built with
Outfit No. 5.



Steam Shovel,
built with
Outfit No. 7.



Grandfather Clock,
built with
Outfit No. 7.