

# MECCANO

TRADE MARKS 296321, 501113, 76, 12633, 10274, 55/13476, 569/13, 884/25, 2913, 80, 124, 336, 4174, 91637, 83171, 157149, 32322, 200639, 209733, 214061, 214062, 12892, 29094, 33316, 1818, 16737, 383/13 5848 50204, 10/12258, 22826, 18982, 20063/925, 9048, 5549, 2189, 16900, 72286, 2389, 41812, 5403, 7315 18066, 139420, 494933-4-5-6, 29041, 26877, 6595, 404718, 410379, 55096, 12240, 41234, 8223, 1855

HORNBY'S ORIGINAL SYSTEM—FIRST PATENTED 1901



# INSTRUCTIONS

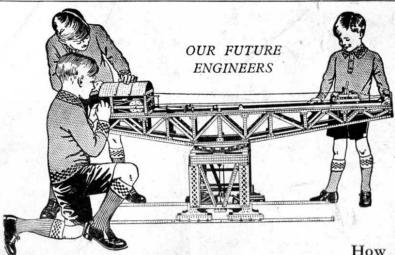
Price 6d.

FOR BUILDING No. 4 OUTFIT MODELS

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No. 33.3A

ENGLISH EDITION



# 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. 4 Accessory Outfit. In turn, a No. 5 A 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 13.

A complete list showing the contents of each Meccano Outfit and Accessory Outfit will be supplied on application to Meccano Limited, Binns Rd., Liverpool 13.

# 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 of 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.

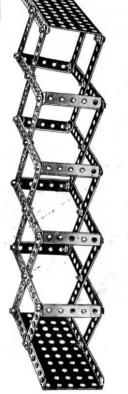
Although all kinds of queries are put to us on all manner of subjects, the main interest is, of course, engineering. The wonderful knowledge of engineering matters possessed by our staff of experts is unique. This vast store of knowledge, gained only by many years of hard-earned experience, is at your 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 dealers.

# Model No. 4.2 Steam Winch

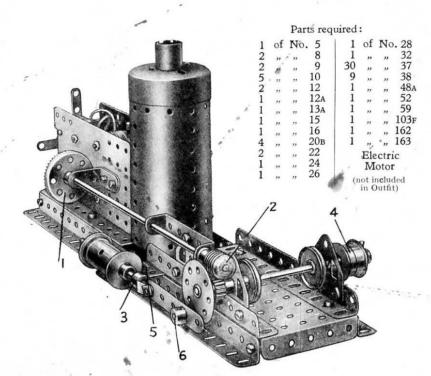
A  $\frac{1}{2}''$  Pinion secured to the armature of the Electric Motor turns a  $1\frac{1}{2}''$  Contrate Wheel 1 mounted on an 8" Axle Rod, to the opposite end of which is secured a Worm Wheel 2. The drum 4 of the winch consists of two  $\frac{3}{4}''$  Flanged Wheels and is secured to the end of 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.



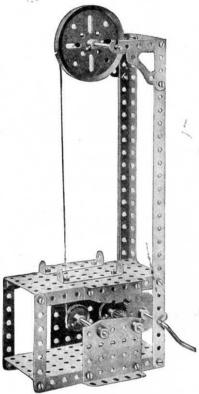
Parts required :

16 of No. 2

8 " " 48A 2 " " 52 Small pieces of looking glass should be inserted in the top and bottom plates.



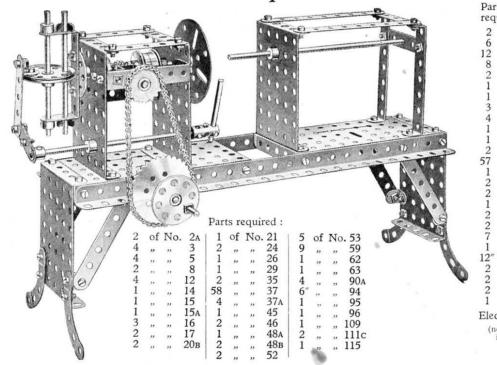
# Model No. 4.3 Band Saw



Parts required:

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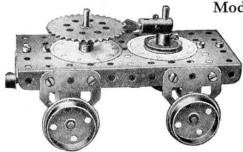
# Model No. 4.4 Elliptical Lathe



### Model No. 4.6 Swing Saw

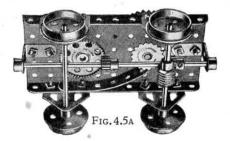
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# Model No. 4.5 Distance Indicator



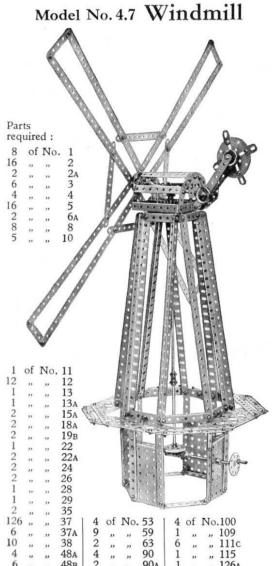
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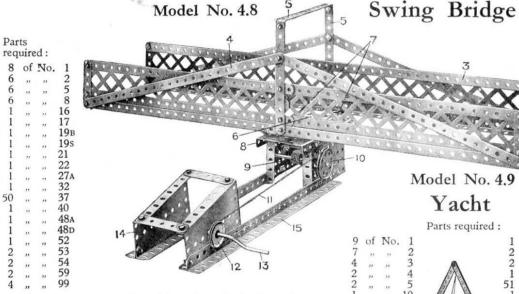
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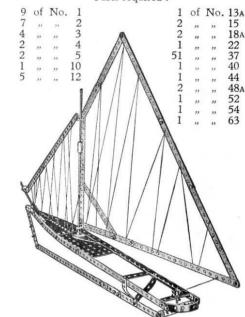
(Model No. 4.6).

A ½" 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.





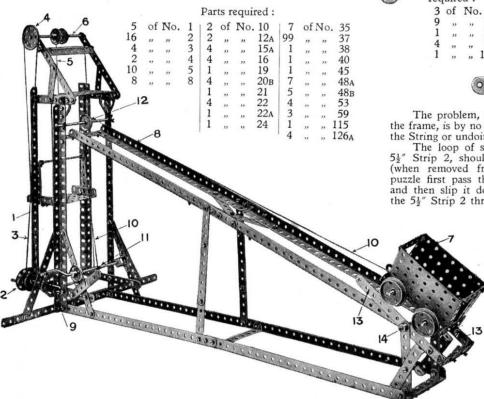
The sides of this model, as shown in the illustration, are made of the Braced Girders secured to the upright Strips 2 and reinforced by the inner Strips 3. Other diagonal Strips 4 brace the side Girders to the top structure 5 forming a stay for the sides 1. The swing base of the bridge is composed of a 3" Pulley Wheel 6 which is bolted to two cross 5½" Strips 7 which n turn are secured to the main base side Girders. The bridge swings on the 5½" x 2½" Flanged 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 1½" Pulley 10 driven by the Cord 11 which is operated from the 1" fast Pulley 12 on the Crank Handle 13 The Crank Handle is journalled in two Sector Plates 14 secured to the base Angle Girder 15.



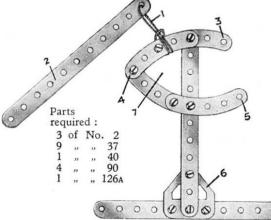
#### Model No. 4.10

# **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.



### Model No. 4.11 Puzzle

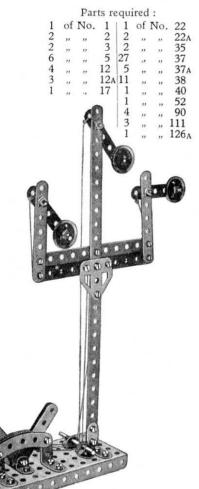


The problem, which is to remove the Strip 2 from the frame, is by no means an easy one to solve. Cutting the String or undoing the knot is not allowed!

The loop of string 1, attached to the end of the  $5\frac{1}{2}$ " Strip 2, should reach halfway 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



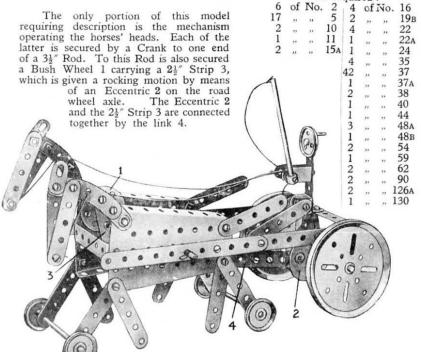
Parts required:

### Model No. 4.13 Breast Drill



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# Model No. 4.14 Trotting Car



### Model No. 4.15 Warehouse

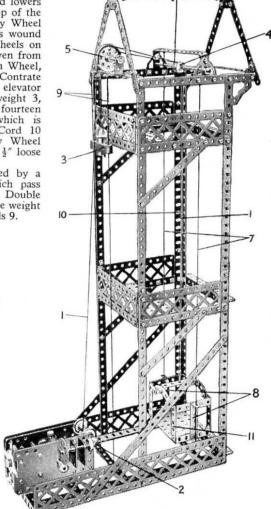
The Cord 1 that raises and lowers the elevator passes from the top of the car 11 over the 1 loose Pulley Wheel 4 and the 11 Pulley 5, and is wound between two 1" fast Pulley Wheels on a 3" Axle Rod 2, which is driven from the Electric Motor via a Worm Wheel, a 57-toothed Gear Wheel, a 3" Contrate Wheel, and a 1 Pinion. The elevator car is counterbalanced by a weight 3. consisting of a Fork Piece, fourteen 21 Strips, and a Collar, which is connected to the car by a Cord 10 passing over a 1" fast Pulley Wheel (behind the Wheel 5) and the 1 loose Pulley Wheel 6.

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

" 126A

Electric Motor (not included in Outfit)

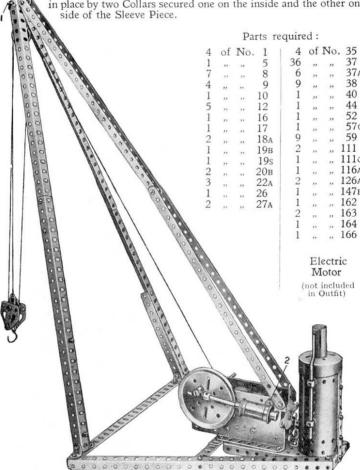
Parts required:



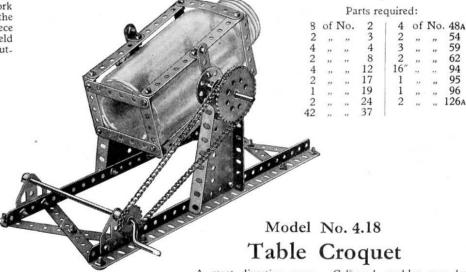
### Model No. 4.16 Sheerlegs

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 3" Bolt, which passes through the hole in the bottom of the

Cranked Bent Strip, and is held in place by a 1½" 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.



# Model No. 4.17 Butter Churn



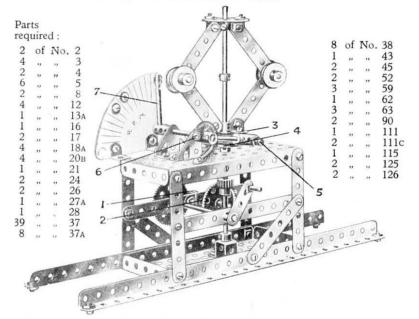
A most diverting game. Coloured marbles may be used for the balls. Full instructions for playing croquet may be obtained from any sports or games dealer.



# 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 journalled 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  $\frac{3}{4}$ " 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  $5\frac{1}{2}$ "  $\times 2\frac{1}{2}$ " 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.

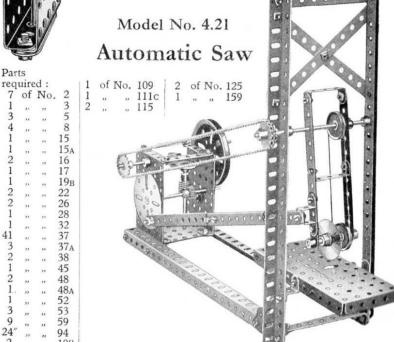


### Model No. 4.20 Conductor's Punch

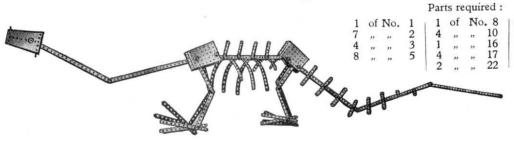
This is just the thing for your younger brother! He only needs a strap with which to hang it over his shoulder to make him into a conductor. The

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2	**	**	3
1	**	22	4
2	**	29	5
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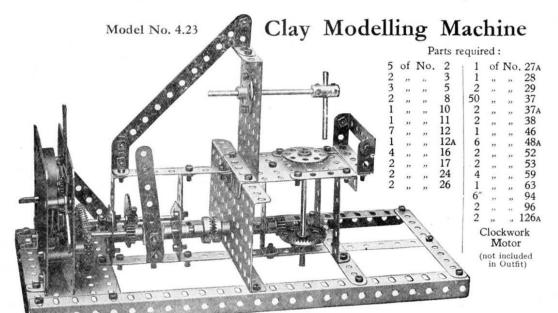
2½" Strip at the bottom is spaced by two Washers away from the body of the punch to allow the ticket to pass in to be punched. The punch Rod is passed completely through the Spring. The lower end of the latter presses against the Double Bracket and the upper end against a Collar secured to the Rod.



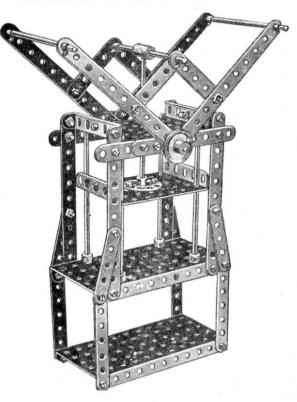
# Model No. 4.22 Diplodocus



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. 4.24 Bale Press



#### Parts required:

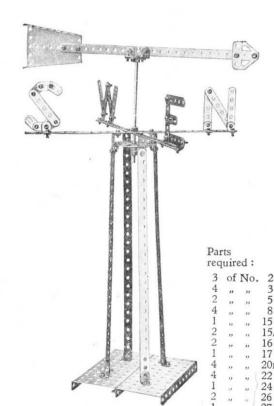
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### Model No. 4.25

# Weather Vane

#### Parts required:

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17	**	**	12	2	22	"	59
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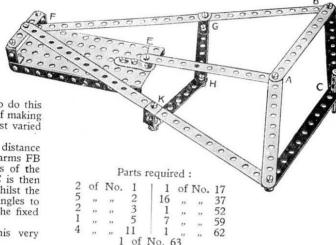
# Model No. 4.26 Geometrical Apparatus

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."

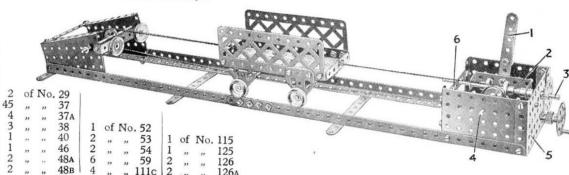
The point F is fixed, and is situated at a distance from the fixed point E, equal to AE, the two arms FB and FD being together equal to the four sides of the lozenge ABCD. The trajectory of the point C is then at right angles to EF. It will be found that whilst the point C is moving in a straight line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

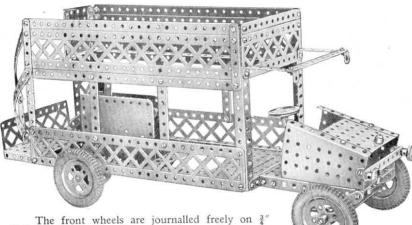


# Model No. 4.27 Cable Railway

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 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.



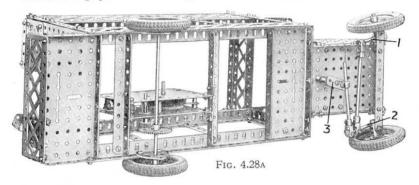
# Model No. 4.28 Motor 'Bus



The front wheels are journalled freely on 3" Bolts secured in Couplings that pivot on Bolts locknutted 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 21 small radius Curved Strips, to which the axle is attached by means of  $\frac{1}{2}'' \times \frac{1}{2}''$  Angle Brackets, the axle being spaced therefrom by a Collar on each Bolt.



# Model No. 4.29 Automatic Gong

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2	**	33	63	(AVE III)			
2	28	200	54 59 62 63 90A		-4		
1	**	2.7	98 99	- TO THE R. P. LEWIS CO., LANSING, MICH.		D - 1	3
4	**	,,	99		- 64	E	1
3	**	.,,	100				100
3		,,	111		Andrews .		0
3	**	"	111c	1		2	-
1		"	116A				A POST
í	1.		125	13/10-11	20	4/10	THE REAL PROPERTY.
2	"	"	126A	18/12		WINDS.	100
4	33	99	142A		THE REAL PROPERTY.	HUL	
4	22	37.	147B	91	A. C. C.		
1 1 1 2 98 4 3 3 2 2 5 1 2 2 2 1 4 3 3 3 3 1 1 2 2 4 1 1 2	"	"	165				
2	,,,	"	100				
		13					

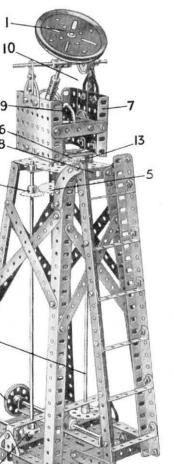
Clockwork Motor (not included in Outfit)

2	of	No.	2A
2243		,,	5
2	**		8
4	**		9
3	**	**	11
1	,,	**	12
1	,,	**	14
1	,,	.,	16
1	.,,	"	17
1	,,	,,	18 <sub>A</sub>
1	,,	,,	24
1	**	**	26
1	***	***	27A
15 2 2	,,	,,	37
2	**	**	37A
2	,,	**	38
1		**	40
1 2 2 1 2	**		45
2	**		48B
2	22	**	52
1	,,	**	53
2	220	200	54
4	,,	**	59
2	55	**	63
2		20	108
1	"	.0	111c
2	,,,	$\sigma$	125
4 2 2 1 2 2 2 2	.,	,,	126
2	12	"	126A

Clockwork Motor (not included

in Outfit)

## Model No. 4.30 Searchlight



10	of	No.	2	1	of	No	. 21	1	of	No	. 48в
1	22	,,	3	3	,,	,,	22	2		,,	48p
4	,,	,,	5	2	,,	,,	24	2	**	,,	52
2	,,,	**	6A	2	,,	**	26	3	,,	,,	53
4 2 6 2 2	,,		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
	,,,	**	17	7	,,	,,	38	2	,,,	,,	126
1	**	,,	19 <sub>B</sub>	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 1/2" Pinion and 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}" \times \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 1" Pinion that engages with the 11" Contrate Wheel 9. The motion of the Contrate 9 is transmitted to the pivotal Rod of the searchlight by means of the Pulleys and cord 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.

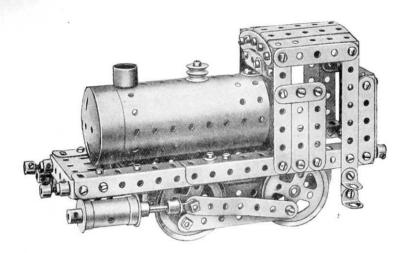
# Model No. 4.31 Alternating Swing



#### Parts required:

3	of	No.	1	1 4	of	No.	12	10	of	No.	48A	4	of	No	. 90A
8	,,	,,,	2	2	**	,,	14	2	,,	22	48D	3	,,	,,	99
2	,,	,,	4	2	,,	22	24				54	1	,,	,,	111c
9	,,	,,	5	2	. ,,	,,	26	9	"	"	59	1	"	,,	115
2	,,	,,,	6A	72	.,	,,	37	2	,,	,,	62				
8	"	**	8	3	**		37A	4	"	22	90				

Clockwork Motor (not included in Outfit)



#### Model No. 4.32

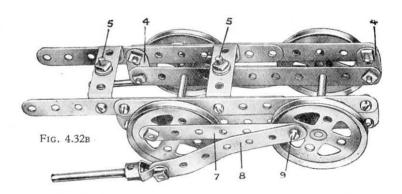
# 0-4-0 Shunting Locomotive

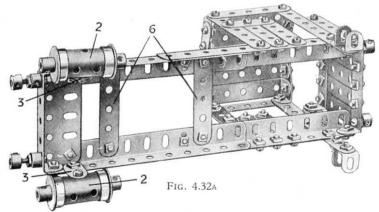
The superstructure is shown in detail in Fig. 4.32a. Each of the two side members is built up from two  $5\frac{1}{2}$ " Angle Girders overlapping five holes. The cab roof is composed of five  $2\frac{1}{2}$ "  $\times \frac{1}{2}$ " Double Angle Strips bolted to two  $2\frac{1}{2}$ " Curved Strips and 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.

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 the 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).

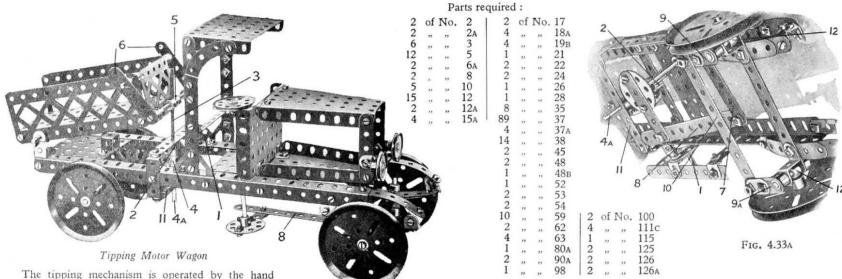




#### Parts required:

6	of	No.	2	10	of	No.					0.38	1	of	No.	116A
2	"	**	2A	4	,,,	"	17		,,,	,,,	48A	1	,,,	22	162
6	,,	,,	3	4			20A	6	22	,,	59	2	,,		163
18	,,	.,,	5	4	22	.22	20в	2	**	27	90	1	22	22	164
2	"	**	6A	2	33	,,,	23	1	33	.73	103F	1	**	**	166
4	,,	,,	9	85	"		37	2	**	,,,	111				
6	**	,,	10	15	,,		37A	5	19	**	111c				

# Model No. 4.33 Tipping Motor Wagon

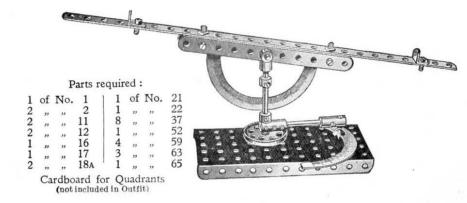


The tipping mechanism is operated by the hand wheel 1, the shaft of which carries a  $1\frac{1}{2}$ " Contrate Wheel that engages with the  $\frac{1}{2}$ " Pinion 2. The  $3\frac{1}{2}$ " Threaded Rod 3, to which the Pinion 2 is secured, is journalled

in one end of a Coupling 4 and passes through the central threaded bore of a second Coupling 5, which is mounted between the ends of two short Rods that are free to turn on Bolts passed through  $2\frac{1}{2}$ " Strips 6. These Strips 6 are attached pivotally to the body of the lorry. The short Rod 4A passes through the  $3\frac{1}{2}$ " Strip 11 and is secured in the lower end of the Coupling 4, the centre transverse hole of which forms a bearing for the Rod of the hand wheel 1.

The steering gear is shown in Fig. 4.33a. The  $2\frac{1}{2}$ " Strip 7 is pivoted to the Strip 8, but is secured rigidly at right-angles to the Crank 9. The Crank 9a is made to move simultaneously with the Crank 9 by means of the tie-rod 10. The front road wheels are mounted on  $\frac{3}{4}$ " Bolts secured in Collars 12.

### Model No. 4.34 Sextant and Theodolite



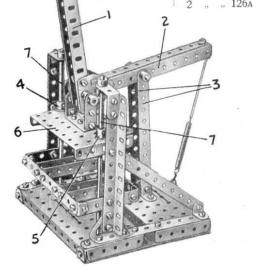
#### Model No. 4.35

# Potato Chopper

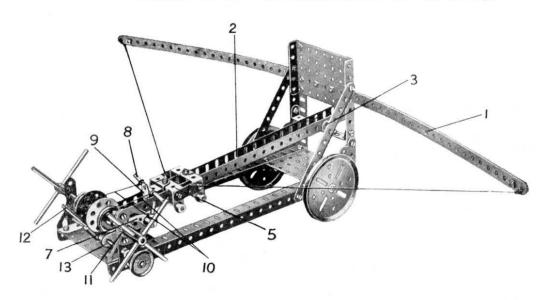
The levers 1 and 2 are secured at right angles to each other by means of two Flat Trunnions. The lever 2 pivots about a short rod journalled in the tops of the  $5\frac{1}{2}$  Strips 3. The Cranks 4 and 5 are bolted to the  $3\frac{1}{2} \times 2\frac{1}{2}$  Flanged Plate 6 and are free to ride up and down the vertical Axle Rods 7 and 8.

#### Parts required:

8	of	No.	2	4	of	No.	38
	"	**	5	1	**	,,,	40
2	,,	**	6A	1	**	**	43
3 2 2 4	,,	**	8	4	.,,	**	48A
4	**	**	9	2	.,,	22	48D
10			12	2	- 22	,,,	52
4	,,		12A	1	,,	,,	53
2	,,		14	1	3.0	33	57c
1	**	,,	17	10	**	,,,	59
1		**	18A	2	**		62
73	- 22	,,	37	2 2 2	,,	"	111c
4	**	**	37A	2	,,	,,	126
				-			106.



# Model No. 4.36 Mechanical Cross Bow



This model represents a large military weapon of the type used before the invention of gunpowder. It is built on the principle of the crossbow. Each side of the bow 1 is composed of three 121" Strips bolted together, the centre being strengthened by three 21 "Strips. The trough 2, which is formed from two 121" Angle Girders, is held loosely between a pair of Angle Brackets 3, and its rear end is secured to a Double Bent Strip bolted to the 3½" × 2½" Flanged Plate. The carriage 5 is composed of four 1" × 1" Angle Brackets joined by a pair of 1\frac{1}{2}" Strips and guided by two \(\frac{1}{2}\)" \(\times \frac{1}{2}\)" Angle Brackets. A Double Bracket is bolted to one of the latter, and carries in its turn a Flat Bracket 9. When the handles are turned in an anti-clockwise direction, the Cord 10 draws the carriage back, and are prevented from unwinding by the Pawl 7 engaging a ½" Pinion Wheel 11. When the lever 12 is depressed, the ends of a pair of 21 Strips bolted to Cranks 13 lift the 2" Rod 8 off the Flat Bracket 9. This releases the carriage, and the projectile (a marble) is shot out of the trough 2 with considerable force.

#### Parts required

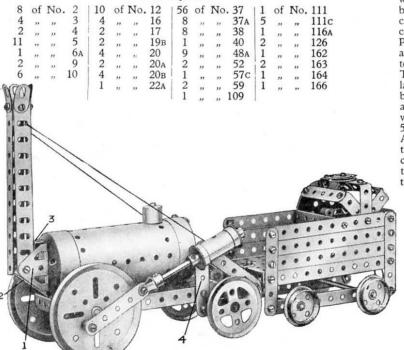
6	of	No.	1	53	of	No	. 37
7	,,	,,	5	2	,,	,,	37A
2	.,,	"	6A	5	,,	"	38
4	,,	"	8	1	"	"	40
2	11	,,	9	1	,,	,,	45
1	,,	,,,	10	1	"	"	48
1	**	,,	11	1	,,	,,	48в
4	,,	***	12	3	,,	,,	53
4	,,	,,	12A	4	,,	**	59
1	**	**	15	2 3	**	**	62
3	,,	**	15A	3	,,	**	63
4	"	,,,	16	2 2	,,		108
4	,,	"	17	2	,,	,,	111
2	22	**	19B	1	**	,,	115
4	,,,	**	22	2	,,	,,	126
2	,,	,,	24	1			126A
1	,,		26	1	,,	,,	147A
		1	of No	. 14	7в		

# Model No. 4.37 Stephenson's "Rocket" Locomotive

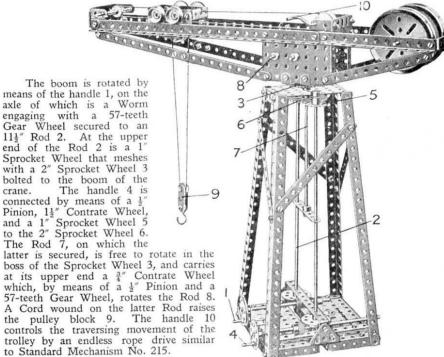
The chimney is attached at its lower end to two Trunnions 1 that are bolted to the front of the boiler. A  $1\frac{1}{2}$ " Strip 2 held in place by a  $\frac{1}{2}$ "× $\frac{1}{2}$ " Angle Bracket closes in the space between the Trunnions at the bottom, and a  $\frac{1}{2}$ "× $\frac{1}{2}$ " Angle 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  $\frac{2}{3}$ " Bolts, on each of which are four Washers between the cylinder and the Strip.

#### Parts required:

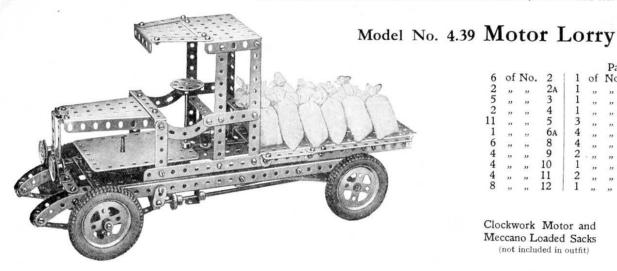


### Model No. 4.38 Girder Crane



#### Parts required

						P	arts r	equi	red	:						
12	of	No.	2	1	of	No.	15A	2	of	No	. 27A	2	of	No.	48D	
2	**	,,	3	4	,,,		16	1	,,	,,	28	2	**	,,,	52	
2			5	3	,,		17	1	,,	**	29	3	**	"	53	
2	"	"	6A	4	,,	,,,	19в	1	.,	27	32	1	"	22	57c	
6	"	"	8	. 1	,,,	"	19s	8	,,	,,,	35	9	"	"	59	
2	"	**	0	4	,,	,,,	20в	76	,,	.,	37	2	,,	**	90A	
9	"	"	10	1		"	21	5	,,	,,	37A	2	"	**	95	
2	"	,,,	12A	î	,,	**	22	2	,,	"	38	2	,,,	,,	96	
2	"	"	13	2	37	"	22A	- 1	,,	**	40	2	,,		103F	
1	"	"	13A	2	"	"	23	2	22	211	46	4	,,,	**	111c.	
1	33	**	14	3	33	2.2	24	2	33	,,,	48	2	,,		115	
1	21	1)	14	2	23	"	26	4	"	"	48A	2	,,	,,	126	

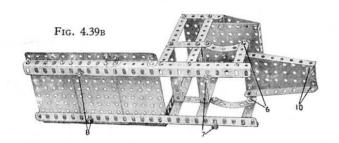


						Par	ts rec	quire	d:						
6	of	No.	2	1	of	No.	13 <sub>A</sub>	1	of	No.	29	6	of	No.	63
2	"	"	2A	1	75	,,	15	95	,,,	,,	37	4	,,	,,	90
5	,,	,,	3	1	"	,,	15 <sub>A</sub>	14	,,	,,	37A	2	"	"	90A
2	"	,,	4	1	**	,,	16	15	,,	,,	38	2	22		111
11	,,	"	5	3	,,	,,	17	1	,,	**	48	6	"	.,,	111c
1	.,,	22	6A	4	"	,,	18 <sub>A</sub>	2	,,	,,	48A	1	"	,,	115
6	,,	,,	8	4	,,	,,	20 <sub>A</sub>	3	,,	,,	48 <sub>B</sub>	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	,,		147в
8	,,,	,,	12	1	"	,,,	28	1	,,	,,	62	2		,,	165

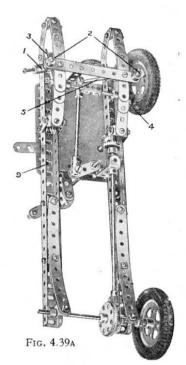
Clockwork Motor and Meccano Loaded Sacks (not included in outfit)

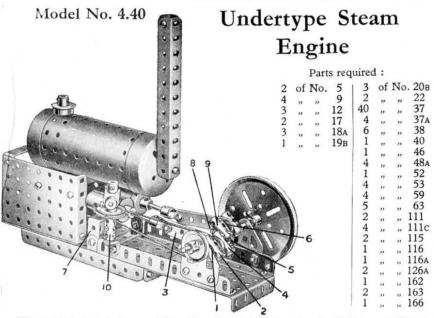
The front wheels are mounted on \(\frac{3}{4}\)" Bolts, which form the stub axles and are secured in Couplings 1 (Fig. 4.39a). Each of the latter carries in its centre transverse hole a 11 Rod 2, which is passed through the end holes of two 41 Strips laid one upon the other, and loosely clamped in place 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 3½" 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 31" 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 21" Double Angle Strips in the front of the chassis, but they are not secured to the Strips.



The complete body shown in Fig. 4.39B can be detached from the chassis (Fig. 4.39A) by undoing the 38" 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.





The crankshaft is built up of four Couplings joined together by \( \frac{3}{4}\) Bolts. A \( \frac{3}{4}\) Bolt is passed through the centre threaded hole of the Coupling 2 and screwed up as tightly is 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 he connecting Rod revolves easily in the intervening space. A \( \frac{3}{4}\) 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 \( \frac{3}{6}\) 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 \( \frac{3}{6}\) 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 1.

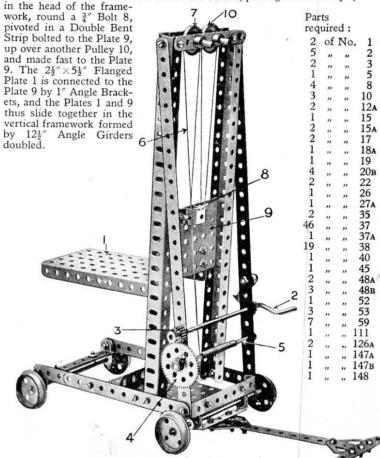
Two 2" Rods are used for the ends of the crankshaft, one carrying a 3" Pulley to represent a flywheel and the other a 1" Pulley round which a length of cord is passed which takes the drive to a 1" Pulley on the centrifugal governor. The latter is built up from a Large Fork Piece with Collars attached by means of  $\frac{3}{6}$ " 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  $2\frac{1}{2}$ "  $\times 1$ " Double Angle Strip 7.

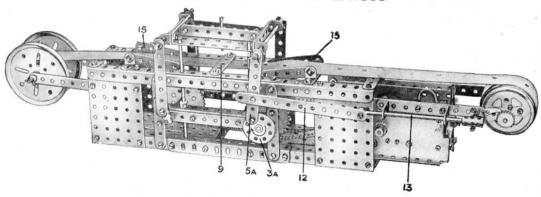
### Model No. 4.41

### **Bale Lifter**

The bale platform 1, consisting of a  $2\frac{1}{2}$  " $\times 5\frac{1}{2}$ " Flanged Plate, is raised by a Crank Handle 2, operating a Pinion 3 which engages with a 57-teeth Wheel 4 on a Rod 5. This Rod carries the Cord 6, passing over a Pulley 7,



### Model No. 4.42 Power Press

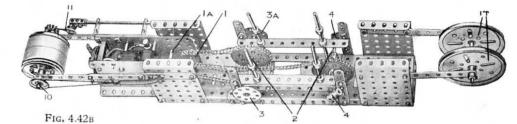


The model shown in the illustration represents a type of automatic press used in factories for stamping out small metal parts. Although the model does not stamp out steel parts, it will cut neat round holes at equal distances in a strip of paper with great rapidity.

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 IA, and from another  $\frac{1}{2}$ " Pinion on this Rod to a second 57-teeth Gear on the Rod I. Two I" 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  $\frac{3}{4}$ " 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  $3\frac{1}{2}'' \times 2\frac{1}{2}''$  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



Parts required:

				-der	····	*	
8	of	No	0.2	1	of	No	. 46
2	"	,,,	2A	2	,,	,,	48
6	"	22	3	2	**	,,	48A
18	,,	,,	-5	2	,,	,,	52
2	,,	,,	8	5	,,	"	53
4	,,	,,	9	10	. ,,	,,	59
2	. ,,	,,	11	1	,,,	,,	62
1	,,	,,	15	3	"		63
5	,,	,,	15A	30		,,	94
5	**	,,,	16	2	33	,,	95
2	,,	,,,	17	2	,,	,,	96
1	,,	,,	18 <sub>A</sub>	2	,,	,,	111c
2	"	,,	19 <sub>B</sub>	1	,,	"	147A
2	,,	,,	20A	1	,,	,,	147 <sub>B</sub>
2	,,	"	24	1	,,	,,	148
1	,,,	22	26	2	. "	"	162A
2	,,	,,	27A			. "	
13	,,	,,	35	Ele	ctr	ic IV	lotor
102	,,,	,,	37	(		inclu	
19	"	,,	38		in	Out	ft)
1 -	,	"	42				

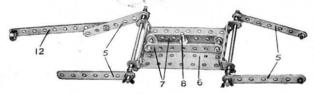
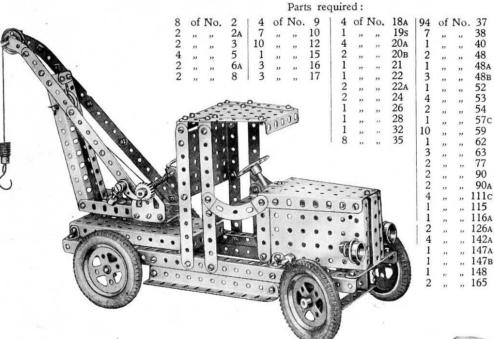


FIG. 4.42A

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 4½" Rod 13 by means of a Coupling and the Rod is pivotally connected by a 5½" 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

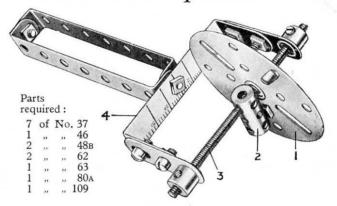
### Model No. 4.43 Motor Breakdown Crane



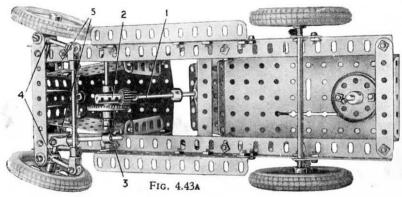
Bearings for the steering column 1 (Fig. 4.43a) are formed by a Flat Bracket and Coupling 2. A  $3\frac{1}{2}$ " Rod passes through the centre transverse hole of the latter and carries a  $1\frac{1}{2}$ " Contrate Wheel which is spaced by means of three Washers from the Coupling. The teeth of the Contrate 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  $1\frac{1}{2}$  Double Angle Strips 5 secure the  $4\frac{1}{2}$  Strips to the side Girders of the model.

Model No. 4.44 Opisometer

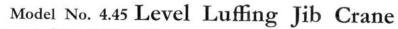


This instrument can be put to practical use for measuring curved lines, the perimeter of bodies, map routes, etc. The Face Plate 1 is free on the Screwed Rod 3, but is attached by a Bolt to a Coupling 2, the end transverse tapped hole of which engages with the thread of the Rod. The scale 4 may be graduated 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.



Parts required:

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



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 2½" ×½" 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 12" 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 3½" Rod, on which is fixed a ½" Pinion engaging with the Contrate, is journalled in the Coupling 5 and in the 21" 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 ½" 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 31 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 11 Rods 11 and the 41 Rod 12, and finally are secured to the moving carriage 13. When the model

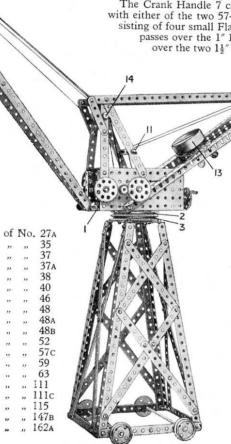
is working the Boiler End on the carriage should be weighed until it exactly

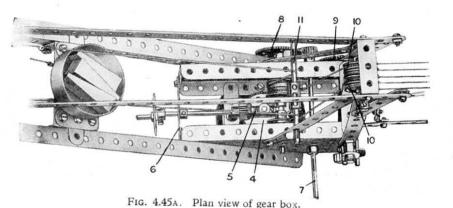
counterbalances the jib.

The 57-teeth Gear 9 is fixed to the 3½" 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 ½" loose Pulleys at the jib head, back to the remaining 1" loose Pulley at 14, and finally over the other 1" 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.

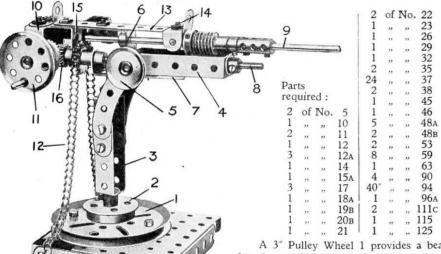
The rails of the carriage 13 should be kept well oiled, so that the carriage

slides easily.



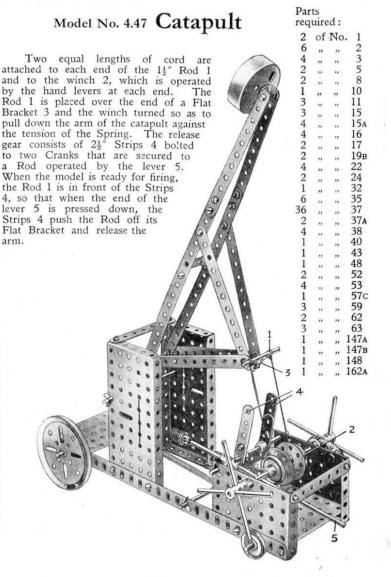


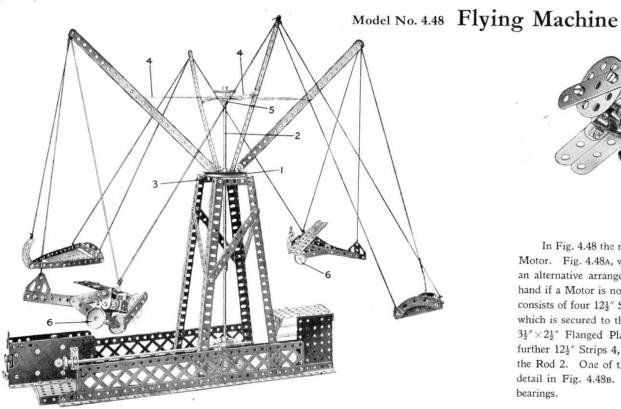
# Model No. 4.46 Naval Quick-firing Gun



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 21" 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 \(\frac{3}{4}\)" Sprocket Wheel and \(\frac{1}{2}\)" Pinion 16. Two 1" \times 1" Angle Brackets 10 form bearings for a 2" Rod carrying the hand Wheel 11. This Rod is fitted with a 3" 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.





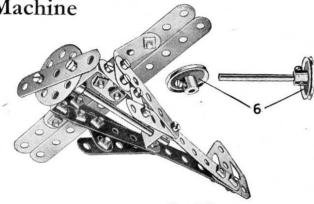


Fig. 4.48B

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.

						Pa	rts re	quire	d:			•			
6	of	No.	1	4	of	No	. 12A	1	of	No.	27A	3	of	No	. 53
16	22	"	2	2	,,	,,	13	1	,,	,,	29	2	"	,,	54
2	**	,,	2A	1	,,	,,	14	1	,,	,,,	32	3	,,	"	59
11	"	"	5	2	,,	,,	16	122	,,	,,	37 i	1	**	,,	63
1	"	,,,	6a	2	,,	"	17	2	,,	"	37A	4	,,	**	90a
6	22	"	8	1	,,	,,	19 <sub>B</sub>	2	**	"	40	1	,,	,,	98
3	"	>>	9	1	23	22	21	1	,,	"	46	2	,,	,,	99
6	**	"	10	4	,,	"	22	2	"	"	48	1	,,	,,	109
6 3 6 3 2	,,,	"	11	2	,,	,,	24	6	"	"	48A	2	,,	,,	111c
2	**	**	12	1	,,	"	26	2	,,	,,	52	2	22	,,	126
						E	lectric	Mo	tor			2			126A

(not included inOutfit)

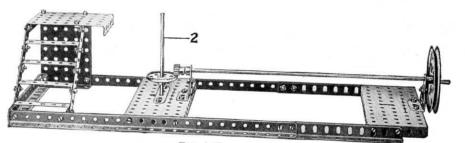
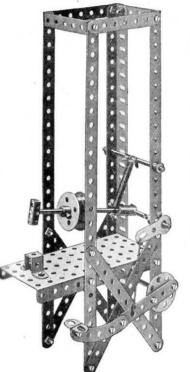


Fig. 4.48A

#### Model No. 4.49

## Treadle Hammer



### 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 ½" Pinion on the Motor shaft engages with the ½" Contrate Wheel 1 attacked to the back axle 2. The latter is journalled in two ½" Flat Girders bolted to two 5½" 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 runring.

A 57-teeth Gear 4 is fixed to a 4½" Rod 5 that carries at one end a Bush Wheel. This is connected to the front wheels by a link built up of 3½" and 4½" Strips and attached by an Angle Bracket 7 to the 2½" 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 1½" 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.

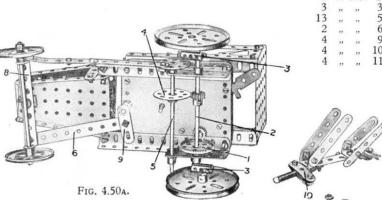


				Pa	rts	requ	iired :				
2	of	No.	2A	1 3	of	No.	12	8	of	No	. 38
3	,,	***	3	1	,,	,,	15	1	,,	,,	43
3 2 4 4	**	**	5	2	,,	,,	15A	1	,,	,,	45
2	22	,,	6A	1	,,	,,	16	2	22	,,	481
4	,,	"	9	1	,,,	22	17	2	,,	,,	53
	"	,,,	10	2	,,,	,,	19 <sub>B</sub>	2	,,,	,,	54
4	22	,,,	11	2 2 2 2	,,	,,,	20A	10	,,	,,	59
				2	,,	"	22A	1	,,,	,,	62
				2	,,	22	24	2	,,,	,,	63
				2	,,	22	26	2	,,	,,	103
	0			1	,,	,,	27A	2 5	30	"	108
1	9/	3)	@ -	1	,,	"	28	5	,,	,,	1110
ø	101	10	19	57	22	,,,	37	2	"	,,	115
1/	1/1	500/	9	14	,,	"	37A	1	,,,	,,	160
	14	W/ /	-								

Clockwork Motor

#### Parts required:

2	of	No.	. 1	3	of	No	. 16	1	of	No.	45
4	32	**	2	2	,,	,,	20в	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	33	**	15A	1	**	,,	43	1	**	**	90



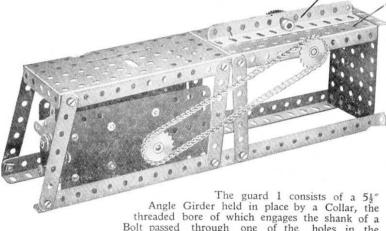
# Model No. 4.51 Telpher Span

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.

# Model No. 4.52 Saw Bench



Angle Girder held in place by a Collar, the threaded bore of which engages the shank of a Bolt passed through one of the holes in the Flanged Plate 2. Hence by altering the position of the Bolt in the Flanged Plate, the guard may be moved nearer or further from the Circular Saw as required to allow for different thicknesses of material.



							100 10	don							
8	of	No.	1												
2	"	"	2					2							
3	,,	"	3	3	of	No	. 22A								
3 2 8	,,	,,	4	1	,,	,,	23	5	of	No	. 48A				
8	,,	,,,	5	2	,,	,,	26	2	,,	"	52	4	of	No	.126A
9	,,	,,	8	1	,,	,,	28	5	,,	,,	53	1	"	,,	160
4	,,	,,	9	1	,,,	,,	32	10	,,	,,	59	1	22	22	162A
1	"	,,,	11	4	,,	,,	35	2	,,	,,	62	1	,,	,,	165
7	,,	,,	12	126	,,	,,	37	2	,,	,,	63	1	,,	,,	166
1	,,	,,	15A	6	,,	,,	37A	1	,,	,,	98		FI	ecti	ic
15224	,,	"	16	24	,,	,,	38	1	,,	**	99			Tota	
2	,,	,,	18a	1	,,	,,	40	2	.,,	**	103F	,			
2	,,	,,	20	1	,,	,,	44	4	,,	,,	111c	(		Out	uded 6t)
4	,,	,,	22	1	22	,,	45	1	,,		115			Cut	



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

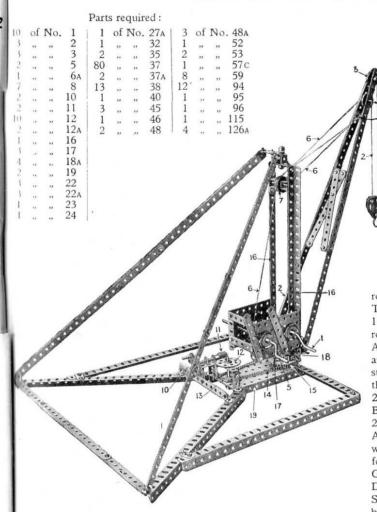
Motor

(not included

in Outfit)

Parts

# Model No. 4.53 Swivelling and Luffing Jib Crane



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 1" Pulley in the block 4 (spacing Washers being used to give clearance to the 1" 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 that is secured to the standard 16 of the crane. The bearing for the Rod of the Worm 11 is made by bolting a 1" × 1" Angle Bracket 20 to the 5\\\\^\*\times 2\\\\^\*\ Flanged Plate 19, and to the Angle Bracket 20 is secured a 11 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 5½" Strip 25 which forms with the Bracket 23 the front bearing for the Rod. The standard is built up of two 121/2" Girders 16 which are connected at the base by a 11/2" 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 5½" × 2½" Flanged Plate 19, Fig. 4.53B.

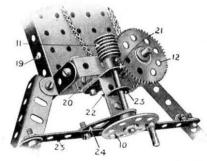


Fig. 4.53A

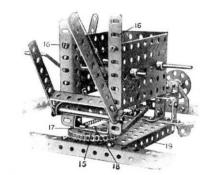
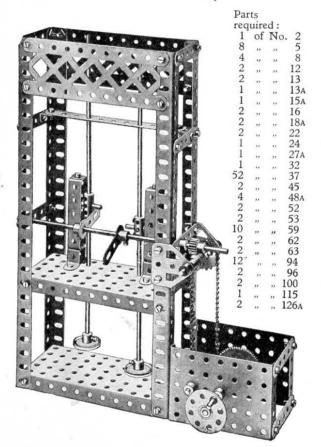


FIG. 4.53B

#### 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.



# Model No. 4.55 Coal Tipper

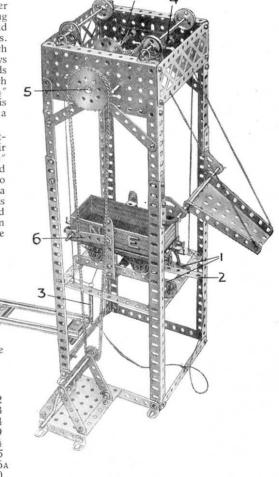
Each of the main vertical columns consists of a 12½" and a 5½" Angle Girder overlapped three holes. The platform carrying the truck is constructed from 5½" Strips, and it slides freely between the upright members. Four cords of equal length, attached to each corner of the platform, are taken over Pulleys 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 ½" 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.

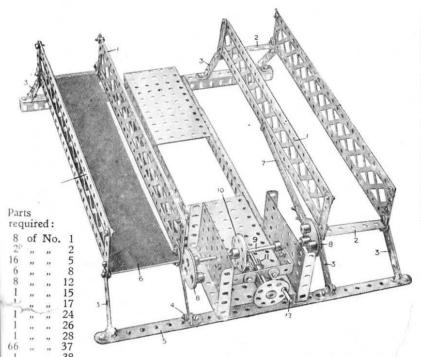
To keep the truck in place on the rails, a pivoted Strip 6, with a ½"×½" Angle Bracket on its end, can be swung round so that the Angle Bracket engages with the back of the truck; while further ½"×½" Angle Brackets on the top of the vertical Strips are arrange.

vertical Strips are arranged to engage with the top edges of the truck.

				Pa	rts	reau	ired	:			
10	of	No	2	3			22A	1 2	of	No	. 52
6	,,,	**	3	1	,,	**	26	1	**	**	53
		. 77	4	2	**	**	27A	1	**	,,	54
9	,,	"	5	12	**	**	35	9			59
4	,,,	,,	8	85	**	**	37	30"	**	25	94
4	- 34	12	9	9	**	.,	37A	1	,,	**	95
21	**	**	12	6	**	,,	38	1	,,	**	96A
3		225	14	1	22	>>	40	2	,,	,,	100
3	,,,		15	1	,,	,,	43	2	,,	,,	111
1	,,	**	19s	1	**	37	46	1	**	,,	115
1	,,	23	22	3	,,	,,,	48A	2	,,	**	126

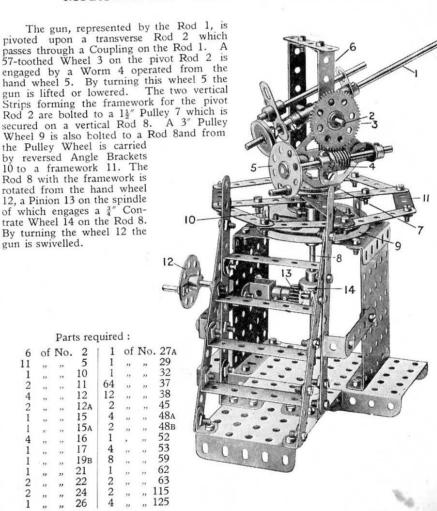


### Model No. 4.56 Cake Walk



The rocking platforms are built up of Braced Girders 1 connected by the end Strips 2 and pivotally bolted and locknutted 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

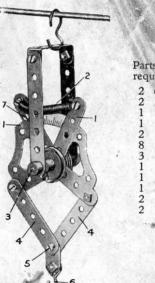


2 of No. 126A

#### 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.



Par	ts uire		
2	of	1000	3
2	,,		5
1	,,	1	10 17
1 2 8 3	n		17
2	"	"	22 37 37 <sub>A</sub>
8	"	"	3/
1	"	"	43
1	"	"	48
1	"	"	57c
2	"	"	59
2	"	,,	108
	2	1-12	18.7

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 11" Flanged Wheels and two pairs of 3" 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 11 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 61 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.

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 unwincing 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.

Parts required:

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 it anodel.

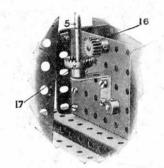


FIG. 4.60A

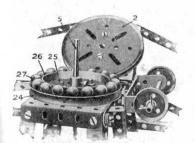
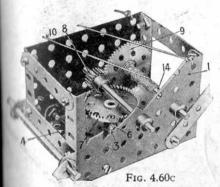


FIG. 4.60B



Model No. 4.60 Elevated Jib Crane

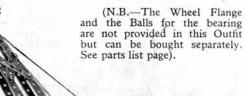
Parts required:

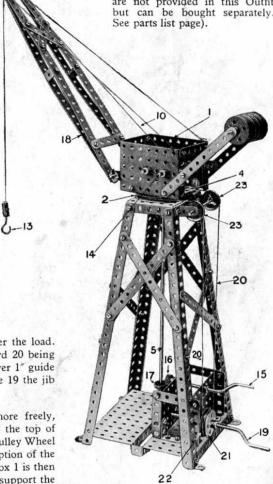
4	of	No.	1	1 1	1 0	f N	0. 19	1	ŏf	No.	29
10	,,	,,,	2	1	1 ,	, ,,	19B	4	.,	,,	35
1	,,	,,	3	100	Ι,	, ,,	-19s	85	,,	,,	37
8	- ,,	,,,	5	1 4	1 ,	, ,,	120	. 1	,,	,,	40
4	,,	,,	8.	1 2	2,	, ,,	20в	1	,,,	,,	46
4	,,	,,	11	1	Ι,	. ,,	21	3	,,	,,	48A
14	,,	,,	12	1	Ι,	, ,,	22	2	,,	,,	52
3	,,	,,,	12A	1 2	2 ,	, ,,	22A	5	,,	,,	53
1	,,	,,	13	1	2 ,		26	1	,,	,,	57c
5	,,	,,	16	1	1 ,	, ,,	27A	6	,,	,,	59
1	,,	,,	18A	1	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  $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips 4. The 111 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 1/2" 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 3" Contrate Wheel 17 and through the

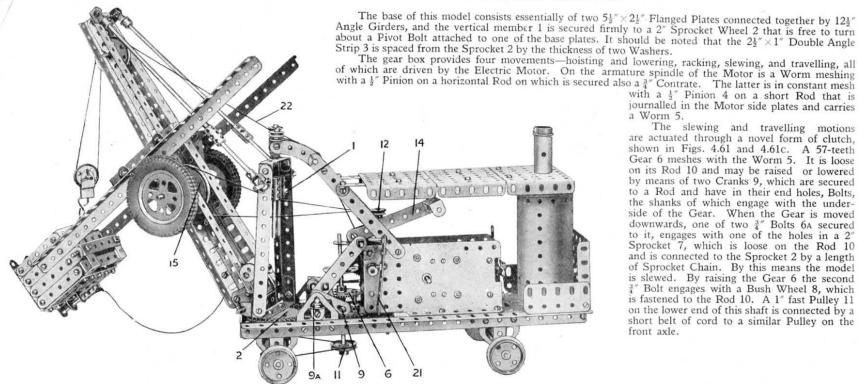
Gear Wheels 7, 8, and 9, and operates the cord 10 to raise or lower the load. The jib 18 is swivelled from the Crank Handle 19, a continuous cord 20 being wound twice round the 3" Flange Wheels 21. The cord 20 passes over 1" guide Pulleys 23 and round the 3" Pulley Wheel 2. By turning the handle 19 the 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.





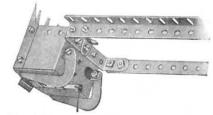
### Model No. 4.61 Steam Shovel



with a 1 Pinion 4 on a short Rod that is journalled 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 3" 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 3" 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.

										1	arts r	equir	ed:											
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	,,	,,	23 <sub>A</sub>	1	,,	"	45	11"		,,	94	1	"		163	
6	,,	,,	3	5	,,	,,	15A	2	,,	,,	24	1	,,	,,	46	2		,,,	95	1	,,	,,	164	
4	**	22	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	,,	"	18 <sub>A</sub>	1	- 22	22	29	2	**	20	52	3	**		111c					
8	**	**	8	4	,,	,,	20	2	,,	,,	32	4	,,	,,	53	2	"	.,	115		Ele	ctric		
2	**	"	9	3	,,	,,	20 <sub>A</sub>	10	,,	**	35	1	**	**	57c	1		**	116A		M	otor		
3	"	,,	10	1	"	"	20в	125	,,	**	37	10	,,	**	59	3	,,		126	(n	ot i	nclude	ed	
1	32	,,	11	1	,,		21	7	**	**	37A	2	**	**	62	4		,,	126A			utfit)		
12	"	,,	12	2	,,	,,	22	- 21	,,	**	38	6	,,		63	2			142A					
4	**		12 <sub>A</sub>	1	1000	22	22A	1	17,525	3.77	40	2			77	1		,,,	147p					



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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.

removed.

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

### Model No. 4.61 Steam Shovel (continued)

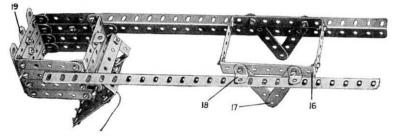


Fig. 4.61B. The Bucket Arm, with Bucket and Guide Frame in position.

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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 \(\frac{3}{4}\)" Belt, 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 1/2" fast Pulley 12

secured to the top end of a Rod that carries a 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 journalled 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.

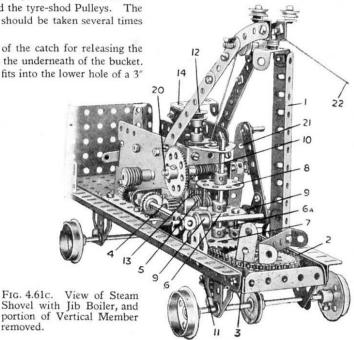
The construction of the bucket itself should be fairly obvious from Fig. 4.61B, with the exception of the catch for releasing the hinged bottom. The catch consists of a 1½" Rod free to slide in a Double Bracket that is bolted rigidly to the underneath of the bucket. One end of the Rod is fitted with a Coupling, to which the release cord is attached, and the other end fits into the lower hole of a 3" Strip 19.

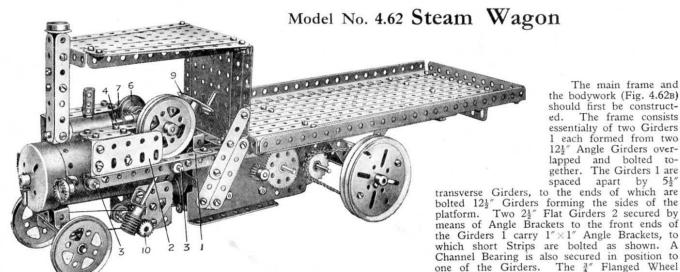
The hoisting barrel consists of a 3½" Rod 20 that is free to slide in the Motor side plates and is controlled by the lever 21, so that the 57-teeth Gear on its extremity may be thrown into or out of engagement with the ½" Pinion 4. When out of gear the projecting shank of a Bolt on the Motor side plate 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 1" 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 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.





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 121 Angle Girders overlapped and bolted together. The Girders 1 are spaced apart by 51/2" 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

FIG. 4.62A

surmounting the chimney is mounted on a 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 3½" Rods 3 that are passed through holes in the Girders 1, 5½" 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.

						Part	s requ	ired:	7
9	of	No.	1 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 " " 37	2 ,, ,, 111
10	,,	,,	5	4	,,	,,	19 <sub>P</sub>	24 38	6 " " 111c
1	,,	,,	6A	4	,,	,,	20A	1 ., ., 45	2 " " 115
6	,,,	,,	8	1	27		20в	2 48	1 " " 116A
3	,,	,,	9	2	,,	,,	22	3 " " 48	
4	**	,,	10	3	,,	,,	23	1 ,, ,, 52	4 126A
5	,,	,,	11	1	,,	,,	24	1 ,, ,, 53	1 160
19	27	29	12	2	**		26	10 59	1 " " 162A
4	,,	,,	12A	2	,,,	,,	27A	2 63	1 " " 162в
1	**	"	15	2	. ,,	,,	29	19" ., ,, 94	1 " " 163
2	.,,	,,	15A	1			32	2 95	1 164

Electric Motor (not included in Outfit)

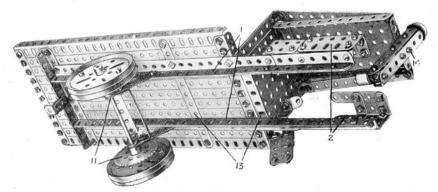


Fig. 4.62B

of No. 15A

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### Model No. 4.62 Steam Wagon (continued)

The "firebox" is formed by two pairs of Flat Trunnions held together by 12" ×2" 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 ½" Pinion 10. This Pinion is secured on the end of a 2" Rod carrying a Coupling between two 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 1 Pinion on the Motor armature spindle engages a 57-teeth Gear on a Rod that carries a further Pinion engaging a second

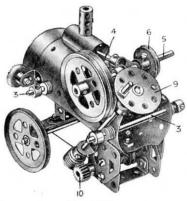


Fig. 4.62c

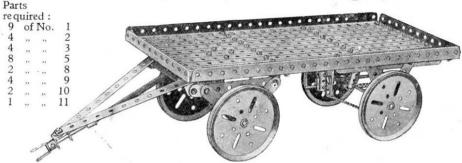
Gear. The Rod of the latter carries two 1/2 Sprockets from which the drive is led by means of chain to the Sprockets 11 (Fig. 4.62B). The armature shaft of the Motor also carries a 1" Pulley which transmits the drive via a belt to the Rod carrying the flywheel. The belt after passing round the Pulley 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.

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.

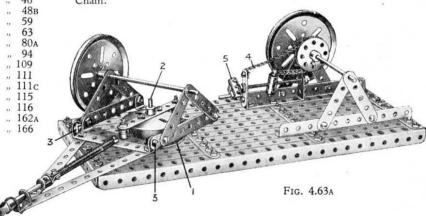
Rubber covered wire is used for connecting the Accumulator and Motor.

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



A Face Plate 1 (Fig. 4.63A) is bolted to the Strips of the platform and a 11" 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 31/2" Strips are bolted to the Boiler End and to these  $3\frac{1}{2}'' \times \frac{1}{2}''$  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.



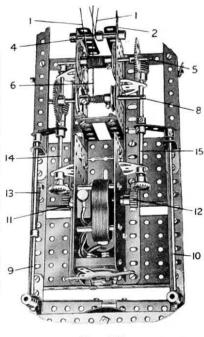


FIG. 4.64A

Parts
required
(continued):

2 of No. 54

1 " " 57c
10 " " 59

2 " " 62

2 " " 63

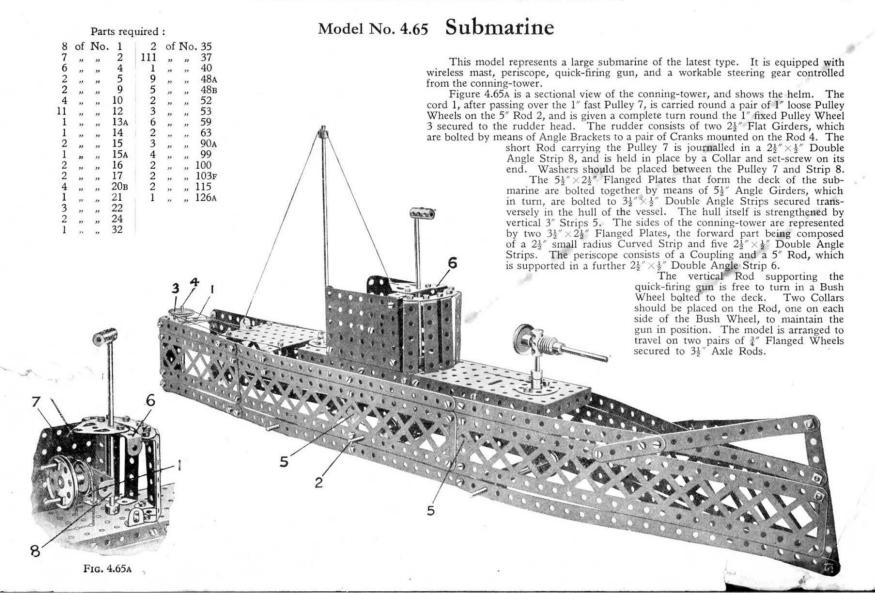
2 " " 111

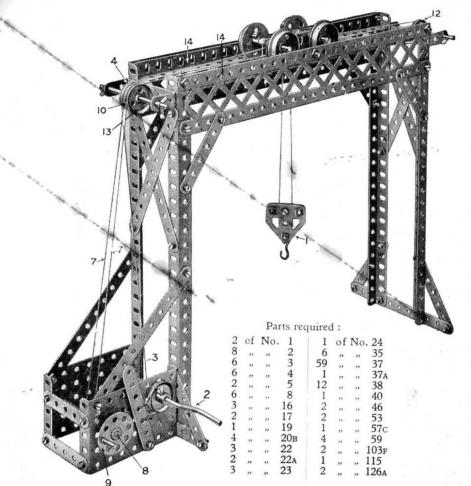
5 " " 111c

4 " " 126

1 " " 147B

Electric Motor
(not included in Outfit)





# 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 ½" Pulley 5 and a corresponding Pulley in the block, thence round another ½" Pulley 6 and is made fast at the end of the gantry. For traversing, a continuous Cord 7 is wound several turns on the 3½" 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, passing through the two Plates 11; and ½" Pulley Wheels 5, 6, on the inner Bolts. The outer plates being

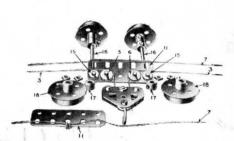


FIG. 4.66A.

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.

#### 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

### POWER UNITS FOR DRIVING MODELS

In order to obtain the greatest possible enjoyment from the Meccano hobby, the models must be set to work by means of one of the Meccano power units. Each of these units has side plates and base pierced with the Standard Meccano equidistant holes.

#### MECCANO CLOCKWORK MOTORS

All Meccano Clockwork Motors are strongly built and are fitted with powerful spring mechanisms that ensure a long steady run on each winding.

X Series Clockwork Motor. This non-reversing motor is specially designed to drive models made with Meccano X Series parts.

No. 1 Clockwork Motor. Non-Reversing.

No. IA Clockwork Motor. Reversing.

No. 2 Clockwork Motor. Reversing.

#### MECCANO ELECTRIC MOTORS

There are five Electric Motors in the series—two 6-volt and three 20-volt. Each is a highly efficient power unit and, with ordinary care, will give long and excellent service. It is important to note that these Electric Motors cannot be run satisfactorily from dry cells.

No. El Electric Motor (6 volt). Non-reversing.

No. E6 Electric Motor (6 volt). Reversing.

No. E1/20 Electric Motor (20-volt). Non-reversing.

No. E20A Electric Motor (20-volt). Non-reversing.

No. E20B Electric Motor (20-Volt). Reversing.

#### MECCANO RESISTANCE CONTROLLER

This Controller enables the speed of Meccano 6-volt Electric Motors to be regulated as desired.

#### MECCANO TRANSFORMERS

A Meccano Transformer provides a convenient and safe means of driving a Meccano Electric Motor from the mains supply where this is alternating current.

There are six Transformers in the Meccano series, all of which are available for the following A.C. supplies, 100/110, 50 cycles. 200/225 volts, 50 cycles. 225/250 volts, 50 cycles. Any of these Transformers can be specially supplied for supplies other than above. When ordering a Transformer the voltage and frequency of the supply must always be stated.

No. T6 Transformer (Output 25 V.A. at 9-volts) for 6-volt Electric Motors. Fitted with speed regulator.

No. T6M Transformer (Output 25 V.A. at 9-volts) for 6-volt Electric Motors. This is similar to No. T6, but is not fitted with a speed regulator.

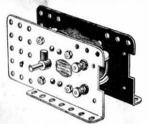
No. 76A Transformer (Output 40 V.A. at 9/3½ volts) for 6-volt Electric Motors. Fitted with speed regulator and separate circuit for supplying current for eighteen 3½-volt lamps.

No. 720 Transformer (Output 20 V.A. at 20-volts) for 20-volt Electric Motors. Fitted with 5-stud speed regulator.

No. T20M Transformer (Output 25 V.A. at 20-volts) for 20-volt Electric Motors. This is similar to No. T20, but is not fitted with speed regulator.

No. T20A Transformer (Output 35 V.A. at  $20/3\frac{1}{2}$  volts) for 20-volt Electric Motors. Fitted with speed regulator and output sockets for lighting lamps.

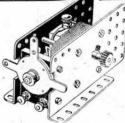
ASK YOUR DEALER FOR A COMPLETE PRICE LIST



No. E20A Electric Motor



No. E1/20 Electric Motor



No. E6 Electric Motor



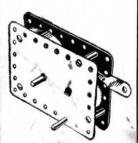
Resistance Controller



Transformer No. T20



Meccano X Series Clockwork Motor



Meccano Clockwork Motor No. I



Meccano Clockwork Motor No. 2

