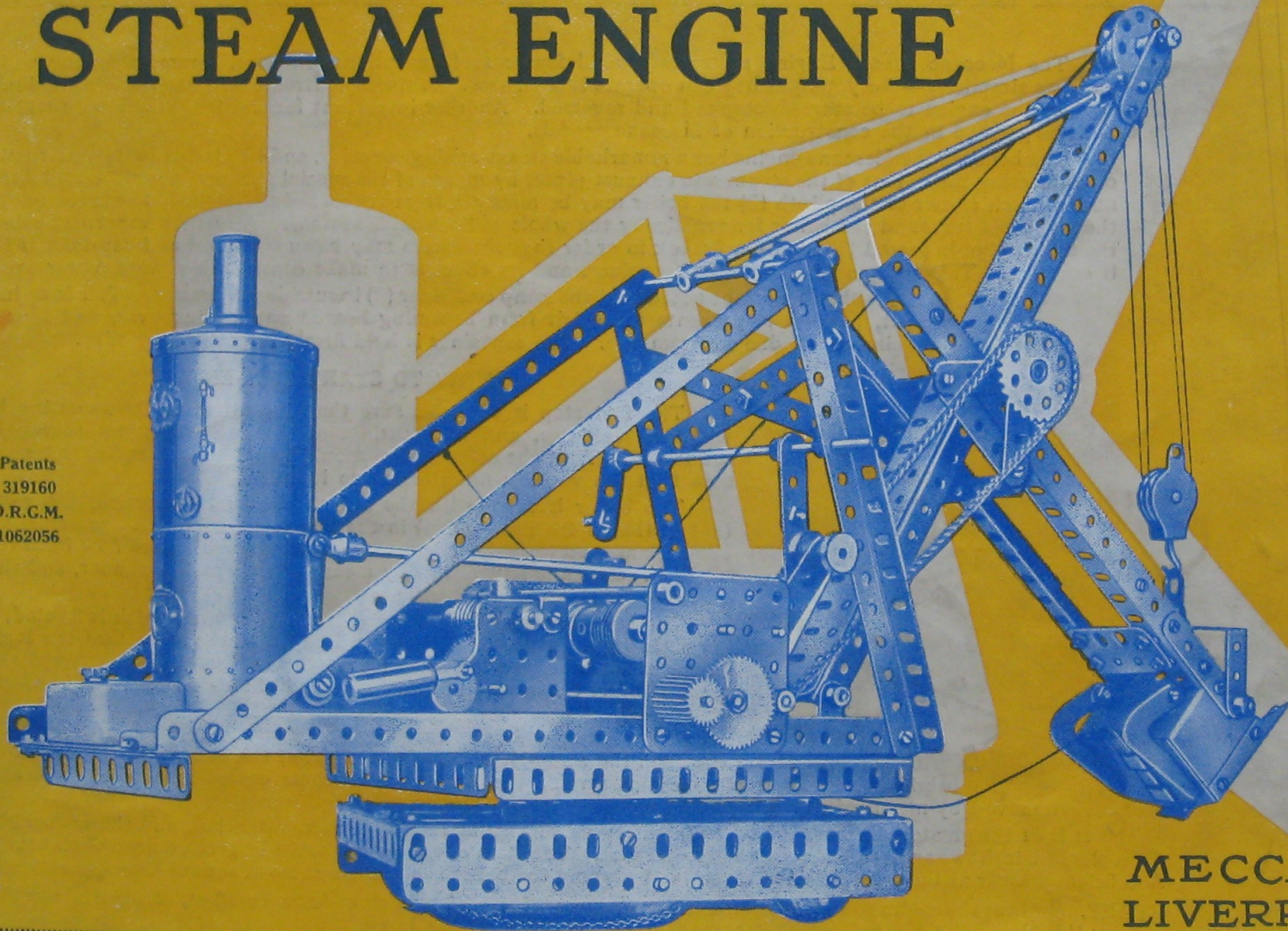


HOW TO USE THE MECCANO STEAM ENGINE

Patents
319160
D.R.G.M.
1062056



This Manual
contains a
Selection of
Choice
Meccano Models,
showing how
simply and
effectively the
Meccano
Steam Engine
may be
incorporated

Price
1/-

30S

MECCANO LIMITED
LIVERPOOL-ENGLAND

Read this page
carefully

How to Operate the Meccano Steam Engine

*If you follow
these simple
directions, the
Meccano
Steam Engine
will give you
years of good
service*

The Meccano Steam Engine possesses several features of exceptional interest, foremost among which is its extreme simplicity—the youngest boy can operate it with ease. A single control lever (marked 1 in the illustration) enables the engine to be started, stopped and reversed. Another important feature is the ease with which it may be incorporated in the construction of Meccano models.

The boiler of the Meccano engine has a remarkable steam-raising capacity, and this is due to its construction. By disconnecting the unions of the steam and exhaust pipes, by means of the special spanners supplied, and undoing the nuts at each corner of the plinth (2) the boiler may be removed from the rest of the engine. It will then be seen how the hot gases surround the boiler for practically the whole of its outside surface. A further important point is that the steam pipe is passed through the firebox in order that the steam may be superheated and deprived of the water it contains. This is done with real steam engines, and its effect is to make considerably more power available.

It should next be noted that the lamp container (3) is outside the firebox. This is an important point, because it prevents the spirit from becoming heated and boiling over, and thus entirely eliminates all danger from fire. The container is held firmly in position by clips.

HOW TO START THE ENGINE

The first step is to make sure that the cylinder, the reversing block on which it oscillates, and the bearings of the crankshaft are thoroughly well lubricated. Then the safety valve should be unscrewed and examined to make sure that the valve is not sticking to its seat.

The boiler is filled with the aid of the funnel supplied, the gauge cock (not visible in the illustration) in the meantime being left open to allow air to escape, and also to indicate when the water commences to flow from the gauge cock. The cock is now closed by means of the special spanner, and the safety valve replaced.

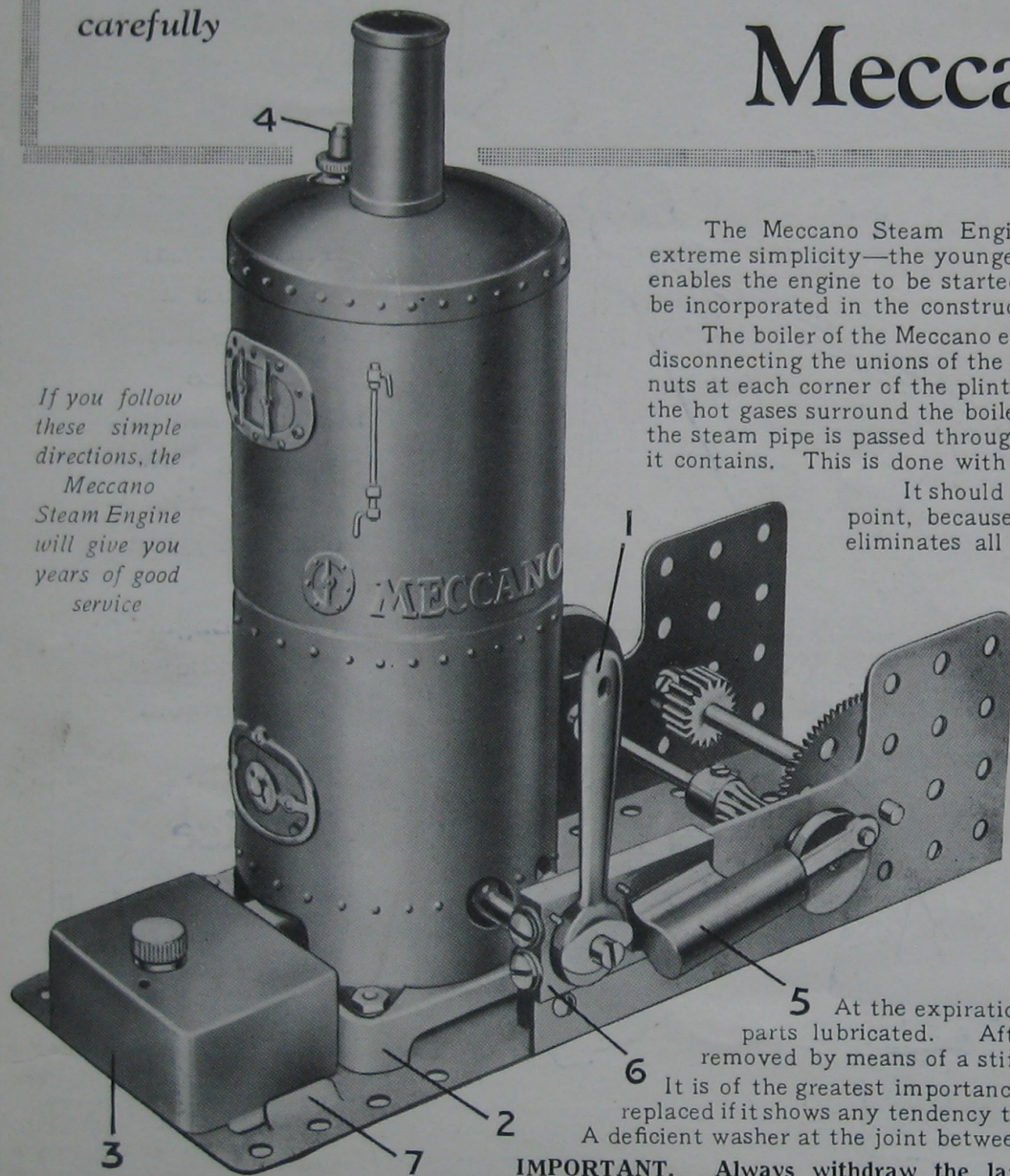
The lamp is next filled with methylated spirit, the wick is lighted, and the lamp placed in position. Care should be taken to ensure that the lugs on the lamp container engage the clips (7) on the bed-plate. No attempt should be made to start the engine until a good head of steam has been obtained.

HINTS ON CARE AND UPKEEP

5 At the expiration of each run the water should be drained out of the boiler and the various moving parts lubricated. After a period of service the barrel will become coated with soot, which should be removed by means of a stiff brush.

6 It is of the greatest importance that the safety valve should receive regular attention, and the washer should be replaced if it shows any tendency to stick to its seat. The stem of the valve should be given a drop of oil occasionally. A deficient washer at the joint between the valve body and the boiler is often the cause of serious loss of steam.

IMPORTANT. Always withdraw the lamp immediately the engine begins to slow down or stops, to obviate the possibility of "boiling dry." Always fill the boiler to the correct level when refilling the lamp.



Driving Models with the Meccano Steam Engine

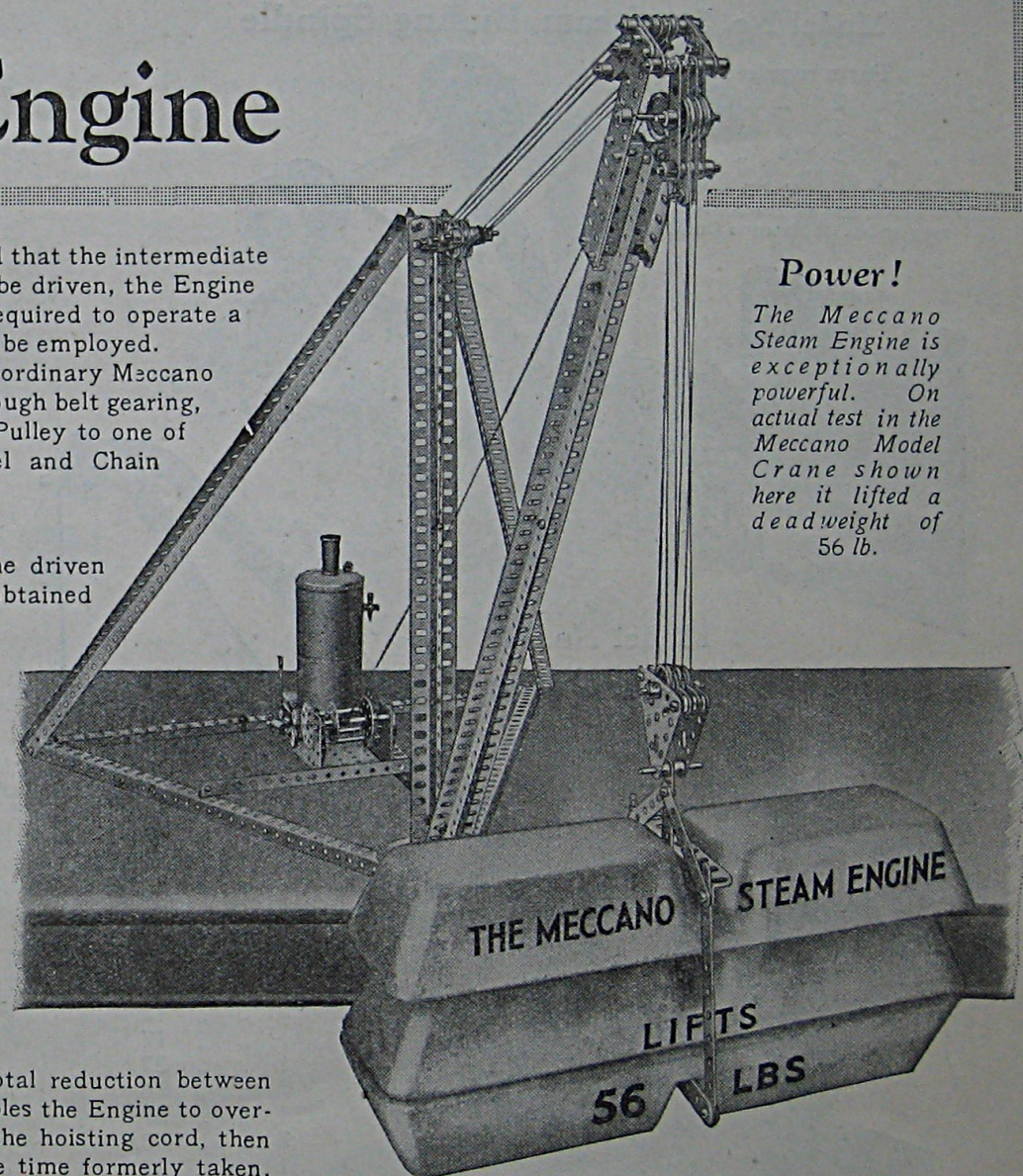
The Meccano Steam Engine is capable of driving almost any Meccano model, provided that the intermediate gearing is designed and constructed properly. No matter what type of model is to be driven, the Engine should always be allowed to rotate at maximum speed. This means that if it is required to operate a slow-moving model, a gear that will provide a considerable reduction in speed must be employed. The simplest means of obtaining the necessary reduction is, of course, provided by the ordinary Meccano gearing. If gears are not available the drive from the Engine can be transmitted through belt gearing, and the speed can be reduced at the same time by taking the drive from a small Pulley to one of much larger diameter (see Models Nos. S3, S4, S6, S18, etc.). Sprocket Wheel and Chain gearing may, of course, be used equally well in place of belts.

HOW TO COPE WITH HEAVY LOADS

Whatever type of gearing is employed it is important to remember that, if the driven shaft moves more slowly than the driving shaft, a mechanical advantage is obtained and increased loads may be overcome, the apparent gain in power being roughly in proportion to the loss in speed. If the drive is led through 1 : 1 gearing (i.e., two Gears of equal size meshing together or two Pulleys of equal diameter connected by a belt), there is no gain in power to counteract the loss through friction. Such gearing should therefore be avoided as far as possible, and when it is necessary to transmit the power from one point to another, the gearing should always result in some reduction in speed in the driven shaft, unless it happens that speed is a more important consideration than power.

CORRECT GEARING

Numerous examples of the different types of gearing that should be employed in connection with the Steam Engine will be found in this manual. In Model No. S13, Steam Capstan, the winding drum, which is mounted on a vertical axis, is required to rotate fairly slowly, so that it may overcome considerable loads. Consequently on the secondary Engine shaft, which is driven from the $\frac{1}{2}$ " Pinion on the crankshaft, a Worm is mounted and engaged with a Pinion on the winding drum shaft. A Worm and Pinion provide a speed ratio of 19 : 1; hence the total reduction between the crankshaft and the winding shaft is 57 : 1. The use of pulley blocks also enables the Engine to overcome increased loads. For example, if a crane can lift 10 lbs. coupled directly to the hoisting cord, then by using a single-sheave pulley block, so that the load is raised in just twice the time formerly taken, the model should be capable of lifting 20 lbs. (not allowing for loss through friction). Similarly, if a two-sheave pulley block is used so that the crane hook is raised in four times the period occupied originally, then a load of nearly 40 lbs. could be raised. Therefore the mechanical advantage is "2" and "4" respectively in these examples.



Power!

The Meccano Steam Engine is exceptionally powerful. On actual test in the Meccano Model Crane shown here it lifted a dead weight of 56 lb.

MECCANO STEAM-DRIVEN MODELS

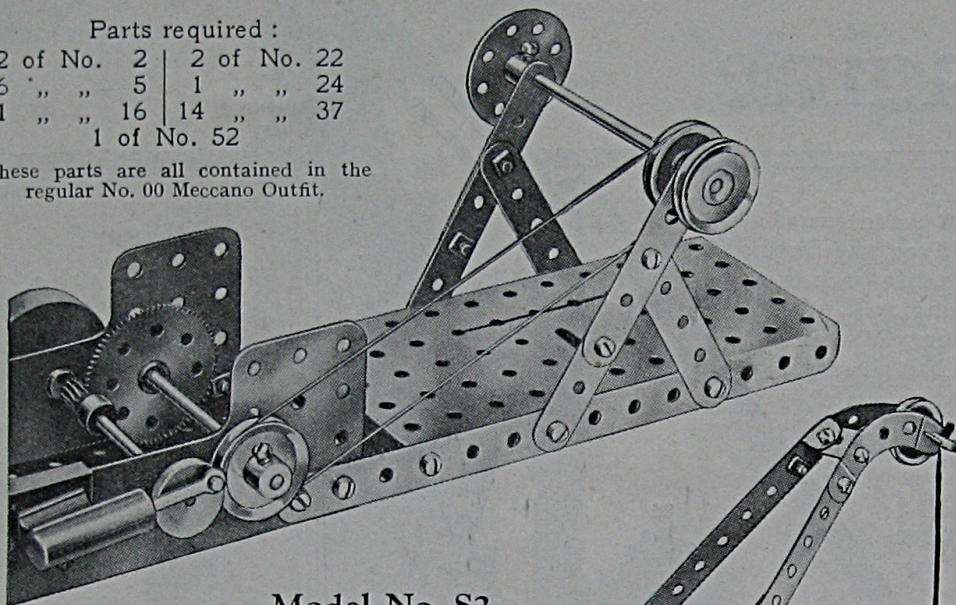
In Models Nos. S1, S3, and S4, the side plates only of the Engine are shown

Model No. S1 Steam Buffing Spindle

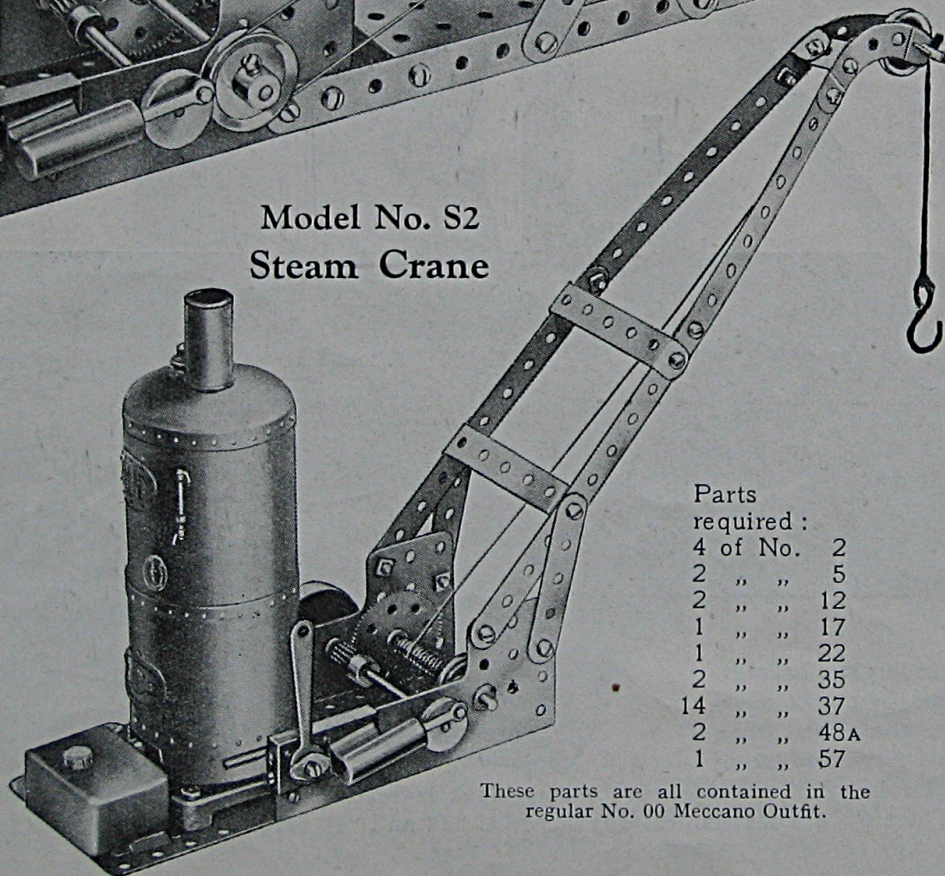
Parts required :

2 of No. 2	2 of No. 22
6 " " 5	1 " " 24
1 " " 16	14 " " 37
1 of No. 52	

These parts are all contained in the regular No. 00 Meccano Outfit.



Model No. S2 Steam Crane



Parts required :

4 of No. 2	2
2 " " 5	5
2 " " 12	17
1 " " 17	22
1 " " 22	35
2 " " 35	37
14 " " 37	48A
2 " " 48A	57
1 " " 57	

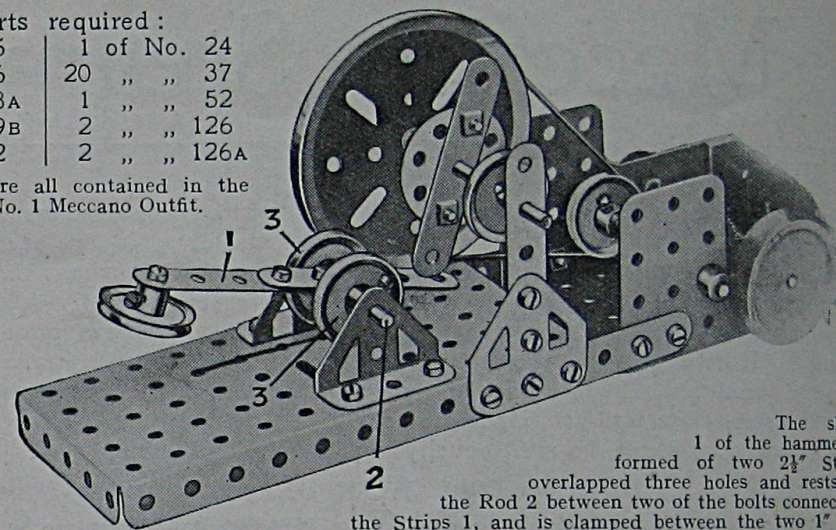
These parts are all contained in the regular No. 00 Meccano Outfit.

Model No. S3 Steam Trip Hammer

Parts required :

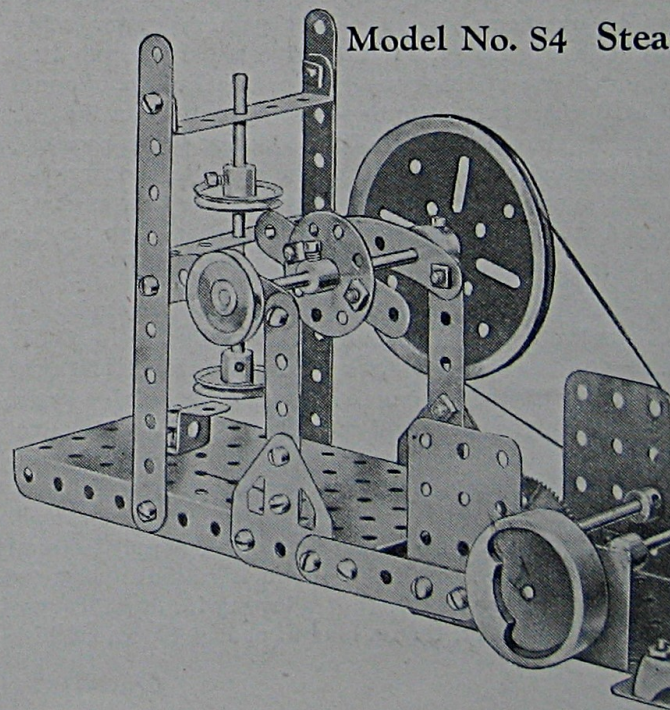
7 of No. 5	1 of No. 24
1 " " 16	20 " " 37
1 " " 18A	1 " " 52
1 " " 19B	2 " " 126
4 " " 22	2 " " 126A

These parts are all contained in the regular No. 1 Meccano Outfit.



The shaft 1 of the hammer is formed of two 2 1/2" Strips overlapped three holes and rests on the Rod 2 between two of the bolts connecting the Strips 1, and is clamped between the two 1" fast Pulleys 3.

Model No. S4 Steam Ore Crusher



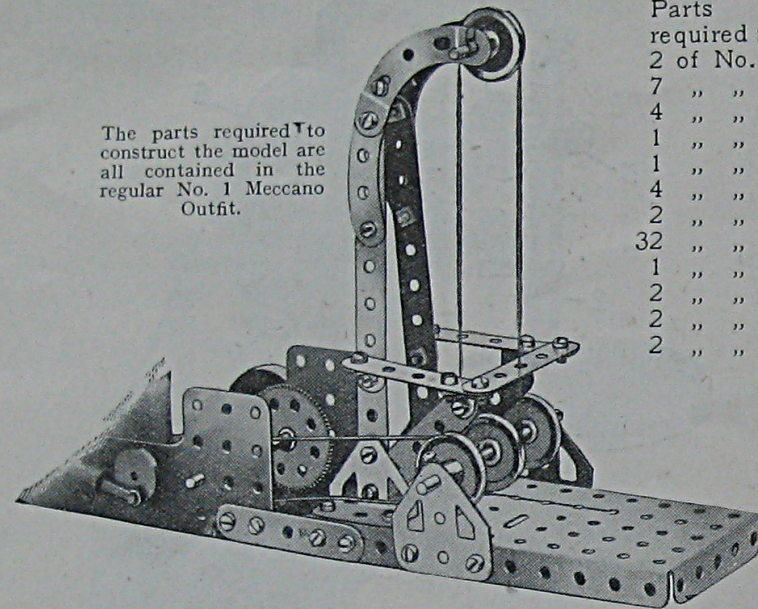
Parts required :

2 of No. 2	2
2 " " 3	5
5 " " 5	19B
1 " " 19B	22
3 " " 22	23
1 " " 23	24
1 " " 24	37
21 " " 37	48A
2 " " 48A	52
1 " " 52	90
2 " " 90	124
1 " " 124	126A
2 " " 126A	

These parts are all contained in the regular No. 1 Meccano Outfit.

In Models Nos. S5, S7, S8 the side plates only of the Engine are shown

Model No. S5 Steam Band Saw



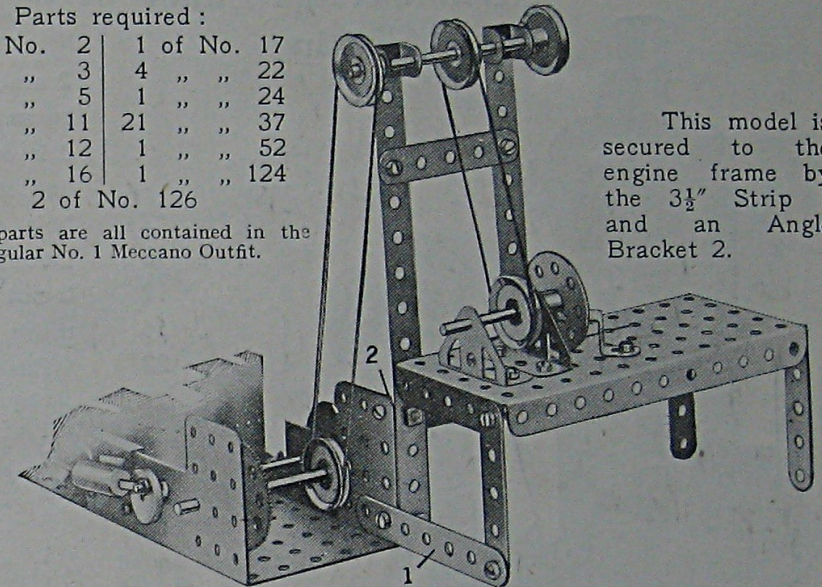
The parts required to construct the model are all contained in the regular No. 1 Meccano Outfit.

Parts required:		
2 of No.	2	
7 " "	5	
4 " "	12	
1 " "	16	
1 " "	18A	
4 " "	22	
2 " "	35	
32 " "	37	
1 " "	52	
2 " "	90	
2 " "	126	
2 " "	126A	

Model No. S7 Steam Bench Lathe

Parts required:		
3 of No.	2	1 of No. 17
1 " "	3	4 " "
4 " "	5	1 " "
2 " "	11	21 " "
2 " "	12	1 " "
1 " "	16	1 " "
2 of No. 126		

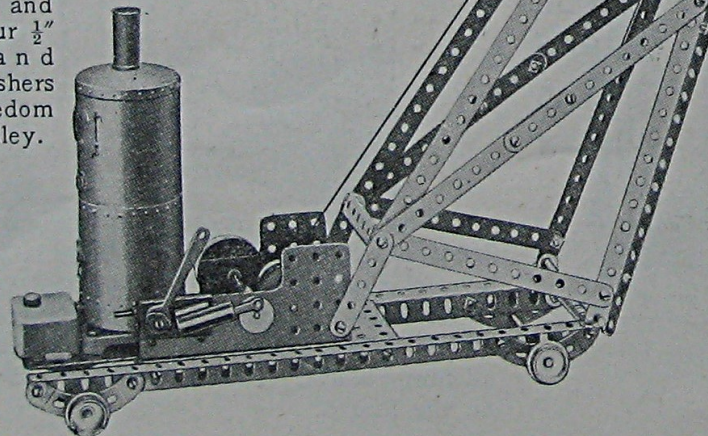
These parts are all contained in the regular No. 1 Meccano Outfit.



This model is secured to the engine frame by the 3 1/2" Strip 1 and an Angle Bracket 2.

Model No. S6 Portable Steam Crane

Little difficulty will be experienced in the construction of this interesting model. The pulley block 1 is described in S.M. 35 and requires four 1/2" Bolts and spacing Washers to give freedom to the Pulley.



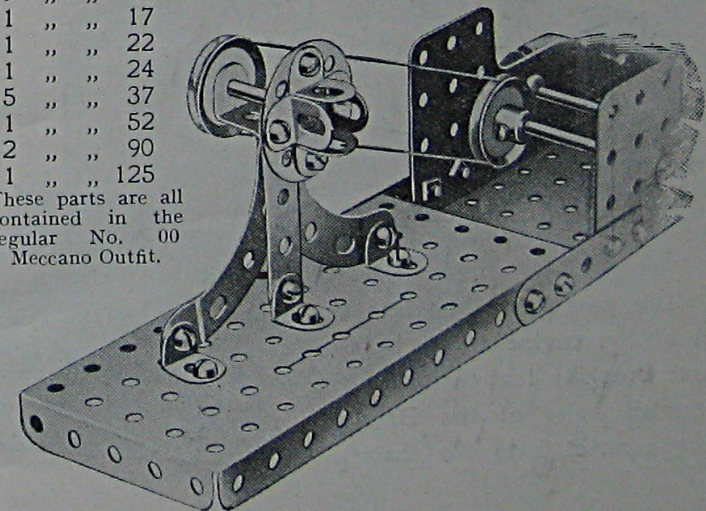
Parts required:		
6 of No.	1	1 of No. 23
10 " "	2	2 " "
2 " "	3	56 " "
3 " "	5	1 " "
4 " "	8	8 " "
1 " "	11	1 " "
2 " "	12	2 " "
1 " "	15A	1 " "
2 " "	16	1 " "
1 " "	18A	4 " "
4 " "	20B	4 " "
1 " "	22	2 " "

These parts are all contained in the regular No. 2 Meccano Outfit with the exception of 4 of 111A.

Model No. S8 Steam-driven Scrap Reel

Parts required:		
3 of No.	5	
7 " "	12	
1 " "	17	
1 " "	22	
1 " "	24	
15 " "	37	
1 " "	52	
2 " "	90	
1 " "	125	

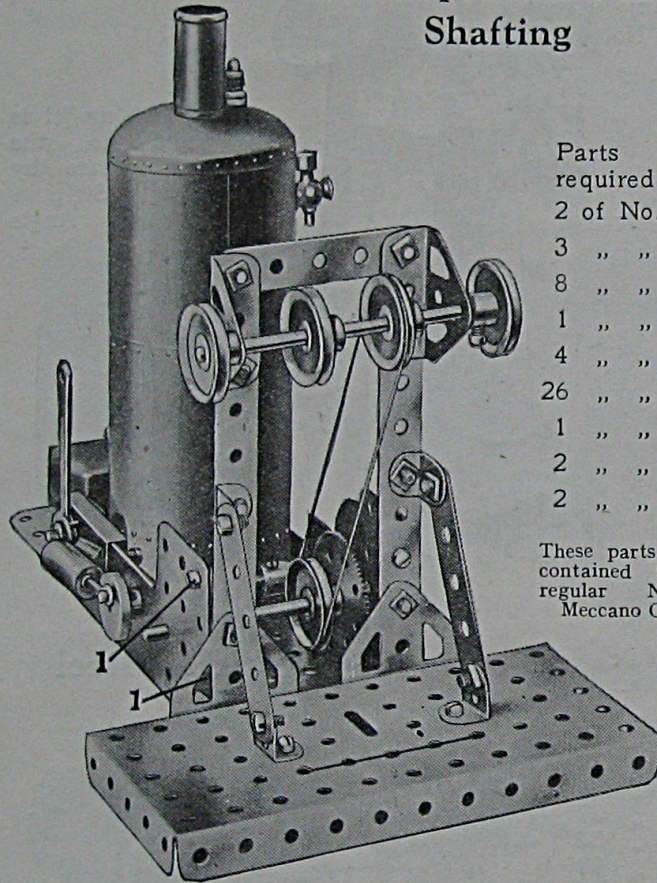
These parts are all contained in the regular No. 00 Meccano Outfit.



MECCANO STEAM-DRIVEN MODELS

In Models Nos. S10 and S11 the side plates only of the Engine are shown

Model No. S9 Steam-operated Pulley Shafting



This model is secured to the end of the engine frame by two Angle Brackets 1 at each side, the elongated holes of the Brackets being connected to the frame.

Parts
required :
2 of No. 2
3 " " 5
8 " " 12
1 " " 16
4 " " 22
26 " " 37
1 " " 52
2 " " 126
2 " " 126A

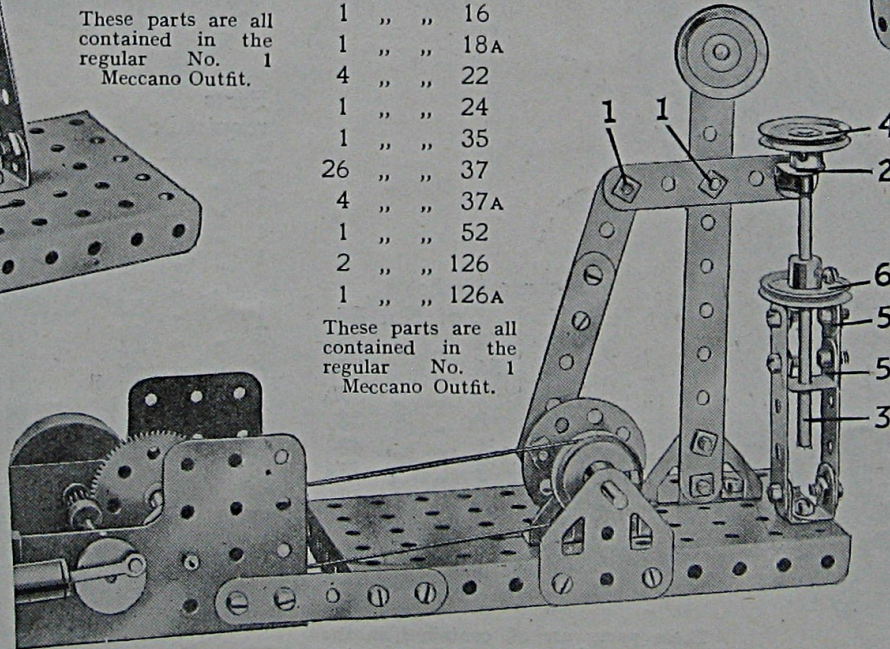
These parts are all
contained in the
regular No. 1
Meccano Outfit.

Model No. S10 Steam Pump

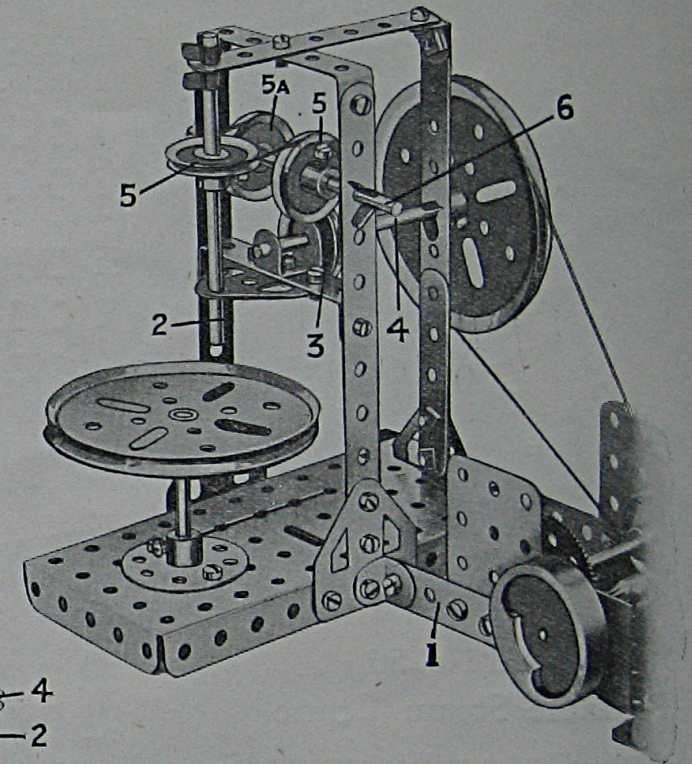
The Bolts 1 and the Angle Brackets 2 are pivotally attached and lock-nutted so as to give free movement. The Rod 3 is connected to the 1" Pulley Wheel 4 and moves freely through the elongated hole of the Angle Bracket 2 and the Double Brackets 5. The 1" Pulley 6 is not secured to the Rod 3 and does not move with it.

Parts
required :
1 of No. 2
7 " " 5
2 " " 11
3 " " 12
1 " " 16
1 " " 18A
4 " " 22
1 " " 24
1 " " 35
26 " " 37
4 " " 37A
1 " " 52
2 " " 126
1 " " 126A

These parts are all
contained in the
regular No. 1
Meccano Outfit.



Model No. S11 Steam Drilling Machine



Parts required :

4 of No. 2	3 of No. 16	27 of No. 37
1 " " 3	1 " " 17	2 " " 48A
1 " " 5	2 " " 19B	1 " " 52
1 " " 11	4 " " 22	1 " " 126
2 " " 12	1 " " 24	2 " " 126A
	5 " " 35	

These parts are all contained in the regular No. 1 Meccano Outfit.

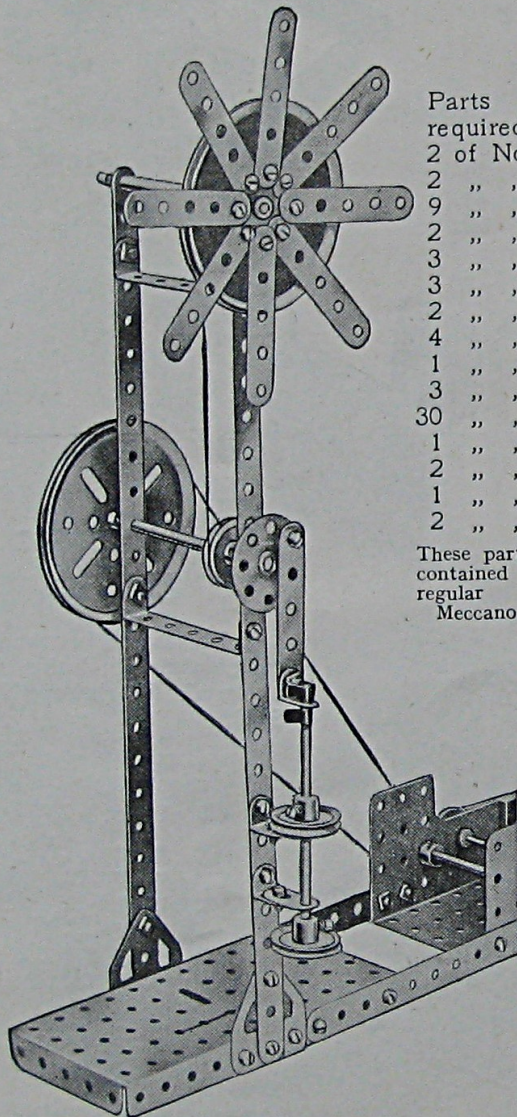
This model is secured to the engine frame by means of an Angle Bracket and a 2½" Strip 1 on each side. The drill 2 is operated through the 1" fast Pulley 3 secured to the Rod 4 and the three 1" fast Pulleys 5 and 5a by a cord passing around all four Pulleys. The Pulley 5a should run freely on the Rod 6.

MECCANO STEAM-DRIVEN MODELS

5

In Model No. S12 the side plates only of the Engine are shown

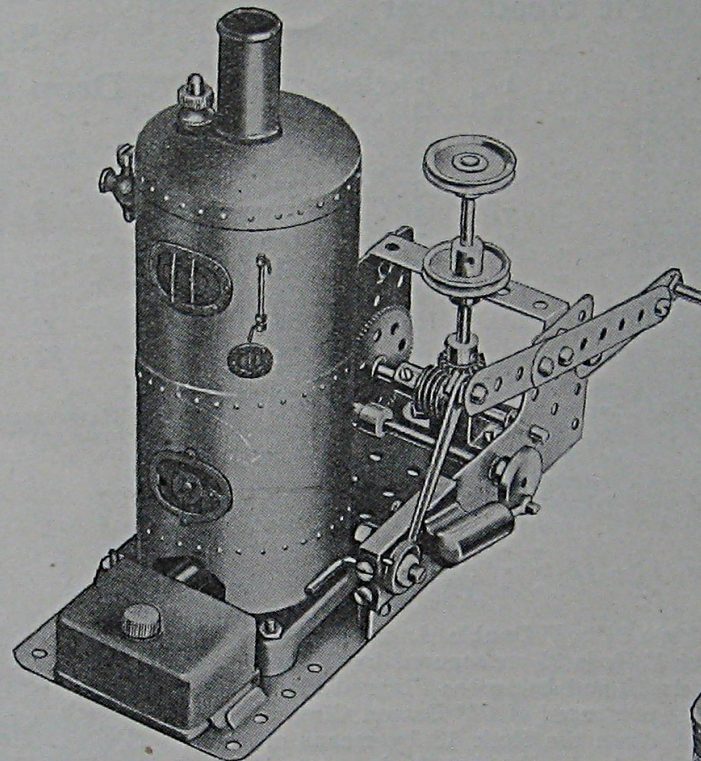
Model No. S12 Steam-Driven Windmill Pump



Parts required :		
2 of No.	1	
2 " "	2	
9 " "	5	
2 " "	10	
3 " "	12	
3 " "	16	
2 " "	19B	
4 " "	22	
1 " "	24	
3 " "	35	
30 " "	37	
1 " "	37A	
2 " "	48A	
1 " "	52	
2 " "	126A	

These parts are all contained in the regular No. 1 Meccano Outfit.

Model No. S13 Steam Capstan



This is a model of an apparatus designed for mounting on the decks of ships. Sometimes steam is supplied from the main boiler, but frequently a separate boiler unit is fitted as in the model.

Parts required :			
1 of No.	3	9 of No.	37
2 " "	5	3 " "	37A
1 " "	16	1 " "	45
2 " "	22	1 " "	48A
1 " "	26A	1 " "	59
1 " "	32	1 " "	115

Steam Engine

The parts required for this model are contained in the regular No. 3 Meccano Outfit.

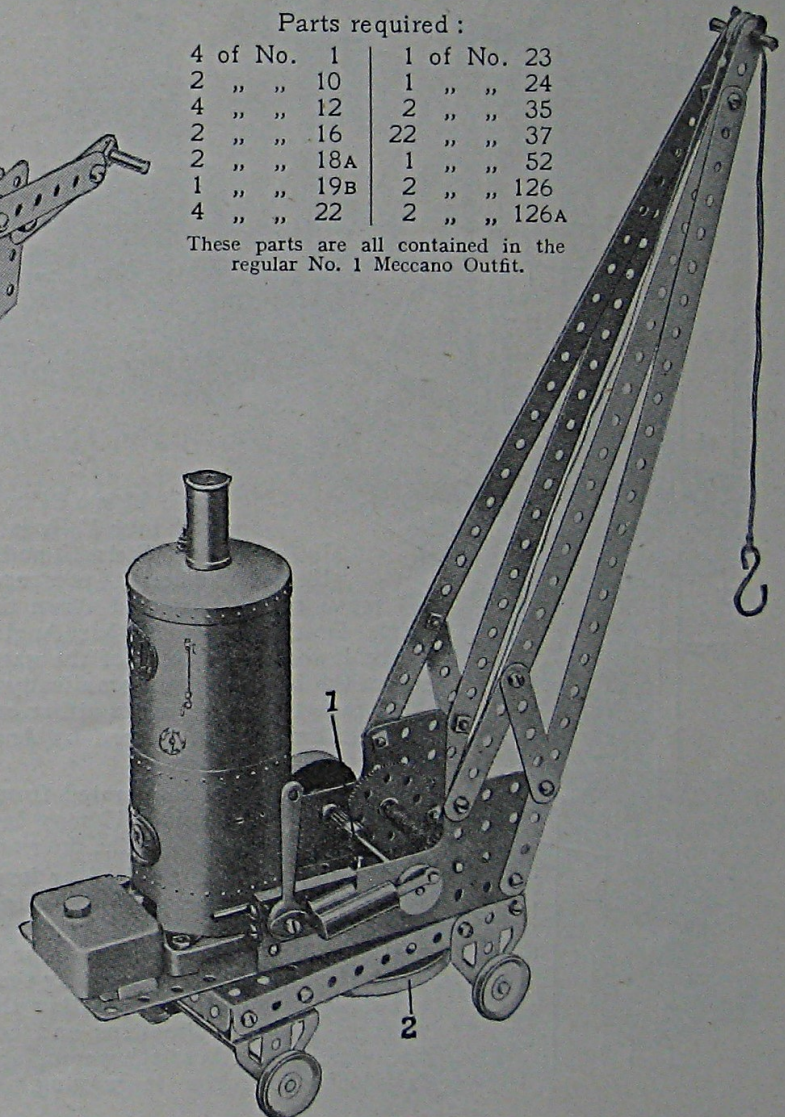
Model No. S14 Swivelling Steam Crane

The crane swivels around the Rod 1, which is passed through the base of the engine frame and is secured above by a Bush Wheel, and below by a 3" Pulley Wheel 2.

Parts required :

4 of No.	1	1 of No.	23
2 " "	10	1 " "	24
4 " "	12	2 " "	35
2 " "	16	22 " "	37
2 " "	18A	1 " "	52
1 " "	19B	2 " "	126
4 " "	22	2 " "	126A

These parts are all contained in the regular No. 1 Meccano Outfit.



MECCANO STEAM-DRIVEN MODELS

In Model No. S16 the side plates only of the Engine are shown

Model No. S15 Steam-Driven Pit Head Gear

Parts required:

6 of No.	1	2 of No.	19B
4 " "	1B	3 " "	22
1 " "	2	2 " "	26
12 " "	5	1 " "	27A
2 " "	7	102 " "	37
2 " "	7A	6 " "	38
4 " "	8	2 " "	48D
2 " "	9	4 " "	52
12 " "	12	4 " "	53
4 " "	13A	16 " "	59
1 " "	14	2 " "	98
2 " "	15	4 " "	99
1 " "	16B	5 " "	100

1 of No. 100A

These parts are all contained in the regular No. 4 Meccano Outfit with the exception of:—

4 of No.	1B	1 of No.	16B
2 " "	7	2 " "	52
2 " "	7A	6 " "	59
3 " "	13A	1 " "	98

1 of No. 100A

12 is a $5\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip to which four 8" Rods 13 are secured by Collars above the Strip 12 and below the Flanged Plate 10. Two gates 14 composed of $2\frac{1}{2}$ " Braced Girders move slidably up and down the Rods 13 by means of Angle Brackets. A further Angle Bracket 15 is secured to the lower end of each of the gates so that as either cage enters the housing it automatically comes into contact with the Brackets 15 and raises either one or other gate. A $4\frac{1}{2}$ " Braced Girder 16 is secured by Angle Brackets to the base 10 to form a barrier.

If this model be operated from the end of a table the upper ends of the guides 17 may be secured to the $5\frac{1}{2}$ " Strip 18 and the lower ends to the floor or other suitable fastening.

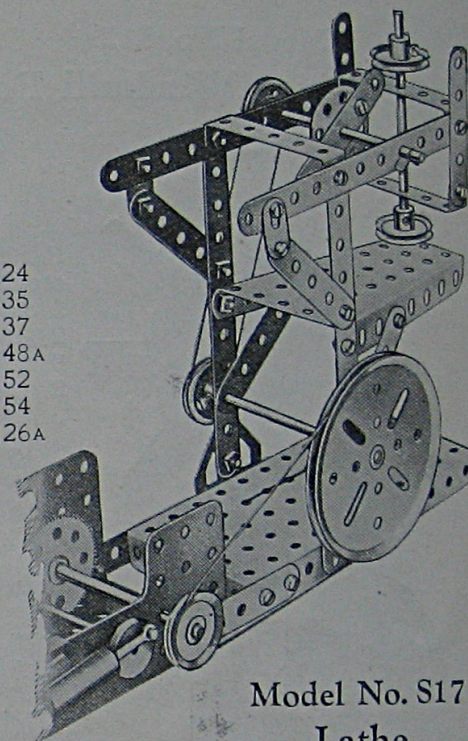
The cages 19 are raised or lowered from the drums 20 and 20a. These are driven through the shaft 21 on which is mounted a $\frac{1}{2}$ " Pinion (on the outer side of the engine frame) meshed with the 27-toothed Gear 22 and through another $\frac{1}{2}$ " Pinion on the shaft operating the drum 20a meshing with a further $\frac{1}{2}$ " Pinion 24 operating the drum 20. The drums work in opposite directions and cause one of the cages to rise while the other is lowered, according to the direction in which the engine is running.

Model No. S16 Steam Drop Hammer

Parts required:

4 of No.	2	1 of No.	24
9 " "	5	1 " "	35
2 " "	10	29 " "	37
3 " "	16	3 " "	48A
1 " "	19B	1 " "	52
4 " "	22	1 " "	54
1 " "	23	2 " "	126A

These parts are all contained in the regular No. 1 Meccano Outfit.



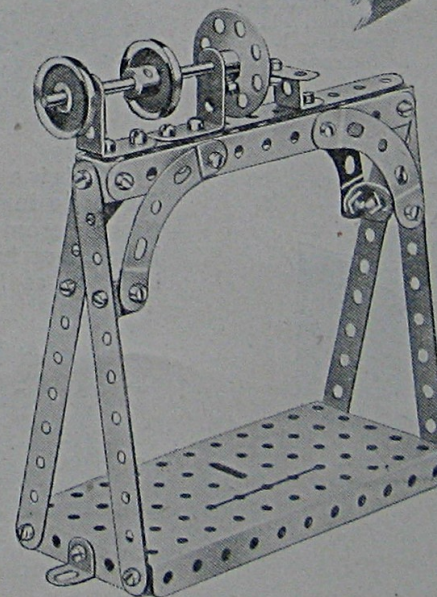
Model No. S17 Lathe

This is another model suitable for inclusion in the model Workshop (No. S18).

Parts required:

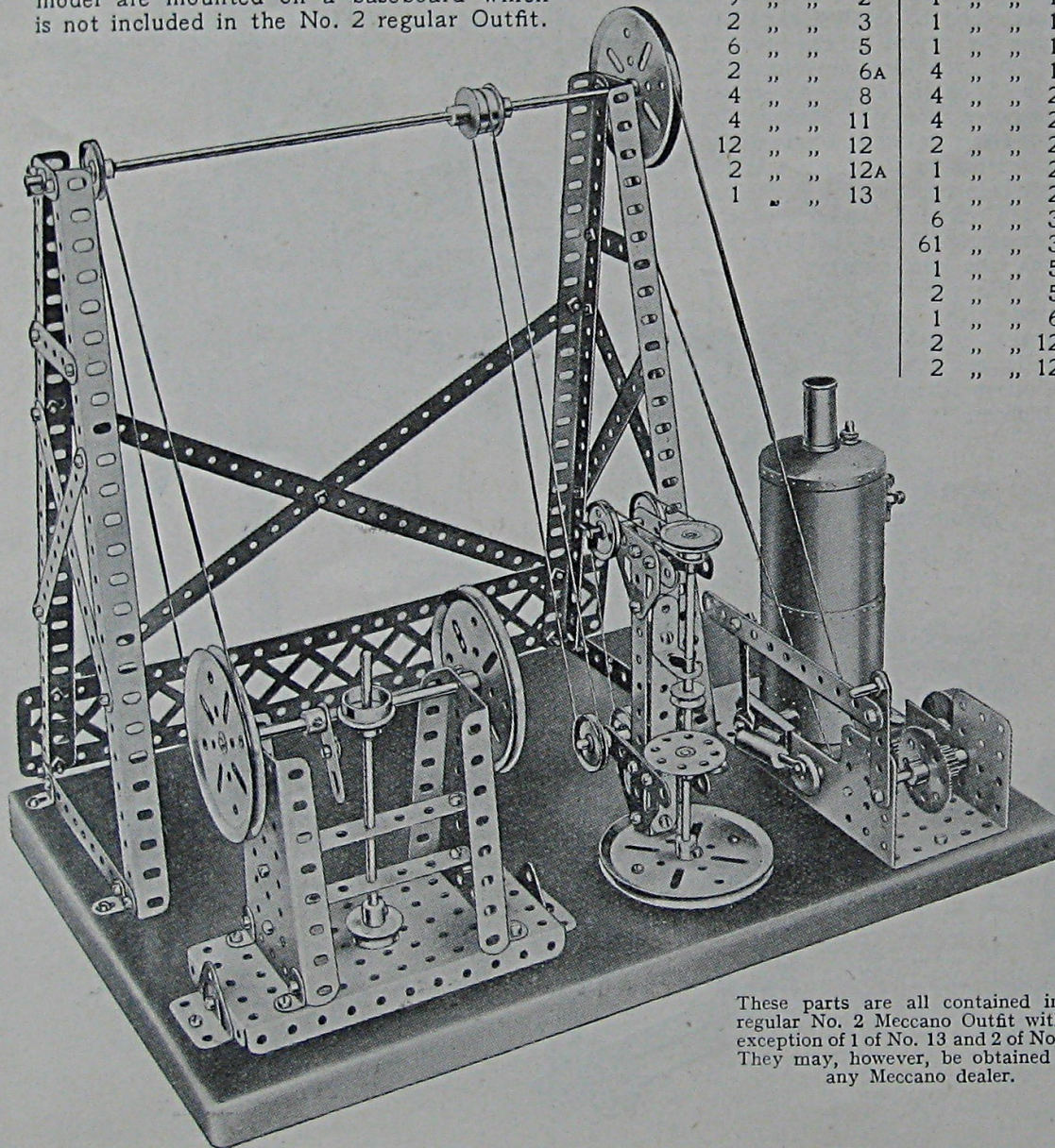
7 of No.	2
1 " "	6A
4 " "	11
6 " "	12
2 " "	12A
2 " "	22
1 " "	24
30 " "	37
1 " "	52
4 " "	90
1 " "	125

These parts are all contained in the regular No. 2 Meccano Outfit.



Model No. S18 Steam-operated Model Workshop

The shafting standard, drilling machine, and automatic stamp comprised in this model are mounted on a baseboard which is not included in the No. 2 regular Outfit.



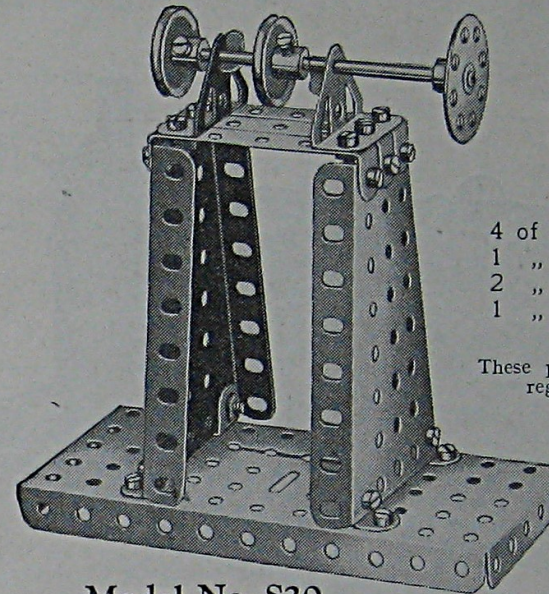
Parts required :

2 of No.	1	2 of No.	15A
9 " "	2	1 " "	16
2 " "	3	1 " "	17
6 " "	5	1 " "	18A
2 " "	6A	4 " "	19B
4 " "	8	4 " "	20B
4 " "	11	4 " "	22
12 " "	12	2 " "	22A
2 " "	12A	1 " "	23
1 " "	13	1 " "	24
		6 " "	35
		61 " "	37
		1 " "	52
		2 " "	54
		1 " "	62
		2 " "	126
		2 " "	126A

These parts are all contained in the regular No. 2 Meccano Outfit with the exception of 1 of No. 13 and 2 of No. 22A. They may, however, be obtained from any Meccano dealer.

Model No. S19 Polishing Spindle

This is a simple model that may be included with advantage in the model Workshop.



Parts required :

4 of No.	12	2 of No.	35
1 " "	16	20 " "	37
2 " "	22	3 " "	48A
1 " "	24	1 " "	52
		2 of No.	54

These parts are all contained in the regular No. 2 Meccano Outfit.

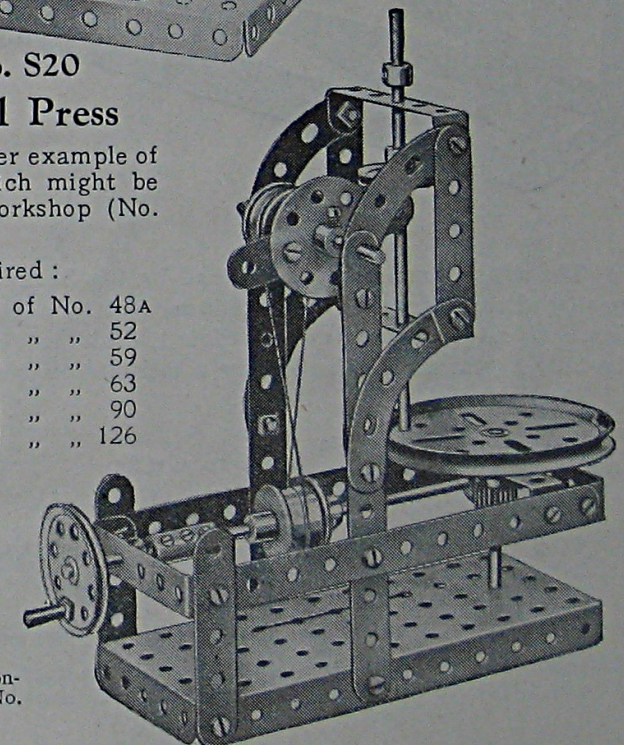
Model No. S20 Auto Dial Press

This is a further example of a small model which might be included in the Workshop (No. S18).

Parts required :

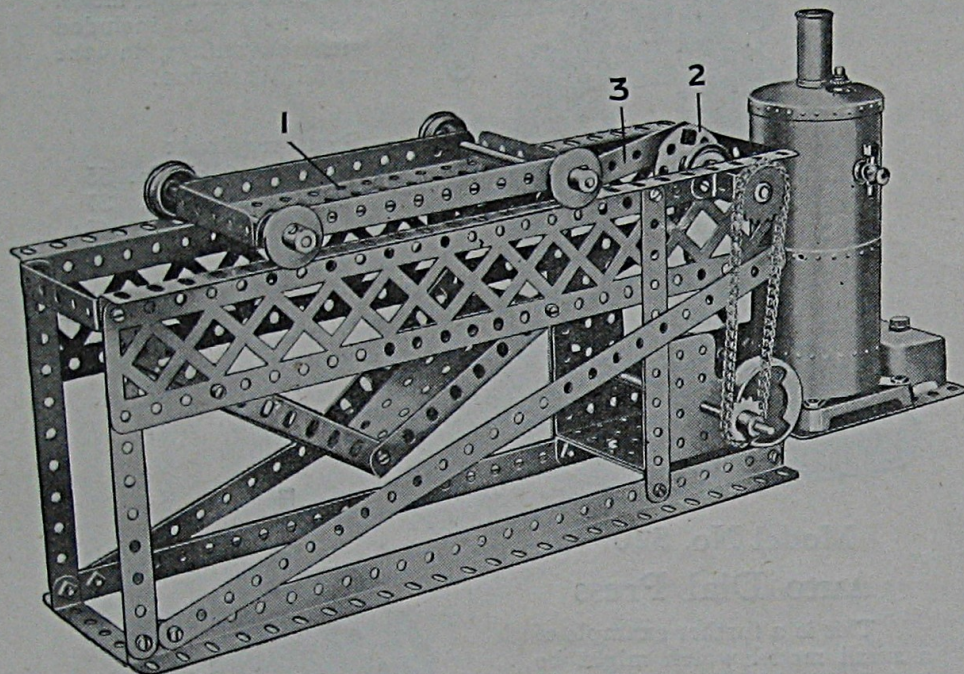
4 of No.	2	5 of No.	48A
5 " "	5	1 " "	52
2 " "	15	3 " "	59
1 " "	16	1 " "	63
1 " "	17	4 " "	90
1 " "	18A	2 " "	126
1 " "	19B		
4 " "	20B		
1 " "	21		
1 " "	22		
1 " "	24		
1 " "	26		
1 " "	32		
22 " "	37		

These parts are all contained in the regular No. 3 Meccano Outfit.



MECCANO STEAM-DRIVEN MODELS

Model No. S21 Steam-driven Sifter



The sifting container 1 is agitated by the Bush Wheel 2 connected by a $5\frac{1}{2}$ " Strip 3, one end of which is secured by a lock-nutted bolt to a Trunnion on the under-side of the Plate 1, while the other end is attached pivotally to the Bush Wheel 2 by a lock-nutted bolt.

Parts required :

2 of No. 1	1 of No. 24	5 of No. 48A	1 of No. 96A
5 " " 2	4 " " 35	1 " " 52	2 " " 99
4 " " 8	30 " " 37	2 " " 54	1 " " 126
3 " " 15A	2 " " 37A	1 " " 59	
4 " " 20B	1 " " 38	9" " " 94	
1 " " 22	1 " " 45	1 " " 96	

These parts are all contained in the regular No. 3 Meccano Outfit with the exception of 9" of No. 94, 1 of No. 96 and 1 of No. 96A. These may be obtained from any Meccano dealer.

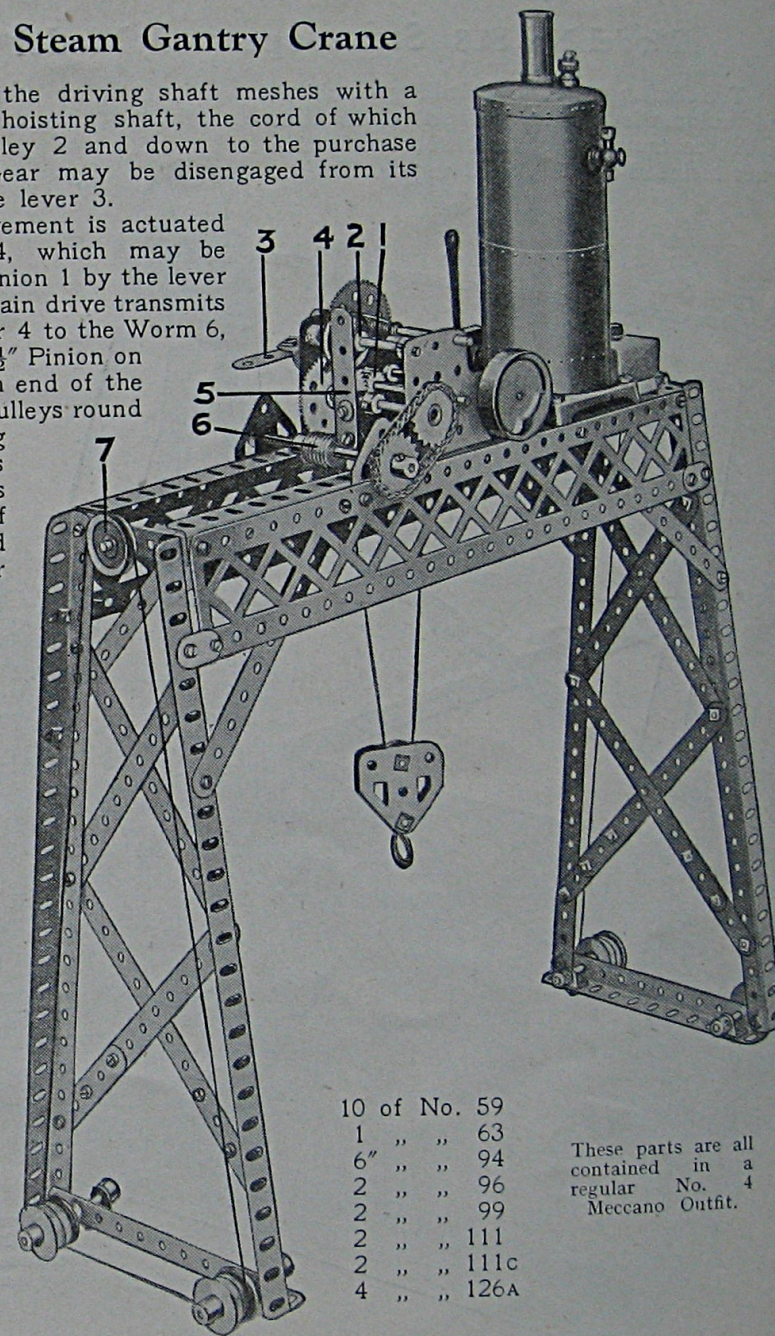
Model No. S22 Steam Gantry Crane

A $\frac{1}{2}$ " Pinion 1 on the driving shaft meshes with a 57-teeth Gear on the hoisting shaft, the cord of which passes over the 1" Pulley 2 and down to the purchase block. The 57-teeth Gear may be disengaged from its Pinion by means of the lever 3.

The travelling movement is actuated by a 57-teeth Gear 4, which may be disengaged from the Pinion 1 by the lever 5. A short Sprocket Chain drive transmits the motion of the Gear 4 to the Worm 6, which is in mesh with a $\frac{1}{2}$ " Pinion on the $11\frac{1}{2}$ " Rod 7. Each end of the latter carries 1" fast Pulleys round which the cord driving the $\frac{3}{4}$ " Flanged Wheels is passed; the cord is wrapped round each of the Flanged Wheels and 1" Pulleys twice in order to increase its grip.

Parts required :

12 of No. 2	
6 " " 5	
6 " " 8	
2 " " 9	
4 " " 10	
6 " " 12	
1 " " 13	
2 " " 15A	
4 " " 16	
4 " " 17	
8 " " 20B	
3 " " 22	
1 " " 23	
2 " " 26	
2 " " 27A	
1 " " 32	
1 " " 35	
61 " " 37	
10 " " 37A	
5 " " 38	
1 " " 40	
2 " " 48A	
1 " " 57	



10 of No. 59	
1 " " 63	
6" " " 94	
2 " " 96	
2 " " 99	
2 " " 111	
2 " " 111c	
4 " " 126A	

These parts are all contained in a regular No. 4 Meccano Outfit.

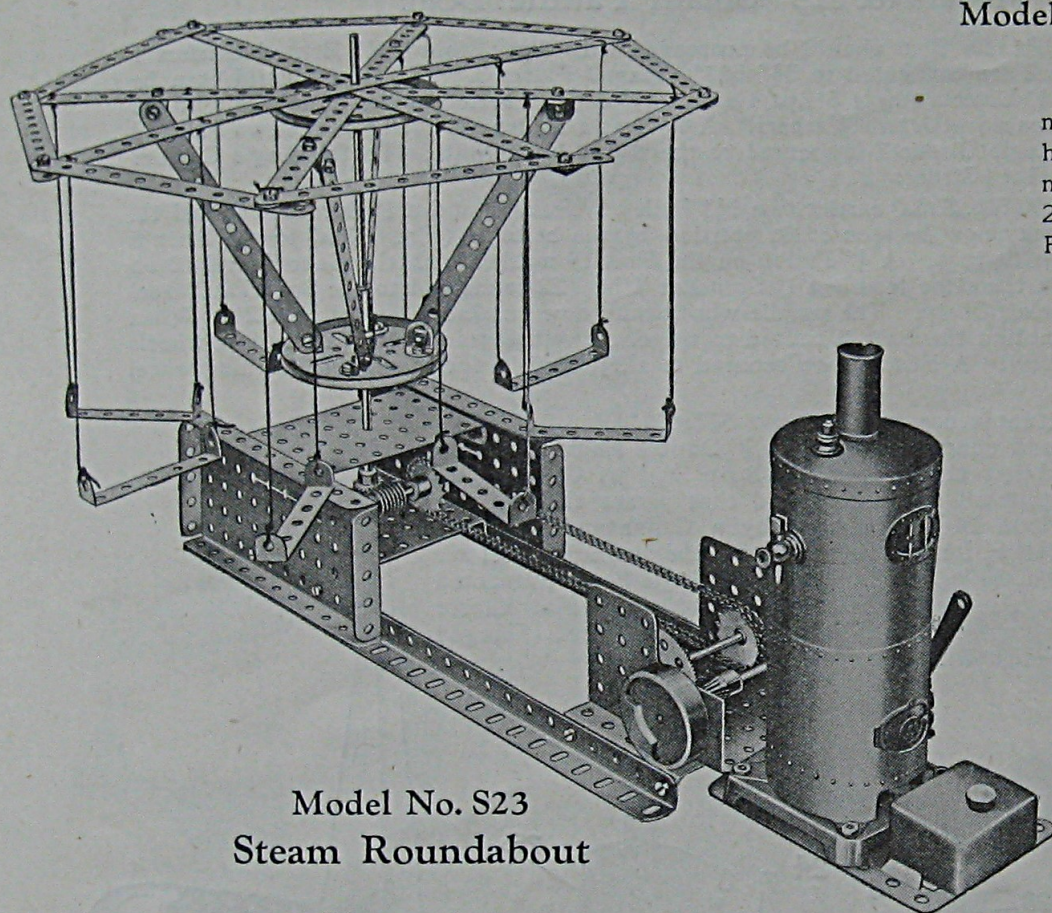
Model No. S24 Steam-Driven Pit Head Gear

The construction of this model should present no difficulties. It is necessary to point out, however, that the two side members 1 are connected near the top (just below the 3" Pulley Wheel) by a 2½" Strip; and the engine is secured to a 5½" x 2½" Flanged Plate bolted to the side Strips.

Parts required :

10 of No.	1	4 of No.	35
8 "	2	77 "	37
6 "	5	6 "	48A
4 "	8	1 "	52
4 "	12	2 "	54
1 "	16	2 "	100
1 "	19B	2 "	126

These parts are all contained in the regular No. 3 Meccano Outfit.

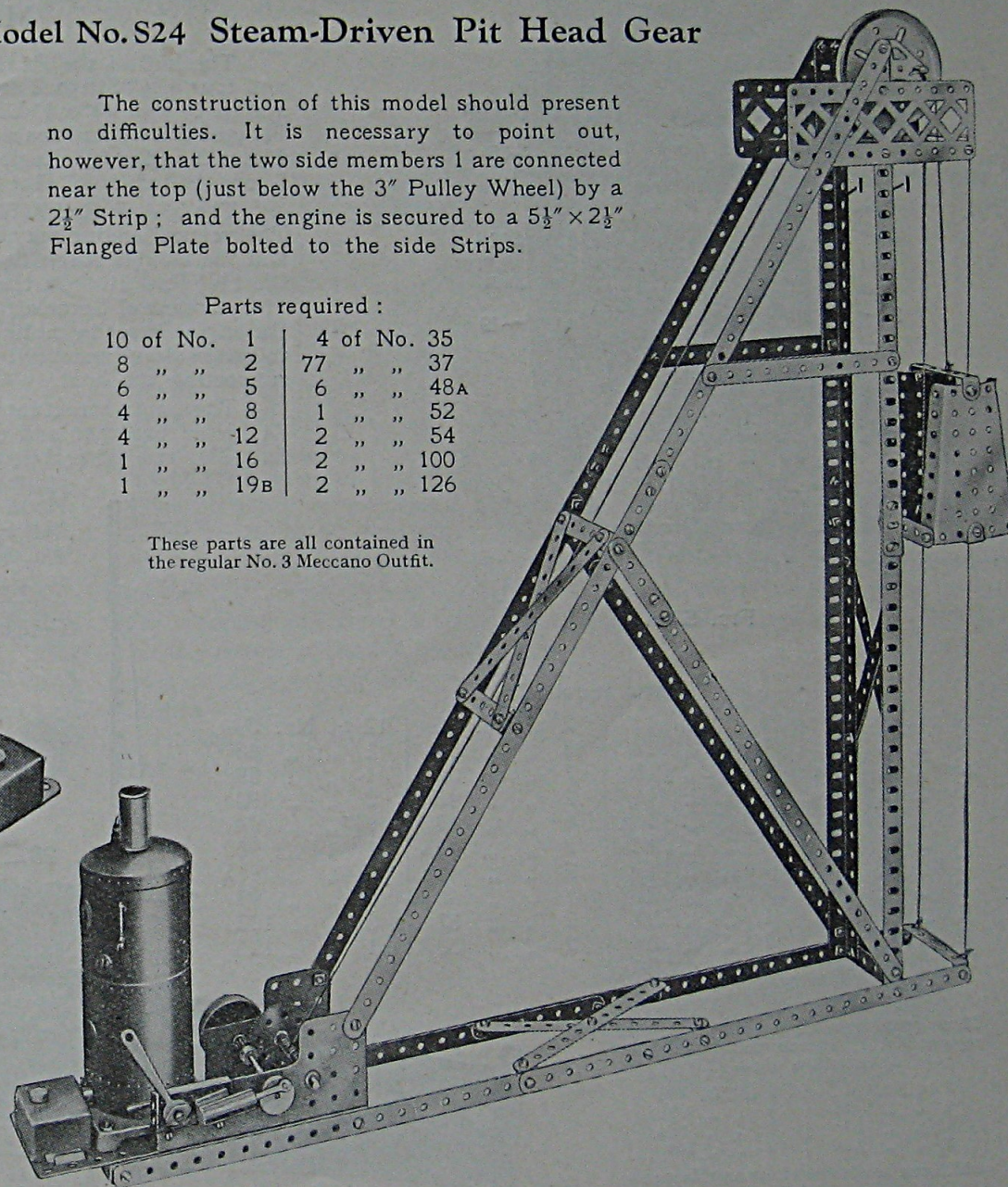


Model No. S23 Steam Roundabout

Parts required :

4 of No.	1	2 of No.	19B	3 of No.	59
12 "	2	1 "	26	1 "	63
2 "	8	1 "	32	18 "	94
8 "	12	39 "	37	2 "	96
1 "	15	8 "	48A	1 "	96A
2 "	15A	2 "	52	2 "	99
		3 "	53		

These parts are all contained in the regular No. 3 Meccano Outfit with the exception of 18" of No. 94, 2 of No. 96, and 1 of No. 96A. These may be obtained from any Meccano dealer.



MECCANO STEAM-DRIVEN MODELS

Model No. S25 Steam Paddle Boat

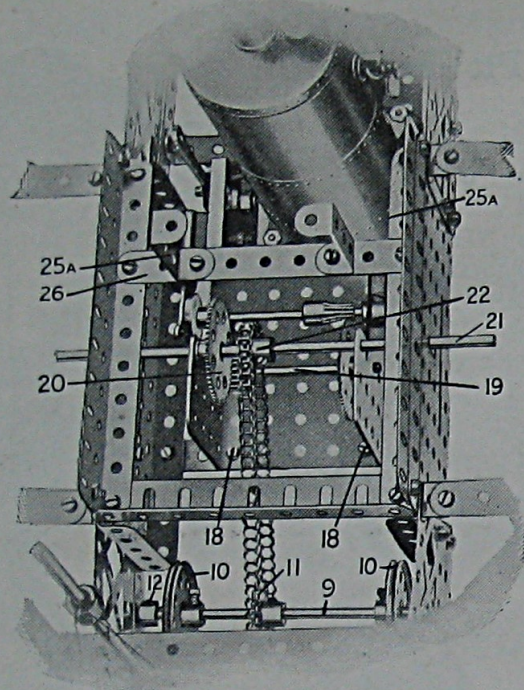


FIG. S25A

Parts required :

4 of No. 1	3 of No. 13	2 of No. 35	12 of No. 59
1 " " 2	1 " " 14	83 " " 37	1 " " 63
3 " " 2A	1 " " 15	7 " " 38	1 " " 89
5 " " 3	1 " " 16	2 " " 45	2 " " 90
1 " " 4	1 " " 16A	6 " " 48	9 1/2 " " 94
4 " " 5	2 " " 18A	8 " " 48A	1 " " 96
2 " " 6	4 " " 19B	2 " " 48C	1 " " 96A
2 " " 9	2 " " 21	1 " " 48D	4 " " 99
1 " " 9A	1 " " 24	2 " " 52	3 " " 103
2 " " 10	1 " " 26	2 " " 53	1 " " 126
18 " " 12	1 " " 27A		

These parts are all contained in the regular No. 4 Meccano Outfit with the exception of:—

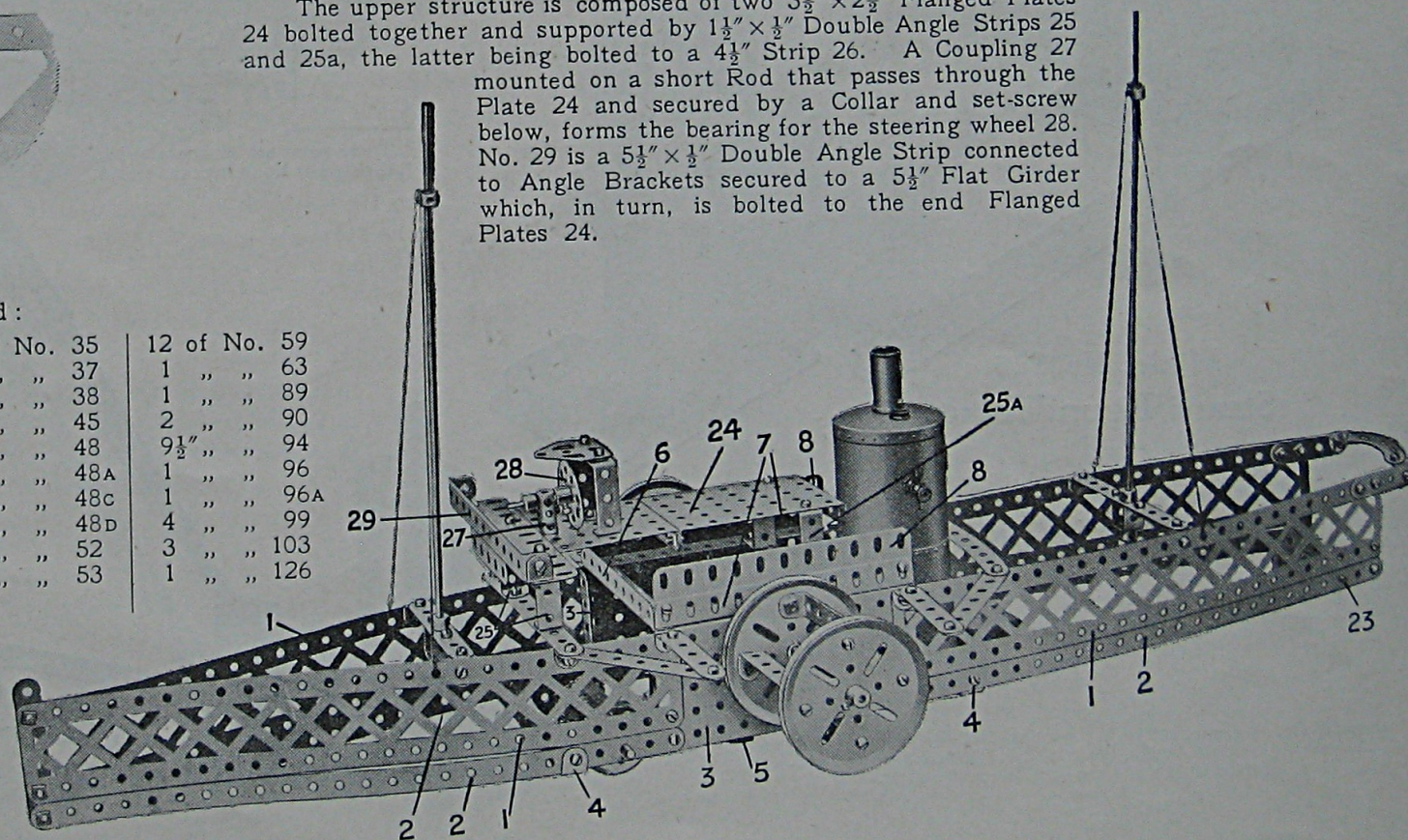
2 of No. 6	2 of No. 48C
1 " " 9A	1 " " 89
1 " " 13	1 " " 96A
1 " " 16A	3 " " 103

which can be obtained from any Meccano dealer.

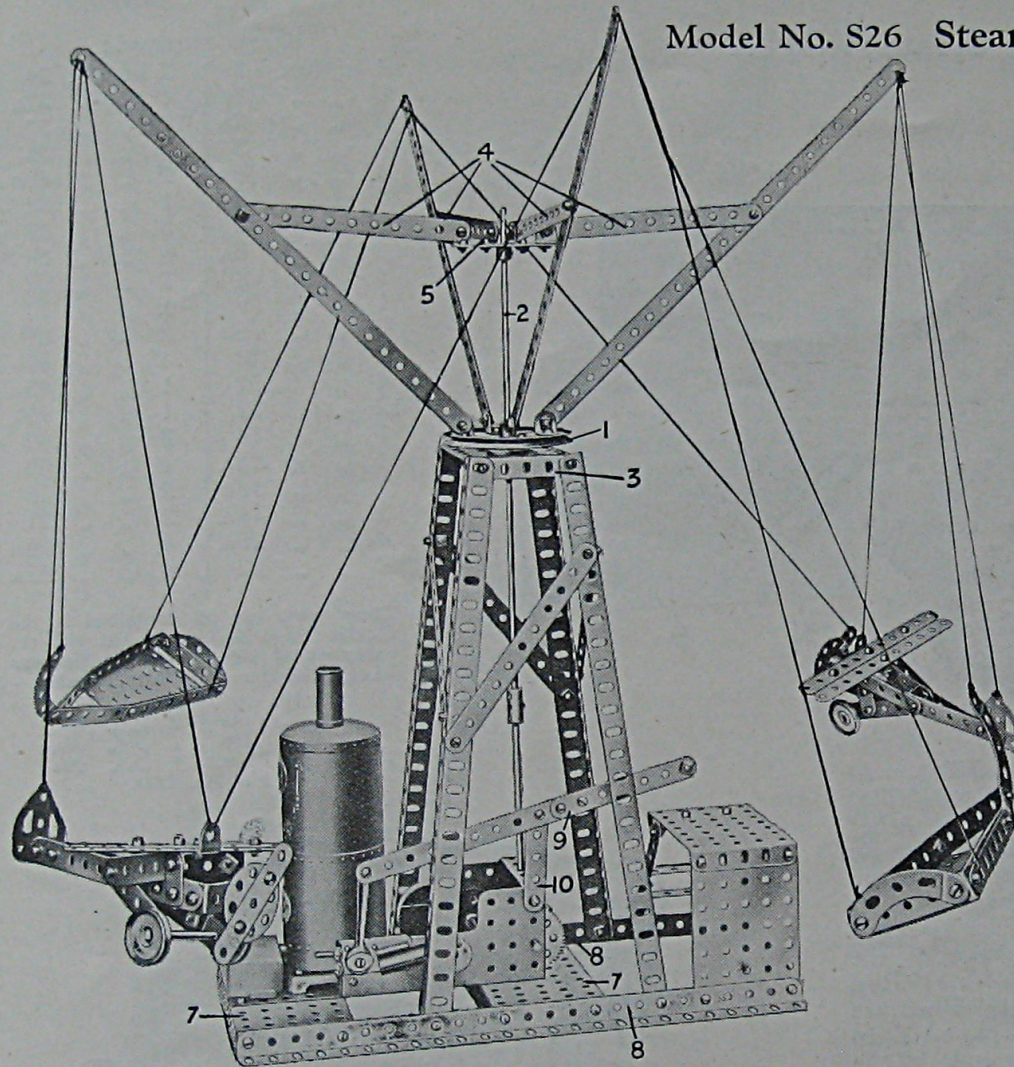
The hull of the Paddle Boat should be proceeded with first; four 12 1/2" Braced Girders 1 and four 12 1/2" Strips 2 are connected to 5 1/2" x 2 1/2" Flanged Plates 3. The sides should then be stayed by two 4 1/2" x 1/2" Double Angle Strips 4 and a 4 1/2" Strip 5 bolted in the fourth hole of the Flanged Plate 3 and spaced with two Washers. A 4 1/2" Angle Girder 6 is bolted to the two Flanged Plates 3 and a 5 1/2" Angle Girder 7 is secured to the top of each Plate. To the Angle Girders 7 are bolted two Flat Girders 8.

The 5" Axle Rod 9 (Fig. S25A) carries two 1 1/2" Pulley Wheels 10 and a 1" Sprocket Wheel 11. The vertical engine may now be secured in position by the bolts 18 (Fig. S25A) to the Strip 5 and the Double Angle Strip 4. A 1/2" Pinion on the Rod 19 meshes with the Gear Wheel 20 on the 11 1/2" Rod 21. On the same Rod is a 1" Sprocket Wheel 22 connected to the Sprocket Wheel 11 by means of Sprocket Chain. The paddle wheels may now be placed on the Rod 21. When the engine is set in motion the boat is caused to travel along the ground and the paddle wheels to rotate simultaneously. A Bush Wheel secured to a 3 1/2" Rod 23 forms the rear running wheel supporting the boat.

The upper structure is composed of two 3 1/2" x 2 1/2" Flanged Plates 24 bolted together and supported by 1 1/2" x 1/2" Double Angle Strips 25 and 25A, the latter being bolted to a 4 1/2" Strip 26. A Coupling 27 mounted on a short Rod that passes through the Plate 24 and secured by a Collar and set-screw below, forms the bearing for the steering wheel 28. No. 29 is a 5 1/2" x 1/2" Double Angle Strip connected to Angle Brackets secured to a 5 1/2" Flat Girder which, in turn, is bolted to the end Flanged Plates 24.



Model No. S26 Steam Flying Machine



The revolving portion of this model consists of four 12½" Strips bolted to the 3" Pulley 1 which is secured to the main vertical shaft 2 and rests on a 1" loose Pulley between it and the 3½" x 2½" Flanged Plate 3. The 12½"

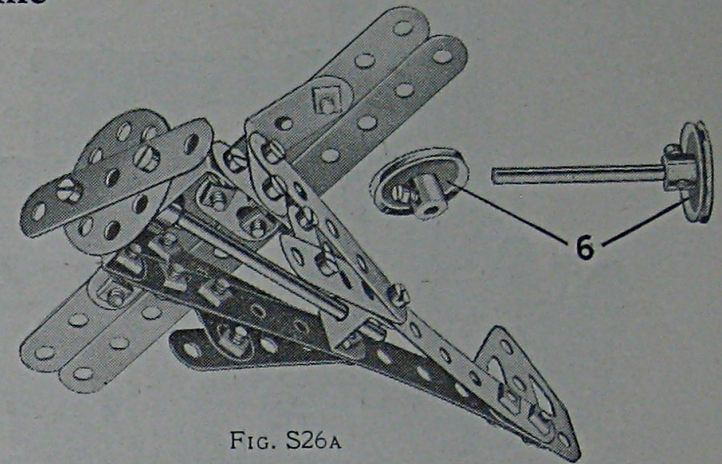


FIG. S26A

Strips are supported by 5½" Strips 4 connected by Angle Brackets to the Face Plate 5 secured to the Rod 2. One of the aeroplanes attached to the model is shown in detail in Fig. S26B. The Wheels 6 are shown removed from their bearings. The engine is bolted to two 5½" x 2½" Flanged Plates 7 connected to the 12½" Angle Girders 8. 5½" and 3½" Strips 9 are bolted together to form the stopping and starting lever and this is pivotally connected by a 2½" Strip 10 to one side of the Engine Frame and to the operating lever on the engine. Fig. S26B shows the arrangement of gearing for operating the vertical shaft.

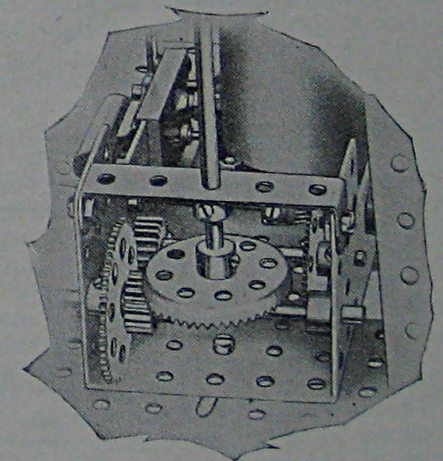


FIG. S26B

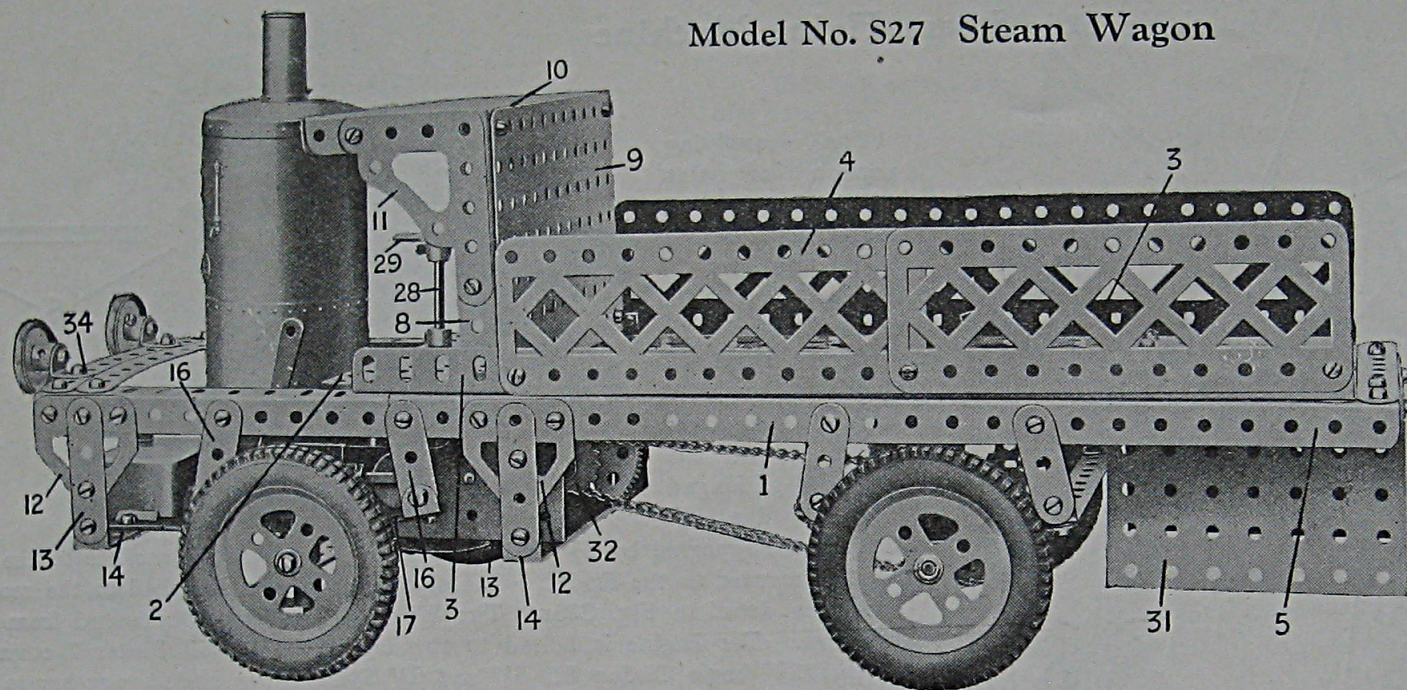
Parts required :

4 of No. 1	4 of No. 10	1 of No. 14	2 of No. 22A	2 of No. 48	1 of No. 63
22 " " 2	2 " " 11	2 " " 16	2 " " 24	6 " " 48A	4 " " 90
2 " " 2A	12 " " 12	1 " " 16B	1 " " 26	2 " " 52	1 " " 109
1 " " 3	4 " " 12A	2 " " 17	1 " " 27A	3 " " 53	2 " " 111A
11 " " 5	2 " " 12B	1 " " 19B	1 " " 28	2 " " 54	2 " " 126A
4 " " 8	1 " " 13	4 " " 22	120 " " 37	4 " " 59	

These parts are all contained in the regular No. 4 Meccano Outfit with the exception of 2 of No. 12B ; 1 of No. 16B ; and 2 of No. 111A. These can be obtained from any Meccano dealer.

MECCANO STEAM-DRIVEN MODELS

Model No. S27 Steam Wagon



Parts required:

1 of No.	1	2 of No.	24
6	"	2	1 " " 27A
2	"	2A	106 " " 37
4	"	3	12 " " 38
1	"	4	2 " " 48D
1	"	5	1 " " 52
5	"	6	3 " " 53
8	"	6A	6 " " 59
6	"	8	2 " " 62
1	"	9	1 " " 70
2	"	9B	2 " " 89
2	"	10	13 " " 94
4	"	11	1 " " 95A
12	"	12	1 " " 96A
1	"	14	2 " " 99
1	"	15A	4 " " 100
1	"	16B	2 " " 108
2	"	18A	2 " " 111
4	"	20A	4 " " 126A
2	"	22	4 " " 142A

These parts are all contained in the regular No. 4 Meccano Outfit with the exception of the following, which can be obtained from any Meccano dealer:—

5 of No.	6	1 of No.	70
2	"	9B	2 " " 89
1	"	16B	1 " " 95A
4	"	20A	1 " " 96A
4 of No. 142A			

A $5\frac{1}{2}$ " Angle Girder is secured across the $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flat Plate 2 by bolts 7 (Fig. S27A). At each end of this is bolted an upright $3\frac{1}{2}$ " Angle Girder 8 to which is attached a $5\frac{1}{2}$ " \times $3\frac{1}{2}$ " Flat Plate 9 to form the back of the cab and a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate 10 to form the hood. A $5\frac{1}{2}$ " and a $2\frac{1}{2}$ " Strip 15 (Fig. S27A) overlapped two holes and connected to the $5\frac{1}{2}$ " Double Angle Strips 14 form a bearing for one end of the steering column 28. The steering gear is built up in the following manner. Two $1\frac{1}{2}$ " Strips 16 are connected on each side of the members 1 as shown in Fig. S27. $3\frac{1}{2}$ " Strips 17 (Fig. S27A) slightly curved to represent springs are attached by Angle Brackets to the Strips 16, Flat Brackets 18 being bolted in the centre holes of the Strips 17. The swivel supports for the stub axles of the wheels are each composed of a $1\frac{1}{2}$ " Rod 19, a Double Bracket 20, a Collar 21 with two Washers above and below. The $1\frac{1}{2}$ " Rods are held in position by a Collar 22 at the top and at the bottom by the Cranks 23 and 23a. A Strip 24 (formed of two $4\frac{1}{2}$ " Strips overlapped five holes) is connected pivotally at its ends to the Cranks 23 and 23a. The Crank 23 is also connected pivotally by a 2" Strip 25 to a 3" Strip 26 that is bolted to a Bush Wheel 27 mounted securely on the steering column 28. The stub axles of the front wheels are formed by passing a $\frac{3}{4}$ " Bolt through the boss of each wheel and screwing it into the Collar 21 until it pinches the Rod 19.

The spring bearings of the rear wheels are connected together at each end by $5\frac{1}{2}$ " Strips 30. The carrier 31 is formed of three $3\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plates bolted together and secured to the bottom of the wagon by Angle Brackets.

The engine may now be placed in position and bolted to the Strips 14. The drive is taken by Sprocket Chain from the 1" Sprocket Wheel 32 on the engine to the $1\frac{1}{2}$ " Sprocket Wheel 33 on the back axle of the wagon.

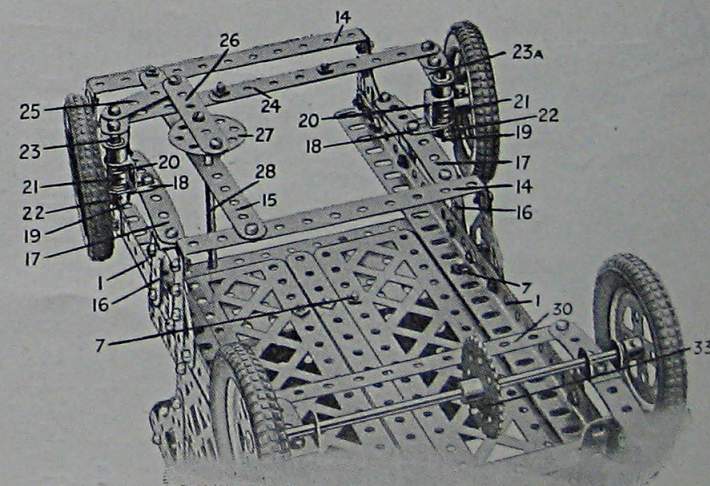


FIG. S27A

Model No. S28

Parts required :

4 of No.	1	1 of No.	48A
4 " "	2	1 " "	52
1 " "	3	1 " "	57
12 " "	5	6 " "	59
4 " "	11	2 " "	62
9 " "	12	1 " "	63
3 " "	15A	8 " "	94
3 " "	16	1 " "	95
2 " "	17	1 " "	96
1 " "	18A	1 " "	103F
1 " "	19B	2 " "	111
6 " "	20B	1 " "	111C
2 " "	22	1 " "	115
1 " "	22A	4 " "	126
1 " "	23	2 " "	126A
1 " "	24	1 " "	155
1 " "	26		
2 " "	27A		
1 " "	32		
3 " "	35		
36 " "	37		
5 " "	37A		
1 " "	38		
1 " "	40		
1 " "	44		

These parts are contained in Outfit No. 4, with the exception of 1 of No. 155.

Travelling Steam Crane

This model has three movements, hoisting, travelling and slewing. A $\frac{1}{2}$ " Pinion on the driving shaft engages with the 57-teeth Gear 1 which is carried on the hoisting shaft. A safety catch, comprising a $\frac{3}{8}$ " Bolt secured in a Collar, is attached to one end of the hoisting shaft. When the latter is disengaged by the lever 2 the $\frac{3}{8}$ " Bolt strikes the bolt head 9 (Fig. S28A).

The clutch shown in detail in Fig. S28A actuates both the slewing and travelling motions in the following way. A 57-teeth Gear meshes with a Worm on the driving shaft.

It is loose on the Rod 10 and may be raised or lowered by means of two Cranks, which are secured to the Rod 3 and carry bolts so inserted that their shanks engage with the underside of the 57-teeth Gear. The operating handle consists of a 2" Rod held in a Coupling secured to the Rod 3.

When the Gear is moved downwards the $\frac{3}{4}$ " Bolt 4 engages with one of the holes in the 2" Sprocket 11, the latter being loose on the Rod 10. A 1" Sprocket, secured to one end of Rod 5, is connected by Sprocket Chain to Sprocket 11. A 1" Pulley fixed to the lower end of the Rod 5 transmits the drive to the travelling wheels by means of a short length of cord wrapped twice round two Flanged Wheels 12 and the 1" Pulley.

When the Gear is raised slightly the $\frac{3}{4}$ " Bolt 6 engages with the Bush Wheel 7, which is fixed to the Rod 10, so that the 1" Pulley and Rubber Ring 8 are rotated. As the latter is pressed against the rim of the 3" Pulley the entire superstructure is caused to rotate. The 3" Pulley is attached to the crane truck by means of Double Brackets, and the Rod 5, which takes the drive to the travelling wheels, forms the pivot about which the superstructure revolves.

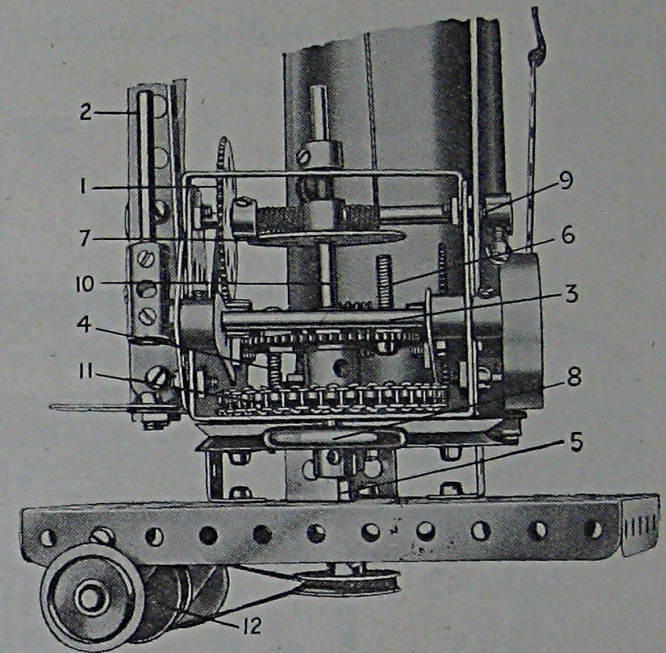
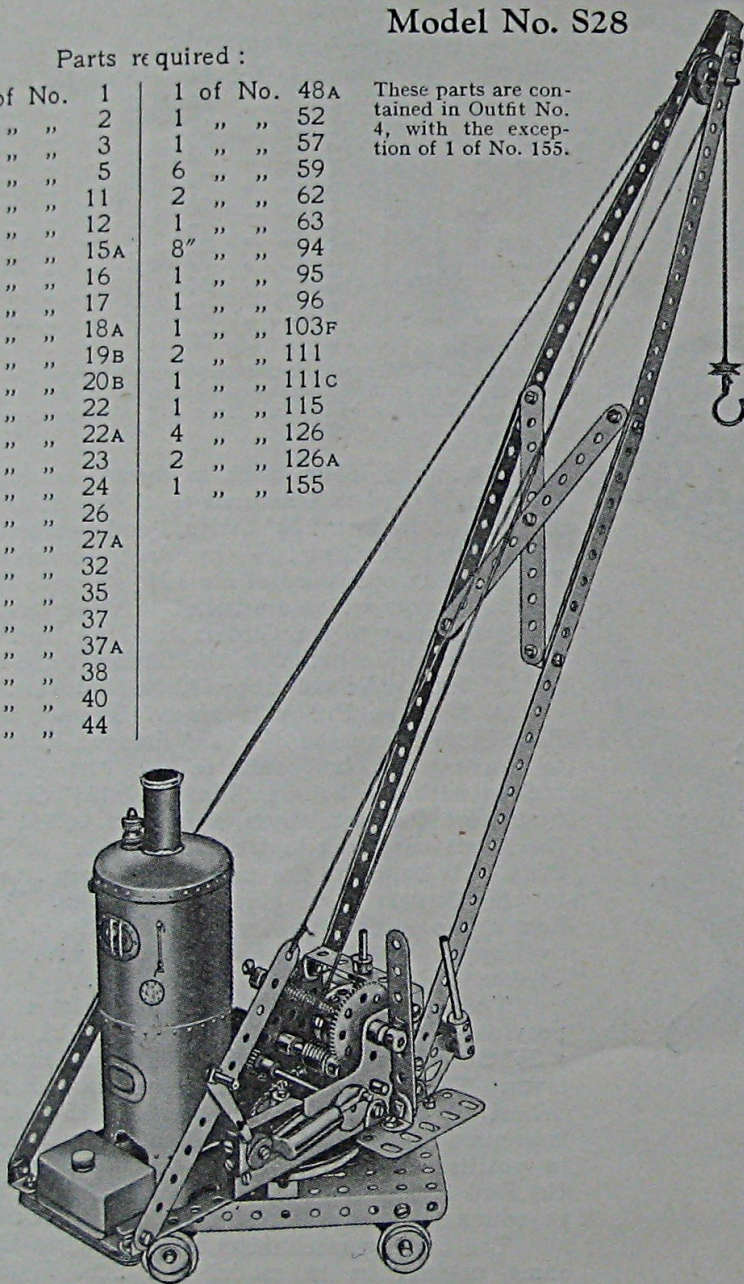
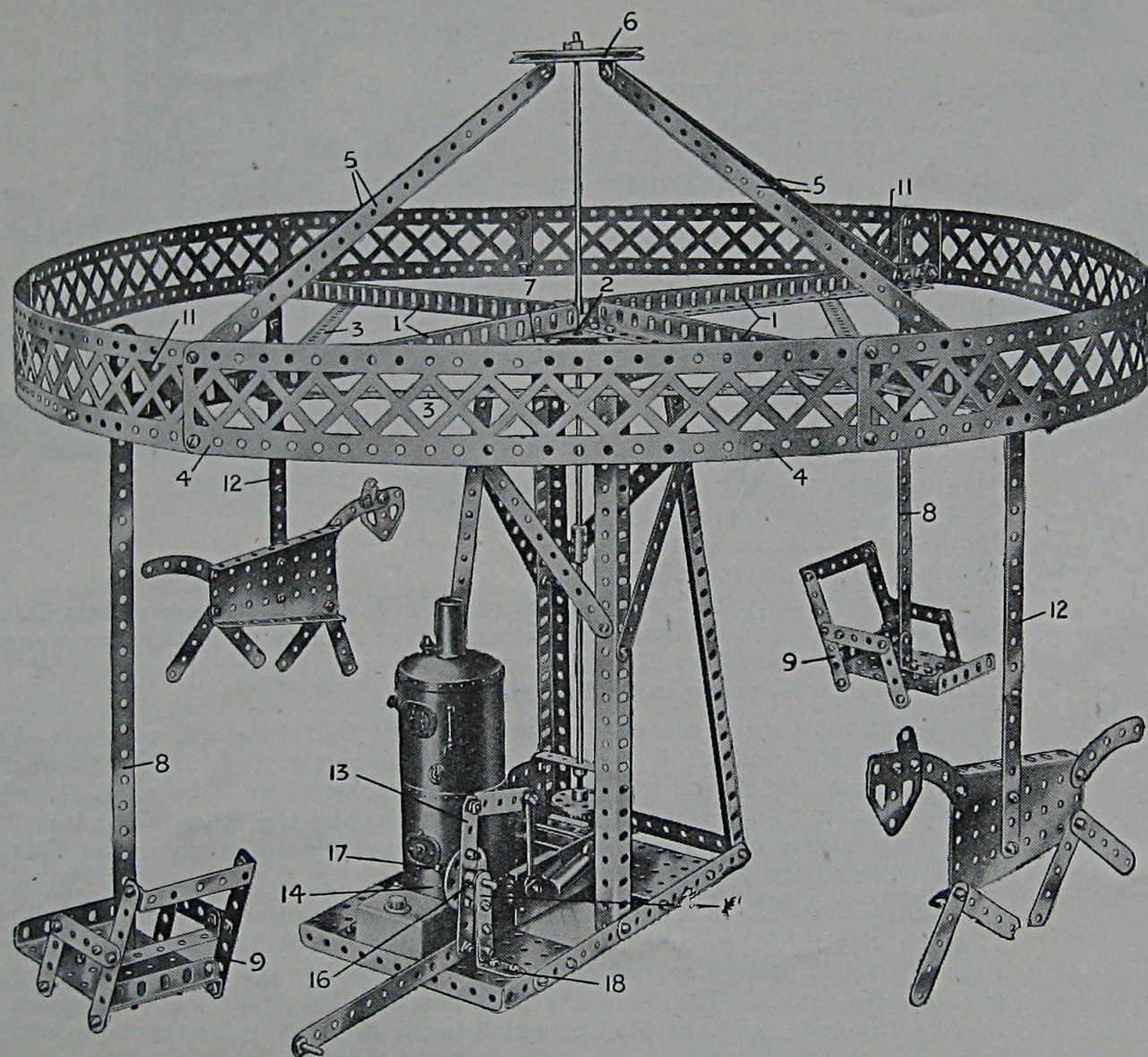


FIG. S28A



MECCANO STEAM-DRIVEN MODELS

Model No. S29 Steam Merry-Go-Round



Parts required :

10 of No.	1	1 of No.	14	3 of No.	53
14 "	2	1 "	16B	2 "	54
5 "	3	1 "	19B	3 "	59
15 "	5	2 "	22A	1 "	62
5 "	6	1 "	24	1 "	63
8 "	8	1 "	26	4 "	90
2 "	10	1 "	27A	6 "	99
8 "	12	1 "	28	1 "	109
5 "	12A	156 "	37	1 "	111
1 "	13	9 "	48A	2 "	126A
		2 "	52		

All the parts in this model are contained in the regular No. 4 Meccano Outfit with the exception of 5 of No. 6, and 1 of No. 16B, which may be obtained from any Meccano dealer.

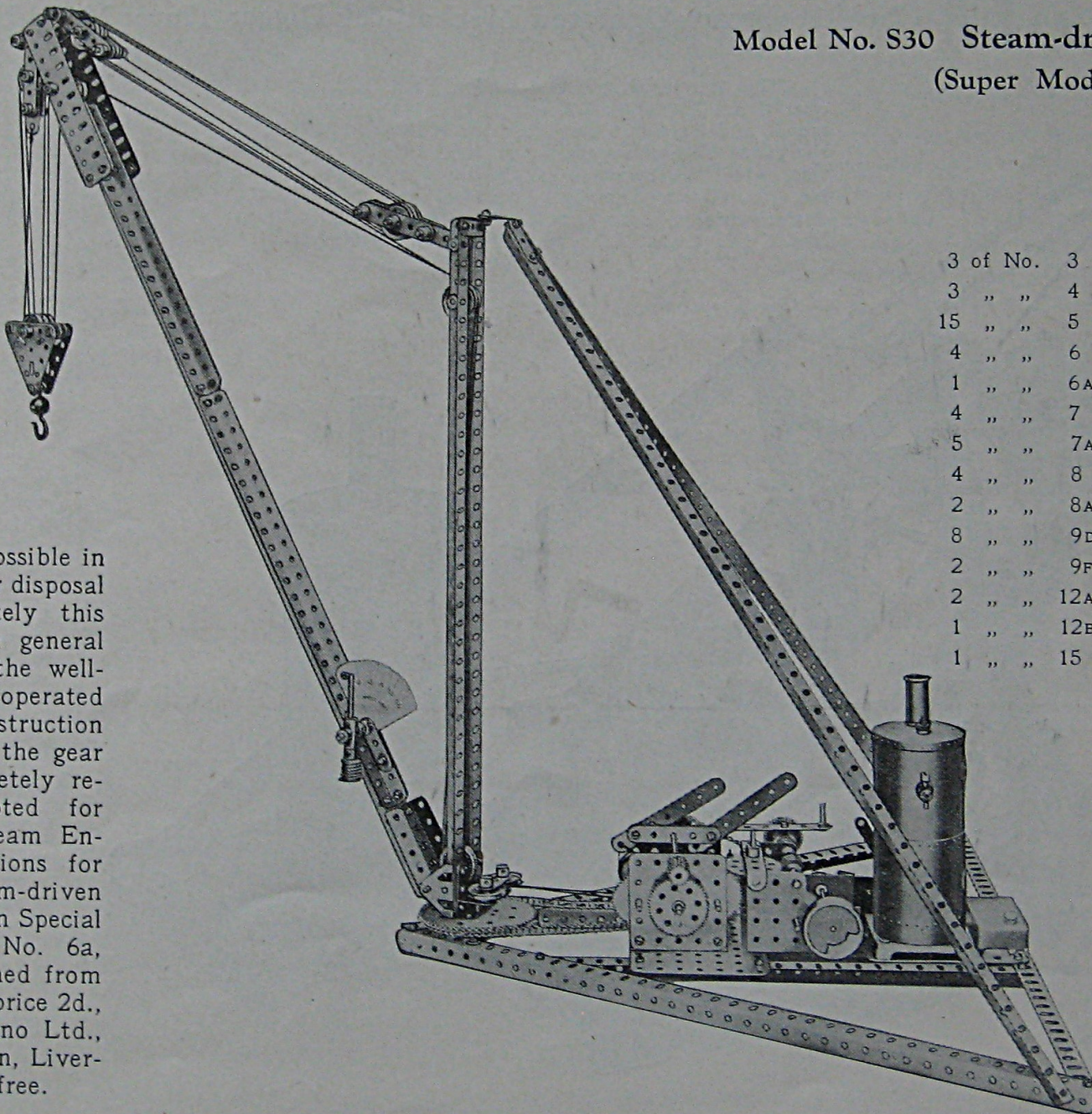
The upper framework is formed of four $12\frac{1}{2}$ " Angle Girders 1 secured to a Face Plate 2 and braced by four $12\frac{1}{2}$ " Strips 3 and connected to the Braced Girders 4 by Angle Brackets. The rim 4 is composed of six $12\frac{1}{2}$ " and one $7\frac{1}{2}$ " Braced Girders which are bolted together before being attached to the Girders 1. Four further $12\frac{1}{2}$ " Strips 5 are bolted to the Girders 1 and to the 3" Pulley Wheel 6 by Angle Brackets.

A 1" loose Pulley is placed between the Face Plate 2 and the $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate 7 to prevent the bolt ends in the Face Plate fouling with the holes in Plate 7. $12\frac{1}{2}$ " Strips 8 support the two chairs 9 and are bolted to the Angle Girders 1 in the fourth hole. A $2\frac{1}{2}$ " Strip 11 is bolted to the end of each Strip 8 and to the Girders 1 to steady the chairs. The horses are supported by two $5\frac{1}{2}$ " Strips 12 overlapped five holes and connected with the Girders 1 by 1" x 1" Angle Brackets.

The starting and stopping arrangement is provided by a $5\frac{1}{2}$ " Strip 19, a $3\frac{1}{2}$ " Strip 13, and a $2\frac{1}{2}$ " Strip 20 pivotally connected to the engine lever. The $3\frac{1}{2}$ " Strip 13 is bolted to a Bush Wheel 14 mounted on a short Rod 15 which is secured in the boss of the Crank 16 and held in position by a Collar 17. The bearing for the Rod 15 is formed by a 1" Angle Bracket 18 to which is attached a 2" Strip and a Crank.

The driving mechanism is arranged in the same manner as in model No. S26, Flying Machine.

Model No. S30 Steam-driven Stiff Leg Derrick (Super Model No. 6a)



It would be impossible in the small space at our disposal to describe adequately this splendid model. In general design it resembles the well-known electrically-operated model (Special Instruction Leaflet No. 6), but the gear box has been completely redesigned and adapted for operation by the Steam Engine. Full instructions for building the steam-driven model are contained in Special Instruction Leaflet No. 6a, which may be obtained from any Meccano dealer price 2d., or direct from Meccano Ltd., Binns Road, Old Swan, Liverpool, price 2d., post free.

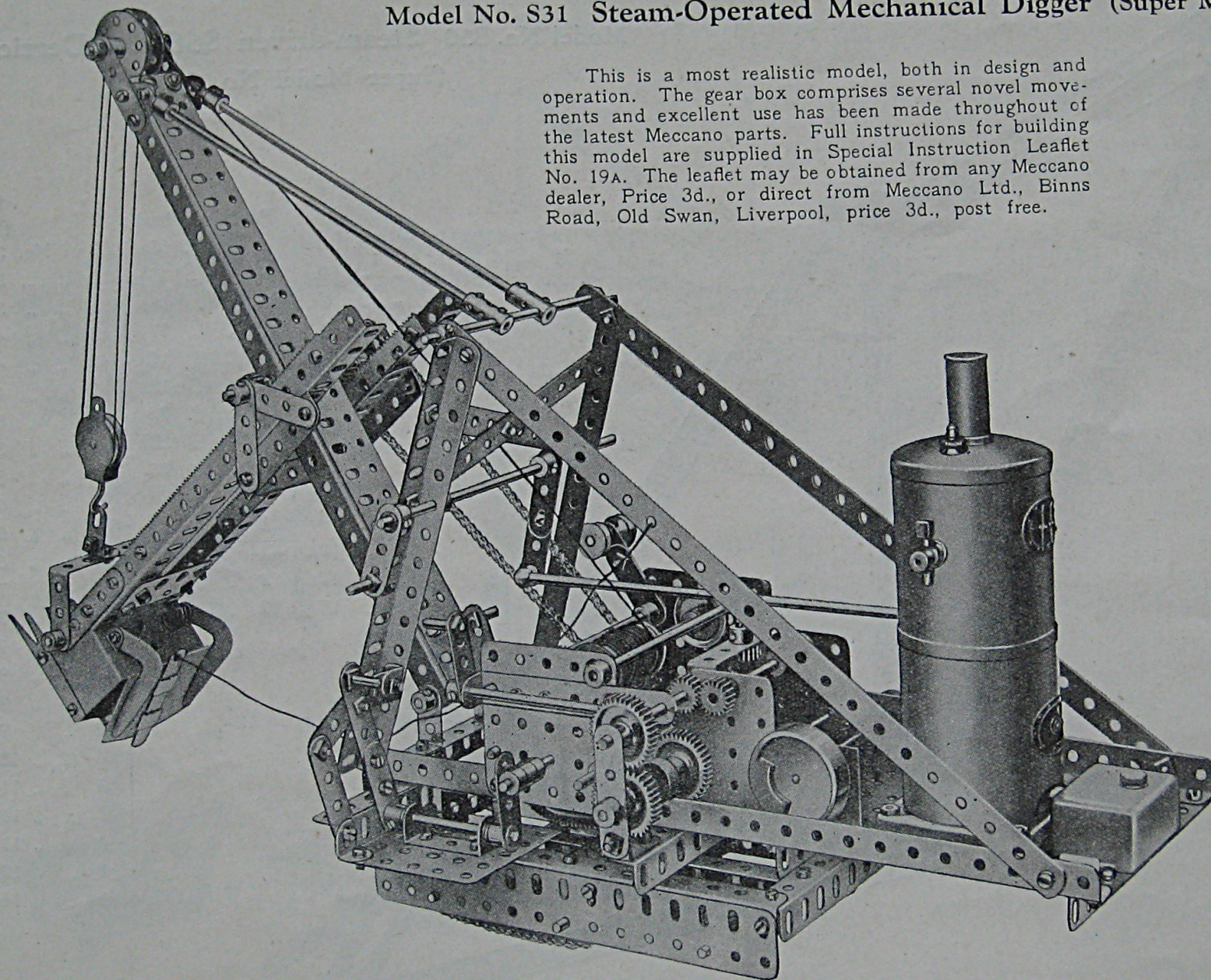
Parts required :

3 of No. 3	2 of No. 15A	82 of No. 37
3 " " 4	3 " " 16	12 " " 37A
15 " " 5	3 " " 16A	66 " " 38
4 " " 6	3 " " 17	2 " " 40
1 " " 6A	9 " " 18A	1 " " 48
4 " " 7	4 " " 18B	1 " " 48A
5 " " 7A	3 " " 22	1 " " 52A
4 " " 8	17 " " 22A	1 " " 57B
2 " " 8A	1 " " 25	43 " " 59
8 " " 9D	1 " " 25A	3 " " 62
2 " " 9F	2 " " 27	1 " " 63
2 " " 12A	2 " " 27A	1 " " 63D
1 " " 12B	2 " " 31	2 " " 72
1 " " 15	2 " " 32	2 " " 76
		26" " " 94
		1 " " 95B
		1 " " 96
		2 " " 96A
		4 " " 103
		3 " " 111
		1 " " 111A
		4 " " 115
		2 " " 126
		1 " " 144

MECCANO STEAM-DRIVEN MODELS

Model No. S31 Steam-Operated Mechanical Digger (Super Model No. 19A)

This is a most realistic model, both in design and operation. The gear box comprises several novel movements and excellent use has been made throughout of the latest Meccano parts. Full instructions for building this model are supplied in Special Instruction Leaflet No. 19A. The leaflet may be obtained from any Meccano dealer, Price 3d., or direct from Meccano Ltd., Binns Road, Old Swan, Liverpool, price 3d., post free.



Parts required :

2 of No. 1	1 of No. 30c
2 " " 2	4 " " 31
1 " " 2A	1 " " 32
1 " " 4	125 " " 37
4 " " 5	3 " " 37A
9 " " 6	21 " " 38
4 " " 8	1 " " 40
2 " " 8A	1 " " 46
6 " " 8B	1 " " 47
5 " " 9A	1 " " 48
1 " " 9B	2 " " 48A
3 " " 9D	1 " " 53A
1 " " 10	24 " " 59
3 " " 12	8 " " 62
3 " " 12A	2 " " 63
3 " " 13A	1 " " 63D
3 " " 14	3 " " 72
7 " " 15	2 " " 77
1 " " 15A	1 " " 90
3 " " 16	1 " " 94
1 " " 16A	1 " " 95A
3 " " 16B	4 " " 96
3 " " 17	1 " " 96A
1 " " 18B	1 " " 103B
4 " " 20	1 " " 103G
2 " " 20B	2 " " 103K
1 " " 22	2 " " 110A
2 " " 22A	2 " " 111A
2 " " 23A	7 " " 115
2 " " 24	2 " " 116A
1 " " 25	6 " " 125
1 " " 25A	2 " " 136
6 " " 26	1 " " 144
3 " " 27	1 " " 152
1 " " 27A	1 " " 163
1 " " 27B	1 " " 168A
2 " " 30	1 " " 168c
1 " " 30A	1 " " 169

La Machine à Vapeur Meccano

La Machine à Vapeur Meccano possède plusieurs caractéristiques d'un intérêt particulier, dont la principale est son extrême simplicité—le plus jeune garçon peut aisément la faire fonctionner. Un seul levier de commande (marqué I sur la gravure) sert à faire démarrer la machine, à l'arrêter et à renverser sa marche.

Une autre caractéristique importante consiste en la facilité avec laquelle elle peut être comprise dans la construction des Modèles Meccano.

La chaudière de la machine Meccano a une résistance à la pression remarquable, ce qui est dû à sa construction. En enlevant à l'aide des clefs spéciales jointes à la machine, les raccords des tuyaux à vapeur et d'échappement, et en dévissant les écrous à chaque angle du socle (2), on peut séparer la chaudière du reste de la machine. Ceci fait, on verra comment les gaz chauds enveloppent la chaudière sur toute sa surface extérieure. La conduite de vapeur est passée à travers le foyer afin que la vapeur puisse être surchauffée et débarrassée de l'eau qu'elle contient. Le même système est usité dans les véritables machines à vapeur, et a pour effet d'en augmenter considérablement la puissance.

Il est à noter que le réservoir de la lampe (3) est situé hors du foyer. Ceci est un point important, car cette disposition empêche l'alcool de se chauffer et de se mettre en ébullition, en éliminant ainsi tout danger pouvant provenir du feu.

Comment Mettre en Marche la Machine

Avant tout, il faut s'assurer que le cylindre, le bloc de renversement sur lequel il oscille et les supports de l'arbre sont parfaitement bien graissés. Puis on dévissera et examinera la soupape de sûreté, pour s'assurer qu'elle n'est pas collée à son siège. On remplit la chaudière à l'aide de l'entonnoir livré avec la machine, en laissant ouvert le robinet de jauge (que l'on ne voit pas sur la gravure), afin de laisser s'échapper l'air et de voir, quand l'eau aura atteint dans la chaudière le niveau nécessaire, ce qui a lieu lorsqu'elle commence à couler du robinet. Ensuite on ferme le robinet à l'aide de la clef spéciale, et on remet en place la soupape de sûreté.

On remplit la lampe d'alcool dénaturé, et ayant allumé la mèche on la met en place. On prendra soin de s'assurer que les pattes du récipient s'engagent bien dans les crochets (7) de la plaque de base ; on ne tentera jamais de mettre en marche la machine avant que la vapeur ait atteint une chaleur suffisante.

On remarquera que lorsque l'alcool de la lampe est épuisé, la chaudière doit aussi être remplie d'eau. Pour le faire, il faut enlever le réservoir d'alcool et remplir la chaudière de la façon décrite.

IMPORTANT. Retirez toujours la lampe immédiatement dès que la machine commence à ralentir sa marche ou s'arrête.

Remplissez toujours la chaudière jusqu'au niveau nécessaire, lorsque vous remplissez le réchaud.

Conseils sur l'entretien

Si l'on suit les simples conseils suivants, la Machine à Vapeur Meccano servira fidèlement et longtemps, sans causer le moindre ennui.

Après chaque course de la machine on videra la chaudière et on graissera toutes les parties mobiles, spécialement le cylindre et les lumières du bloc de renversement.

Après un certain temps de service, le cylindre se couvrira de suie qu'il faudra enlever. On y arrivera facilement en démontant la chaudière de la façon décrite et en nettoyant le cylindre à l'aide d'une petite brosse à poils raides.

Il est extrêmement important que la soupape de sûreté fonctionne bien. Afin d'assurer son fonctionnement il faut apporter beaucoup de soin à l'entretien de la soupape même et changer la rondelle aussitôt qu'on lui découvrira une tendance à se coller à son siège. De temps en temps on graissera la tige de la soupape avec une goutte d'huile. En examinant la rondelle formant jointure entre le corps de la soupape et la chaudière on pourra aussi constater la nécessité de la changer. Une rondelle défectueuse est souvent la cause d'une grande perte de vapeur.

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Old Swan, Liverpool, Angleterre

Meccano (France) Ltd.,
78-80 Rue Rébeval, Paris XIXe.

MECCANO

MAGAZINE

A FINE ENGINEERING

The "Meccano Magazine" is the Meccano boy's newspaper. He reads it regularly and corresponds with his friend the Editor when he feels inclined.

The Magazine tells him of the latest Meccano models; what Meccano Clubs are doing; how to correspond with other Meccano boys; of the Competitions that are running. It contains splendid articles on such subjects as Railways, Famous Engineers and Inventors, Electricity, Bridges, Cranes, Wonderful Machinery, Aeronautics, Latest Patents, Radio, Stamps, Photography, Books and other topics of interest to boys, including suggestions for new Meccano parts and



MONTHLY FOR BOYS

correspondence columns in which the Editor replies to his readers' enquiries. The publishing date is the 1st of each month.

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STEAM ENGINE, Complete 21/-

	s.	d.		s.	d.		s.	d.		
Baseplate	each	1	0	Reversing Cam	each	8	Boiler Casing	each	3	0
Flywheel and Screw	"	1	9	" " Spring	"	1	Water Level Cock complete	"	1	0
Screws for Flywheel	doz.	3	" " Stud	"	1	" " " Washers	doz.	6		
Crankshaft	each	1	Cylinder and Block	"	9	Safety Valve complete	each	6		
Crankshaft Pinion and Grub Screw	"	4	" Stud	doz.	6	" Body	"	2		
Driving Wheel and Set Screw	"	6	" Nut	"	9	" Spring	doz.	6		
Boiler Mounting	"	3	" Spring	"	6	" Nut	"	6		
Screws for Boiler Mounting	doz.	1	Piston	each	3	" Washer, large	"	6		
Nuts (Hex.) Boiler Mounting	"	6	Insulated Handle for Reversing			" " small	"	3		
Steam Chest (with stop pins and			Lever on Cam	"	2	" Pin	"	9		
inlets assembled)	each	2	Crank	"	4	Spirit Container	each	1	3	
Plug Screws for Steam Chest	doz.	9	Exhaust Pipe Complete	"	8	Spanner	"	2		
Washers for Plug Screws	"	3	Boiler complete (steam pipe assembled)	4	0	Spirit Container Stopper	"	1		
Fixing Screws for Steam Chest	"	9	Boiler Casing Cap and Chimney	10		Wick	doz.	1	0	
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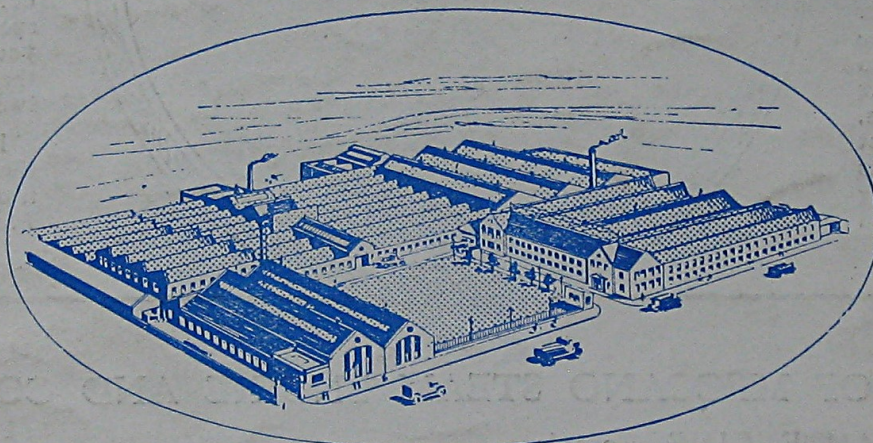
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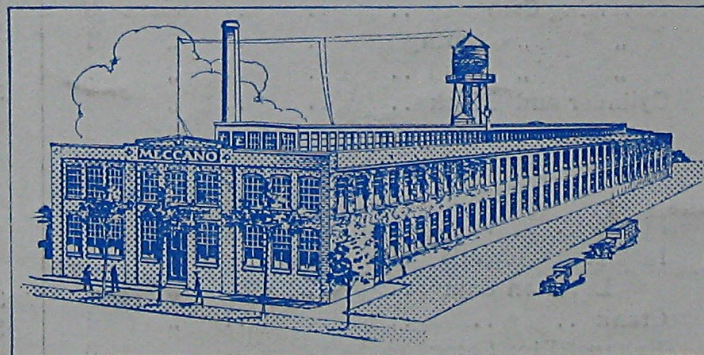
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