

MECCANO



(MECHANICS MADE EASY)

MANUAL OF INSTRUCTIONS

For the whole series of Models, comprising
eleven progressive outfits

American Agents: THE EMBOSSING COMPANY, ALBANY, N.Y.

 MECCANO LIMITED, LIVERPOOL, 

MECCANO.

DURING the years which "Meccano" has been on the market its progress has been extensive and rapid, and it now holds a warm place in the affections of many thousands of boys and parents. Each year we have enlarged its scope and improved our Models, and "Meccano" now holds an unrivalled and, we believe, an unassailable position in the land of Toys and Hobbies. A "Meccano" working Model is a thing which commands the absorbed interest of the parent, and fills the youthful mind with pleasure. Every requisite for making the various Models which we illustrate is provided in our series of Outfits, and the building up of these working Toys, with the aid of the bright nickel-plated and accurately fitting strips, and neatly turned and beautifully finished wheels and pulleys, has proved a source of pleasure to many thousands of boys and girls.

This year we have introduced several new Models, which we feel sure will please both present and prospective users of "Meccano." We should like to again emphasize the fact that all our Models are built on sound and standard engineering principles, and that the parts employed represent the main mechanical parts used in machinery, such as levers, beams, wheels, axles, pulleys, wormwheels, screws, bolts, keys, &c., so that, as an introduction to the serious study of mechanics, the value of this hobby is very great indeed.

Each Model may, of course, be taken to pieces, and the same parts may be used to make up other Models. Additional parts may be purchased at any time from your dealer, or direct from us.

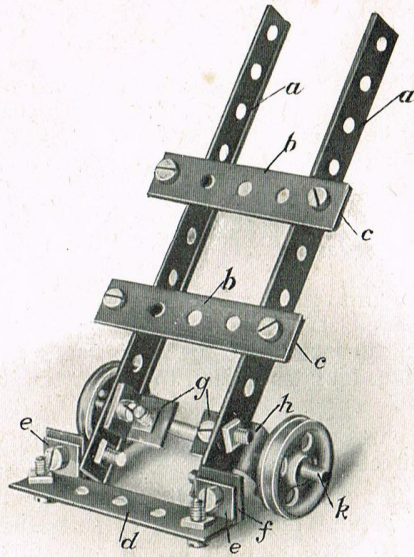
We have illustrated a large and varied selection of Models which can be made with "Meccano," but these by no means represent its full possibilities. Both parents and children will find the designing of new Models an interesting and stimulating exercise, and in many instances a pleasant mode of exercising their inventive faculties. Some of our new Models have been designed, entirely or suggested to us by users of "Meccano," in various parts of the country, whom we have never seen, and we gratefully acknowledge our indebtedness to them. We are at all times glad to correspond with users of "Meccano," and to assist them by suggestions, or criticism, when difficulties occur with new Models.

To the beginner we would suggest that the simple designs be proceeded with first, and skill gradually acquired in following the designs, and correctly connecting the parts together. The strips are perforated with holes equi-distant, and successive lengths may be united together by means of one, or where a very rigid connection is required, two bolts. The axles fit any of the holes, and their position in the various designs can always be ascertained by counting the holes.

Additional parts may be purchased either separately or in complete connecting Outfits, as set out on pages 51 and 52. Thus, by purchasing a No. 1A Accessory Outfit, sufficient parts may be obtained to convert a No. 1 into a No. 2 "Meccano" Outfit. The No. 2A Accessory Outfit contains all the parts necessary to convert a No. 2 into a No. 3 Outfit, and so on.

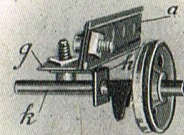
Fig. No. 1. Luggage Truck.

(MADE WITH MECCANO OUTFIT NO. 1.)



PARTS REQUIRED.

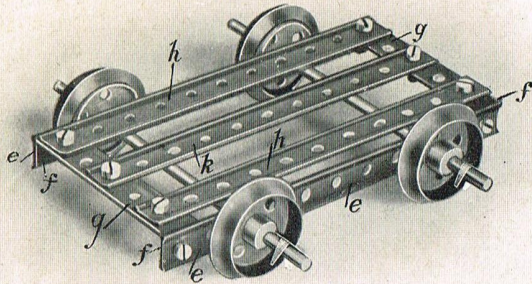
2	5½" Perforated Strips.
3	2½" " "
12	Angle Brackets.
1	3½" Rod.
2	Wheels.
18	Nuts and Bolts.
2	Keys.



This is a simple and neat little model, very easily constructed. Commence by screwing the two cross pieces B to the two side frames A, four angle brackets and eight nuts and bolts are required for this. The lowest cross piece D may then be carried from the end holes of the frames A by a combination of the two angle pieces E F at each end, and the bearings for the wheel axle are each somewhat similarly constructed of two angle pieces G H, as will be readily understood by referring to the small detail view. When these are in place the axle K is inserted, keys L put over the ends, and the wheels secured thereon.

Fig. No. 2. Truck.

(MADE WITH MECCANO OUTFIT NO. 1.)



PARTS REQUIRED.

5	5½"	Perforated Strips.
2	2½"	" "
4		Angle Brackets.
2	5"	Rods.
4		Wheels.
10		Nuts and Bolts.
4		Keys.

This is an interesting model, which can easily be constructed by means of the following instructions :—

To construct this design, take a 5½" strip E and attach by means of screws and nuts an angle piece F at each end. Then take a second 5½" strip, and in the same way attach angle pieces at each end of it. These strips are to form the sides of the truck in which the axles of the wheels run. Now connect each end pair of angle pieces with two 2½" strips G at right angles to the 5½" strips forming the sides, and over these short strips G lay two 5½" strips H, fastening each corner of the truck, where the ends of the strips H and G overlay the angle pieces F, by means of screws and nuts. Now attach the 5½" piece K at each end to the centre hole of the strips G. This with the two pieces H forms the bottom of the truck. Next insert two axles, as shown, through the third holes from the ends of the side pieces E, then push on the four wheels and secure them in position by the keys.

Fig. No. 3. Endless Rope Railway.

(MADE WITH MECCANO OUTFIT NO. 1)

PARTS REQUIRED.

- | | |
|----|------------------------|
| 7 | 5½" Perforated Strips. |
| 6 | 2½" Angle " Brackets." |
| 13 | 2 5" Rods. |
| 1 | 2" Rod. |
| 1 | Crank Handle. |
| 6 | Wheels. |
| 21 | Nuts and Bolts. |
| 5 | Wood Screws. |
| 6 | Keys. |

This is an attractive little combination working model, which will well repay a little trouble in making.

The truck made according to the previous design is used, and it is connected to an endless cord which passes from a pulley attached to the board to another pulley and shaft carried on the bracket shown. In the illustration, the two pulleys are shown close together to save space, but they may, of course, be placed at any distance desired.

The bracket is constructed as follows: Two vertical 2½" side pieces are connected together at the top and bottom by two more 2½" pieces attached by angle pieces as shown. From the angle pieces at the top, two 5½" pieces are carried down to two angle pieces screwed to the board as shown, and angle pieces are placed at the feet of the uprights, which are also screwed to the board. The pulley is keyed to the vertical spindle, which is threaded through the central holes of the two 2½" cross pieces, and a second pulley, attached to a U-shaped piece as shown, is screwed opposite to the bracket.

A piece of string is then formed into an endless rope running over the two pulleys, and the truck is attached to one side of the string, so that by rotating the handle in one direction or another, the truck is moved as desired.

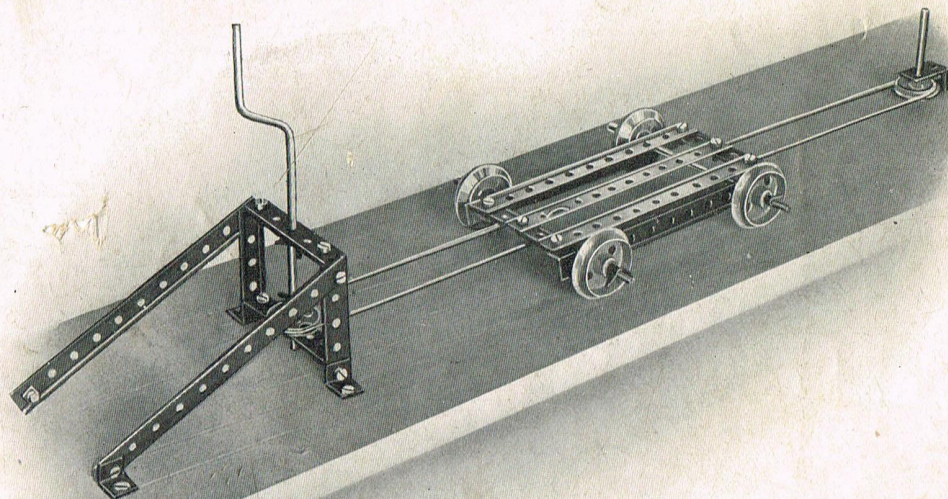
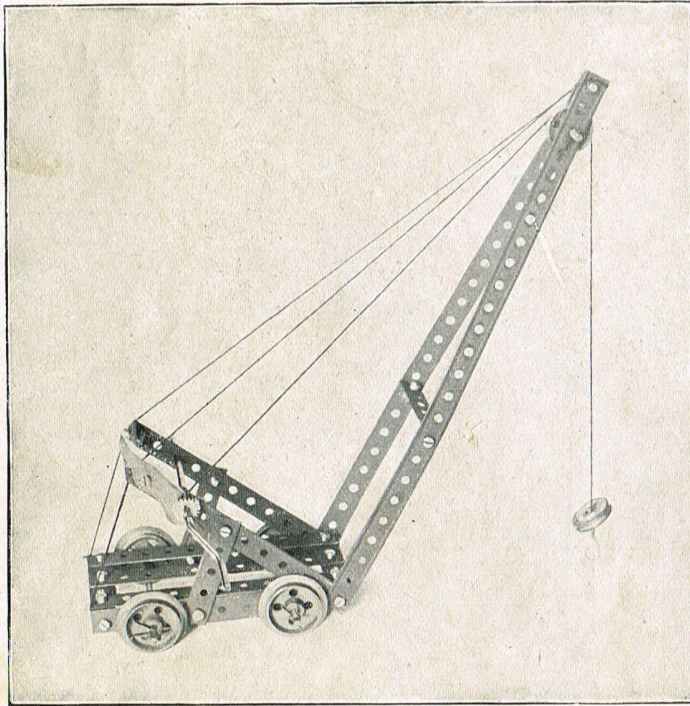


Fig. No. 4. Travelling Jib Crane.

(MADE WITH MECCANO OUTFIT NO. 1.)



PARTS REQUIRED.

2	12½"	Perforated Strips.	6	Wheels.
7	5½"	" "	1	½" Pinion.
6	2½"	" "	1	Pawl.
8		Angle Brackets.	23	Nuts and Bolts.
2	5"	Rod	1	Hook.
1	2"	Rod.	8	Keys.
1		Crank Handle.		

A very fine model which cannot fail to interest and instruct the budding mechanic. It is designed on thoroughly scientific lines, and it will teach a boy more about the principles of a crane's action than hours of book study.

The truck of Example 2 is used in the construction of the crane, with the following additions :—

Two 5½" strips sloping back to carry the spindle, and two 12½" strips to form the jib, are attached by the same screws to the end holes of the truck; the two 5½" strips being braced to the truck by the two 2½" strips as shown, and being connected together at their ends by a 2½" strip and angle pieces.

The spindle, to which the pinion is keyed, is carried in the third pair of holes in the 5½" strips as shown, and the pawl is pivoted on the screw which holds the angle piece in position.

The jib is braced by a 2½" strip and angles at the ninth hole from the end, and the two sides are bolted together at the top hole, and the short spindle carrying the pulley is carried in the third hole from the top, over which pulley the string is passed and tied to the pinion spindle; the whole structure is braced by tie rods formed of strings attached to the ends of the truck, the 5½" strips, and the jib.

Fig. No. 5. Windmill.

(MADE WITH MECCANO OUTFIT NO. 1)

PARTS REQUIRED.

4	12½" Perforated Strips.
2	5½" " "
8	2½" " "
12	Angle Brackets.
1	3½" Rod. s.
1	Crank Handle.
3	Wheels.
25	Nuts and Bolts.
8	Keys.

An effective model which calls for no special instructions to construct.

It will not be described quite so fully as the preceding ones, in order that its construction may be a test for the young model-maker, and may be of use in developing his faculties for constructional work.

It will suffice to say that the four 12½" strips are formed at the top by four angle pieces, and are stiffened lower down by the four 2½" strips formed into a square, the corners of which are connected by angle pieces to the 12½" strips.

The wind sails are made by attaching four 2½" strips to the bush wheel, and keying the latter to the spindle.

NOTE.—This spindle has a second pulley on the frame connected by the string band to the pulley on the spindle below.

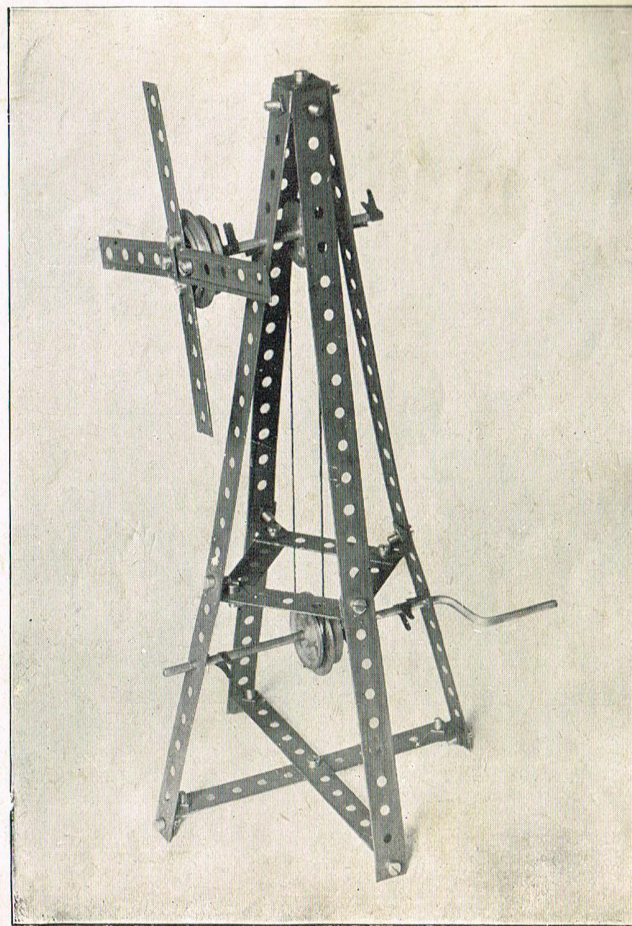
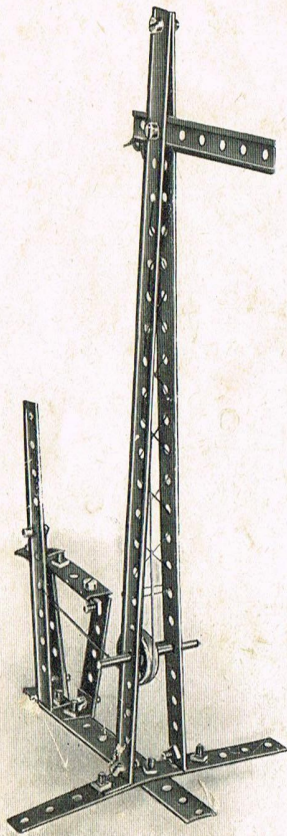


Fig. No. 6. Railway Signal

(MADE WITH MECCANO OUTFIT NO. 1.)



PARTS REQUIRED.

2	12½"	Perforated Strips.
3	5½"	" "
1	3½"	" "
3	2½"	" "
8		Angle Brackets.
2	2"	Rods.
1		Wheel.
19		Nuts and Bolts.
1		Key.

A simple model which explains itself.

Very little difficulty will be found in constructing it after Model 5 has been accomplished. It will therefore form another test for the young model-maker.

In fixing the lever to the angle bracket at the bottom, lock the nuts so as to prevent the screw from working out.

Fig. 1.

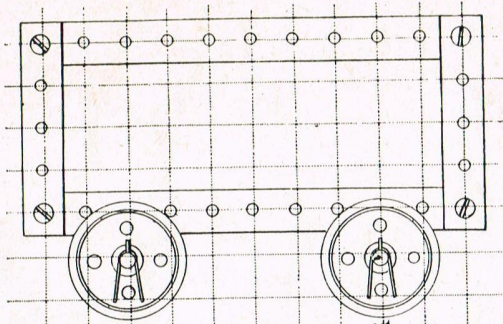


Fig. 2.

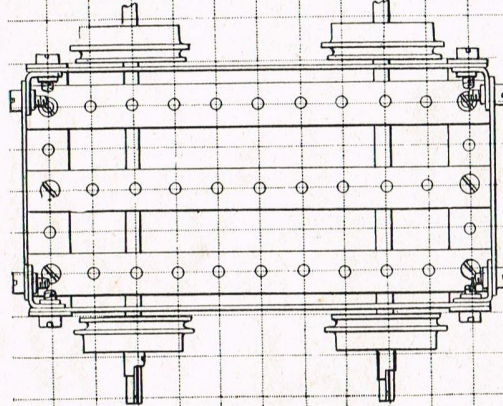


Fig. 3.

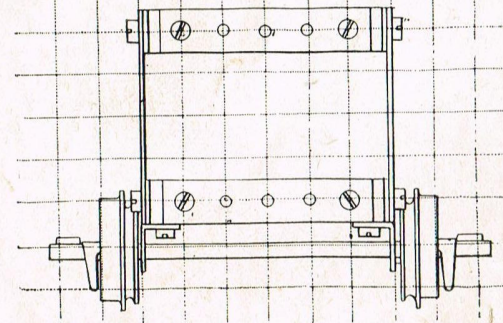
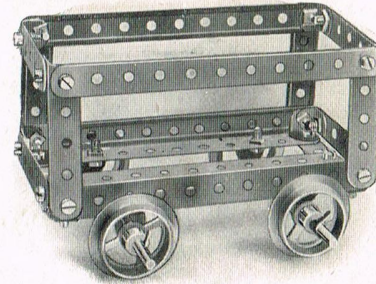


Fig. No. 7. Truck.

(MADE WITH MECCANO OUTFIT NO. 1)



PARTS REQUIRED.

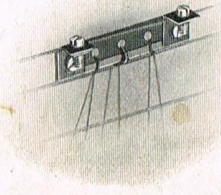
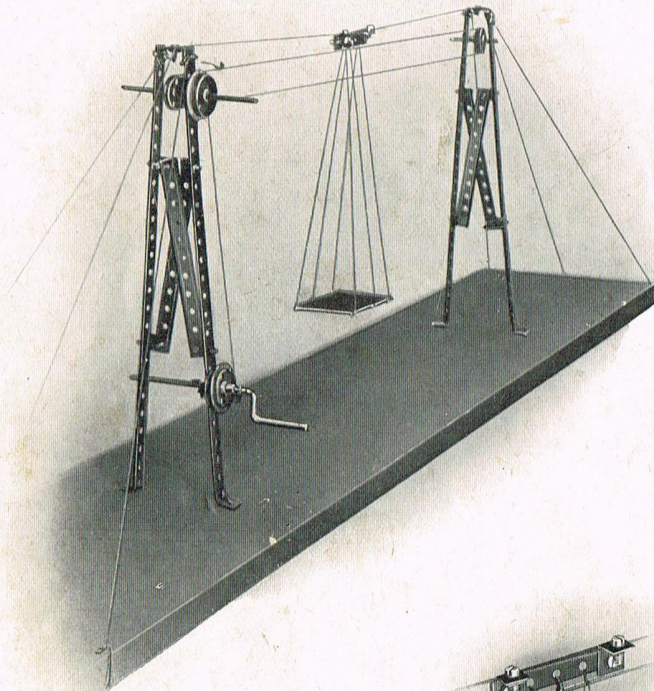
7	5 1/2" Perforated Strips.
10	2 1/2" " " "
16	Angle Brackets.
2	5" Rods.
4	Wheels.
22	Nuts and Bolts.
4	Keys.

We have given here an example of the actual kind of drawing which an engineer would make to represent such a model. The top figure would be called an elevation, the middle one a plan, and the lower one an end view. It will be noticed that the views are on squared paper, and the elevation and plan are projected from each other, as should be the case with all views on an engineering drawing.

This model is constructed in precisely the same way as preceding models, and we confidently leave our young friend to make it up for himself.

Fig. No. 8. Model of Telpher Span.

(MADE WITH MECCANO OUTFIT NO. 1)



PARTS REQUIRED.

4	12½" Perforated Strips.
4	5½" " "
1	2½" " "
18	Angle Brackets.
1	3½" Rod.
1	2" " "
1	Crank Handle.
4	Wheels.
30	Nuts and Bolts.
4	Wood Screws.
6	Keys.

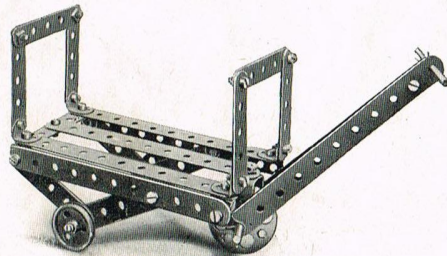
For the information of our young friends we may say that Telpher is the name of the man who invented this device. It was designed to overcome the difficulty of transporting goods over hilly and difficult country. Its construction cannot fail to fix in the mind the principles on which it works.

We recommend that the standards be screwed down before connecting the cords. The crank-pulley cord may be wound twice around the pulleys to ensure a better grip.

Fig. No. 9. Luggage Truck.

Fig. No. 10. Luggage Truck.

(MADE WITH MECCANO OUTFIT NO. 1)



PARTS REQUIRED.

7	5½" Perforated Strips.	1	Bush Wheel.
12	2½" " "	2	1" Pulley Wheels.
8	Angle Brackets.	22	Nuts and Bolts.
1	3½" Rod.	6	Keys.
2	2" Rods.	1	Bent Strip.

PARTS REQUIRED.

5	5½" Perforated Strips.	2	1" Pulley Wheels.
13	2½" " "	20	Nuts and Bolts.
6	Angle Brackets.	2	Keys.
1	3½" Rod.		

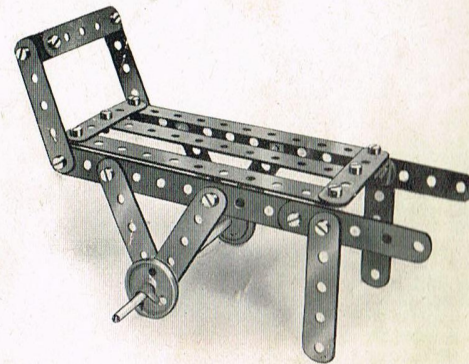
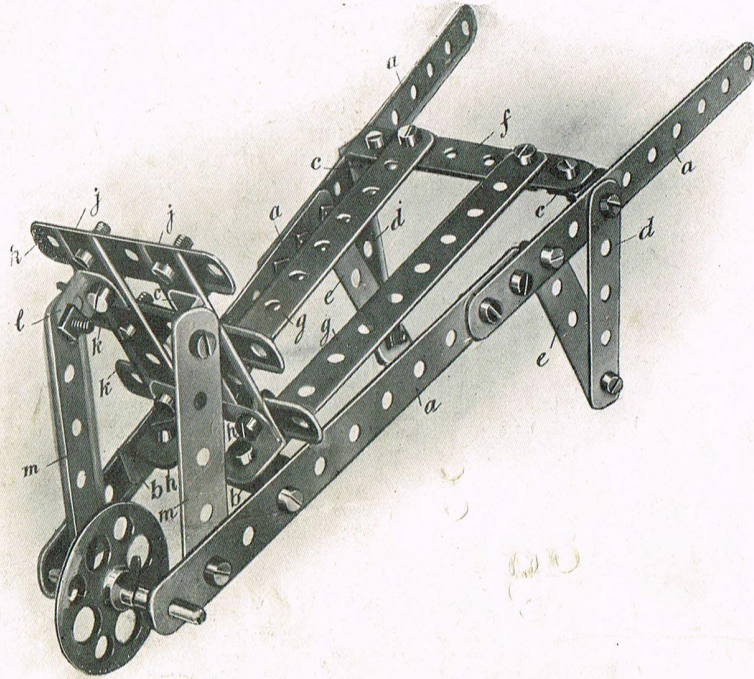


Fig. No. 13. Luggage Barrow.

(MADE WITH MECCANO OUTFIT NO. 2 OR NO. 1 AND NO. 1A)



PARTS REQUIRED.

6	5½" Perforated Strips.
13	2½" " "
8	Angle Brackets.
1	2" Rod.
1	Bush Wheel.
30	Nuts and Bolts.
2	Keys.

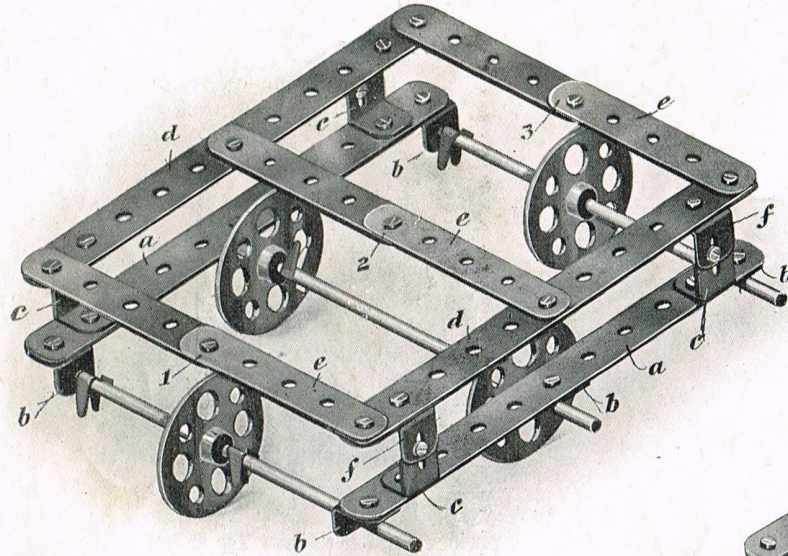
*Parts required in addition to
Outfit No. 1.*

1	2½" Perforated Strip.
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Our illustration clearly shows how this model is built up, and no difficulty should be experienced with it. The two angle pieces C are connected together by two overlapping 2½" strips in F. The wheel is held in place by two keys which have their feathers turned *away* from the wheel, thus forming collars between which the wheel rotates.

Fig. No. 14. Revolver Truck.

(MADE WITH MECCANO OUTFIT NO. 2 OR NO. 1 AND NO. 1A)



PARTS REQUIRED.	
4	5½" Perforated Strips.
6	2½" " "
14	" Angle Brackets.
3	5" Rods.
4	Wheels.
27	Nuts and Bolts.
10	Keys.

Parts required in addition to Outfit No. 1.

1 5" Rod.

In a Revolver Truck the two end wheels are always raised just a little higher than the two centre wheels. This enables the truck to be quickly revolved upon the centre wheels. The construction of this model is clearly shown in our illustration.

Fig. No. 15. Railway Wagon.

(MADE WITH MECCANO OUTFIT NO. 2 OR NO. 1 AND NO. 1A)

PARTS REQUIRED.

5	5½" Perforated Strips.	2	5" Rods.
2	3½" " "	4	Wheels.
5	2½" " "	23	Nuts and Bolts.
10	" Angle Brackets.	4	Keys.

Parts required in addition to Outfit No. 1.

1 3½" Perforated Strip.

A very simple and attractive working model. The front swivelling support, of which a separate view is given, is formed from a 2½" strip bent to the shape indicated in the drawing. The rear axle frame is formed from a 2½" strip, and is held to the platform by two pairs of angle pieces. Both axles are carried in inverted angle pieces.

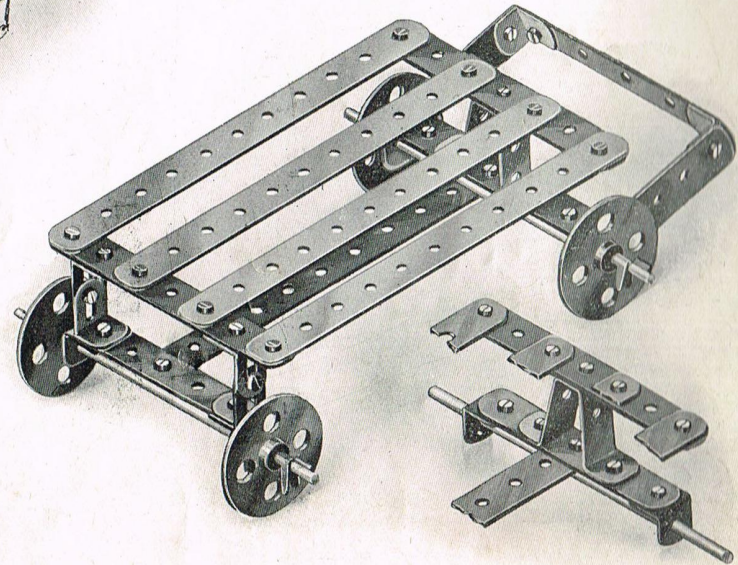
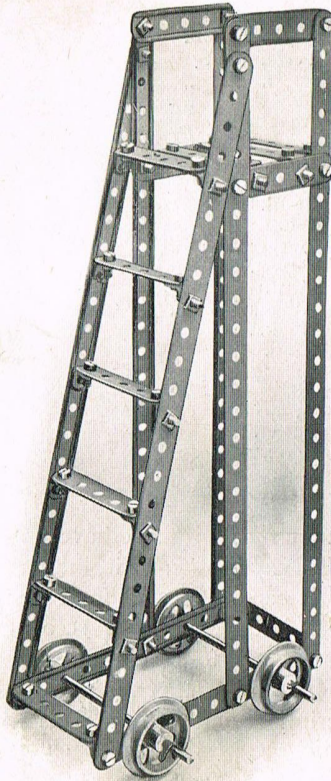


Fig. No. 16. Ladder on Wheels.

(MADE WITH MECCANO OUTFIT NO. 2 OR NO. 1 AND NO. 1A)



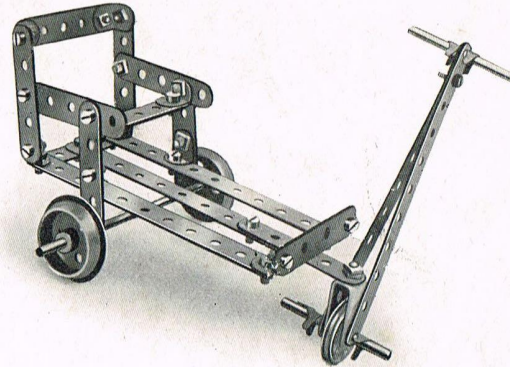
PARTS REQUIRED.

6	12½" Perforated Strips.
2	5½" " "
13	2½" " "
18	Angle Brackets.
2	5" Rods.
4	Wheels.
48	Nuts and Bolts.
4	Keys.

*Parts required in addition to
Outfit No. 1.*

1	2½" Perforated Strip.
18	Nuts and Bolts.

Fig. No. 17. Bath Chair.



PARTS REQUIRED.

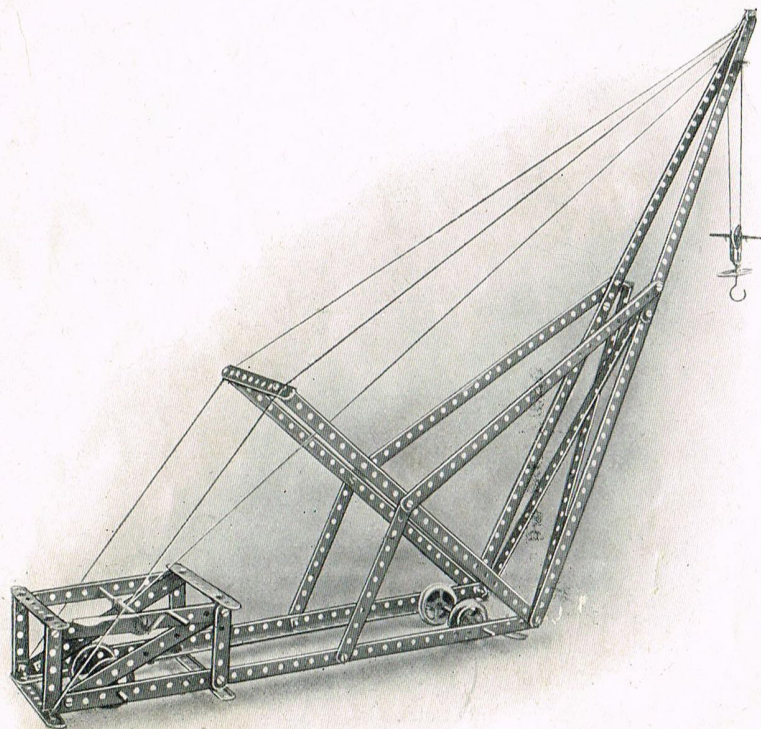
5	5½" Perforated Strips.
11	2½" " "
11	Angle Brackets.
1	5" Rod.
2	2" Rods.
2	Flanged Wheels.
1	1" Pulley Wheel.
29	Nuts and Bolts.
6	Keys.
1	Bent Strip.

*Parts required in addition to
Outfit No. 1.*

2	Flanged Wheels.
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Fig. No. 18. Travelling Jib Crane.

(MADE WITH MECCANO OUTFIT NO. 2 OR NO. 1 AND NO. 1A)



PARTS REQUIRED.

10	12½"	Perforated Strips.
14	5½"	" "
5	2½"	" "
2		Angle Girders.
16		Angle Brackets.
2	5"	Rods.
2	2"	" "
1		Crank Handle.
6		Wheels.
1		Bush Wheel.
1	½"	Pinion.
1		Pawl.
38		Nuts and Bolts.
1		Hook.
10		Keys.

Parts required in addition to Outfit No. 1.

4	12½"	Perforated Strips.
4	5½"	" "
1	2"	Rod.
8		Nuts and Bolts.

This is so important a model that we have thought it best to give a detailed description of it, making use of engineering terms. It can be erected from a study of the illustration alone, but we strongly recommend our enthusiastic young friend to carefully read our instructions, and to make himself familiar with the correct technical description and terms. This model will well repay the time expended on a close and careful study.

The lower horizontal sides of the crane should first be put together. Each side consists of an angle

girder and a $5\frac{1}{2}$ " strip joined together, three holes overlapping. The winch frame at the end is formed of four $2\frac{1}{2}$ " strips secured to the side frames and connected together at their tops by two $5\frac{1}{2}$ " strips, the sides so constructed being united together by four $5\frac{1}{2}$ " strips connected to the angle pieces as shown at the third hole from each end; a fifth transverse $5\frac{1}{2}$ " strip is used to connect the other ends of the horizontal sides together as shown, and the wheel axles are inserted through appropriate holes in the ends of the horizontal frame.

The bearings for the winch handle are formed by two $5\frac{1}{2}$ " top strips of the winch frame; the winch handle has a pinion, and a ratchet is pivoted to the right-hand diagonal, and a brake wheel and lever may be added if desired.

Each side of the jib is constructed of two $12\frac{1}{2}$ " strips, jointed together by overlapping; at the top where the sides meet a pulley is fixed on a short length of spindle, and at the bottom the two sides are respectively screwed to the two ends of the horizontal base.

The jib is braced by two diagonally arranged $12\frac{1}{2}$ " strips attached to the sides of the jib by angle pieces.

From each side of the jib two $12\frac{1}{2}$ " strips are carried to a truss member, formed of two $12\frac{1}{2}$ " strips united together, secured at one end to the screws at the base of the jib, and united at their other ends by a $5\frac{1}{2}$ " strip; the connection being made at the third hole from the end, as in the case of the other $5\frac{1}{2}$ " transverse strips. The truss frame is connected to the horizontal base by two $5\frac{1}{2}$ " strips as shown.

The rope by which the weight is raised has one end fixed to the end of the jib; it is then passed round the pulley block, then over the jib pulley, and finally connected to the winch handle.

The crane is further strengthened by strings to represent tie rods, which connect the ends of the jib, the truss frame, and the winch frame as shown.

If possible, the joint between the truss frame, the side frame, and the jib, should be made with a single pair of screws, which should also carry the angle pieces for the cross bracing of the crane.

Fig. No. 19. Windmill.

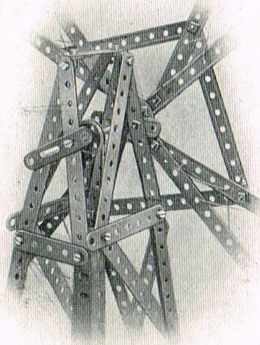
(MADE WITH MECCANO OUTFIT NO. 2 OR NO. 1 AND NO. 1A)

PARTS REQUIRED.

10	12½"	Perforated Strips.
16	5½"	" "
2	3½"	" "
4	2½"	" "
4		Angle Girders.
8		Angle Brackets.
1	5"	Axle Rod.
1		Crank Handle.
2	1"	Pulley Wheels.
1		Bush Wheel.
49		Nuts and Screws.
8		Keys.

Parts required in addition to Outfit No. 1.

4	12½"	Perforated Strips.
6	5½"	" "
1	3½"	" "
4		Angle Girders.
19		Nuts and Screws.



This model requires no special instructions. We would, however, say that with the assistance of the parts contained in the succeeding outfits a more elaborate mechanism may be arranged to enable it to be driven by an engine or other suitable motive power.

This model also lends itself to further decorations by means of coloured ribbons used in the place of the cord lacings; or as streamers.

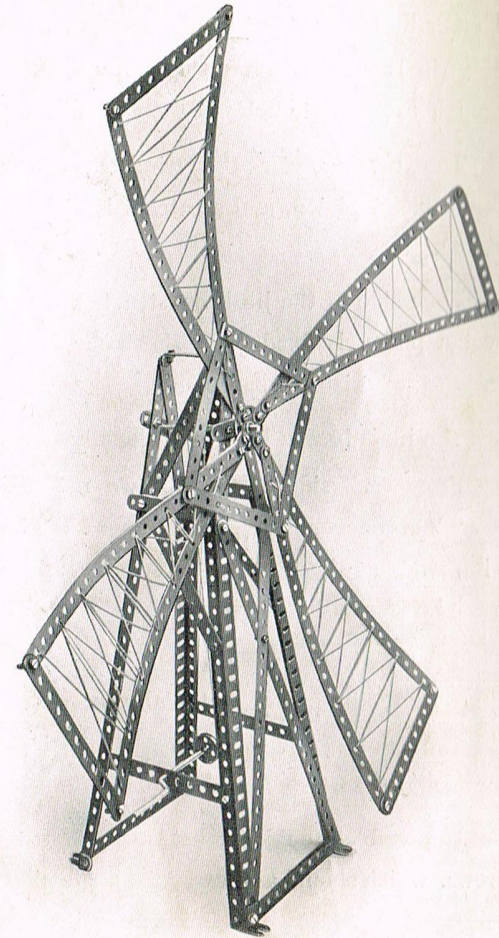
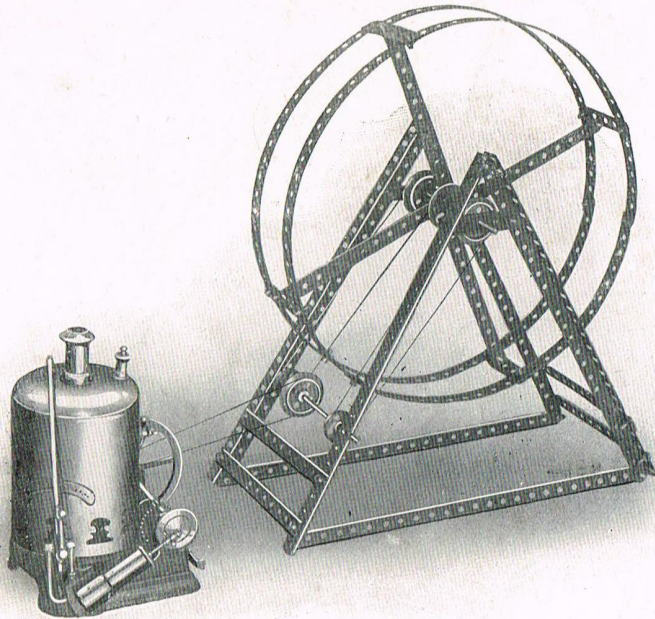


Fig. No. 20. Wheel.

(MADE WITH MECCANO OUTFIT NO. 2 OR NO. 1 AND NO. 1A)



PARTS REQUIRED.

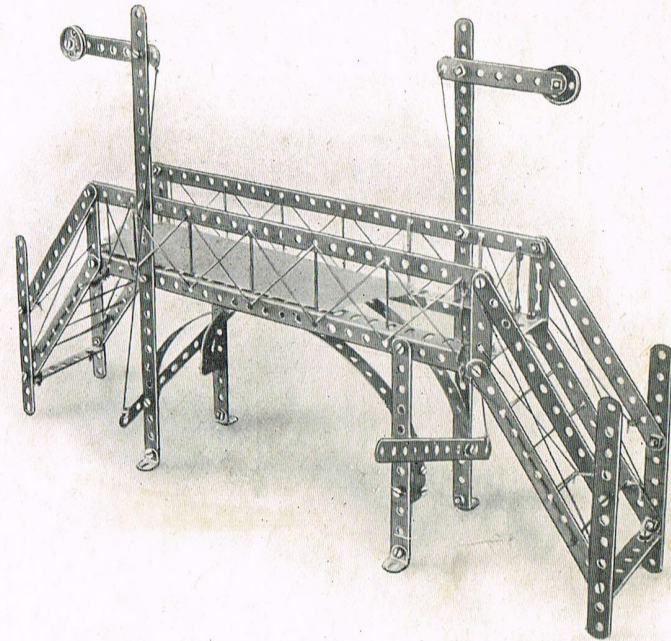
8	12½" Perforated Strips.	3	1½" Pulleys.
8	5½" " "	2	1" " "
6	2½" " "	1	Bush Wheel.
4	Angle Girders.	48	Nuts and Bolts.
8	" Brackets.	4	Wood Screws.
2	5" Rods.	6	Keys.

Parts required in addition to Outfit No. 1.

2 12½" Perforated Strips. 4 Angle Girders. 18 Nuts and Bolts.

We have shown this model with a toy engine added to work it. By extending the shaft additional pulleys may be used for driving small models.

Fig. No. 21. Bridge with Signals.



PARTS REQUIRED.

6	12½" Perforated Strips	..	..	—
16	5½" " "	..	..	6
2	3½" " "	..	..	1
8	2½" " "	..	..	—
2	Angle Girders	..	..	2
8	" Brackets.	..	..	—
2	1" Pulley Wheels.	..	..	—
50	Nuts and Bolts.	..	..	20

Parts required in addition to Outfit No. 1.

Fig. No. 30. Cable Railway.

(MADE WITH MECCANO OUTFIT No. 3 OR No. 2 AND No. 2A)

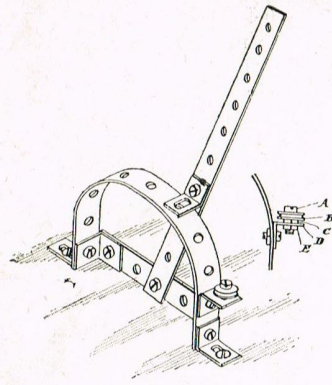


FIG. 30C.

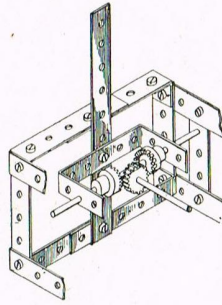


FIG. 30A.

*Parts required in addition
to Outfits*

PARTS REQUIRED.

6	5 1/2"	Perforated Strips.
6	3 1/2"	" "
12	2 1/2"	" "
4		Angle Girders.
18		" Brackets.
4	5"	Rods.
1	1 1/8"	Pulley.
2	1"	Pulleys.
2	3/4"	Pinions.
1		Gear Wheel.
2	3/4"	Contrite Wheels.
44		Nuts and Bolts.
12		Wood Screws.
13		Keys.

No. 1	No. 2
—	—
5	4
—	—
4	—
—	—
3	2
1	1
—	—
2	2
1	1
2	2
14	—
7	—
1	—

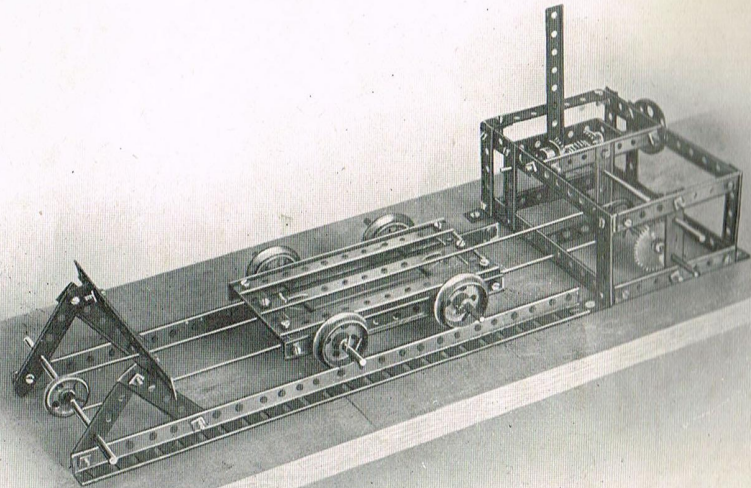


FIG. 30B.

Our illustration hardly does this excellent model justice, owing to the parts having to be so crowded together. This is a very fine model, both instructive and highly interesting.

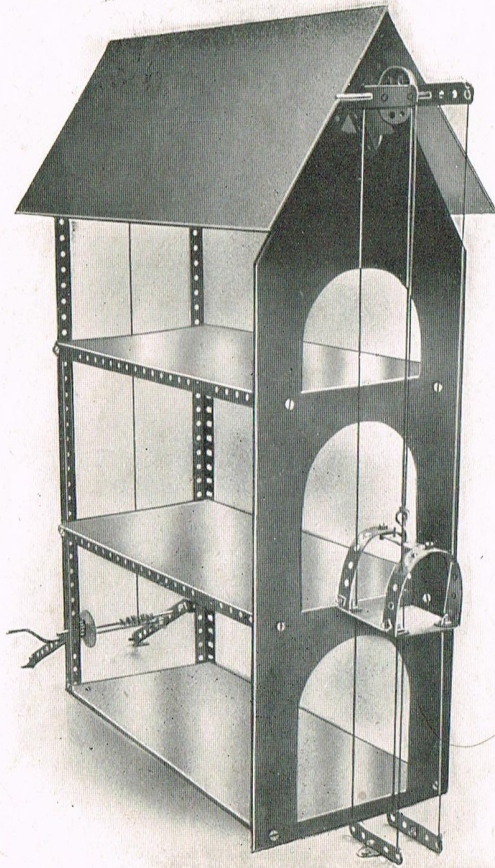
The driving power is received at the outer pulley, and is transmitted through the clutch mechanism (of which a separate detail is given) and the pair of gear wheels to the lower spindle on which the driving pulley is fixed, the driving rope passing round this pulley and the second pulley at the end of the rails, all as shown in the drawing.

In fixing the lever for operating the clutch mechanism, the nuts should be locked to prevent the screw working out. Only one section of rails is shown in the design, but they may be extended as desired.

Figure No. 30c is an example of a lever for operating signals at a distance. The bracket D is gripped between the top facing nut C and the lower locking nut E, which are threaded on the bolt A so as to leave sufficient play for the guide pulley B to rotate easily.

Fig. No. 31. Warehouse with Elevator.

(MADE WITH MECCANO OUTFIT NO. 3 OR NO. 2 AND NO. 2A)



PARTS REQUIRED.

9	12½"	Perforated Strips.
16	5½"	" "
4	3½"	" "
16	2½"	" "
4		Angle Girders.
42		" Brackets.
1	5"	Rod.
1	3½"	" "
1	2"	" "
1		Crank Handle.
1	1½"	Pulley Wheel.
1	¾"	Pinion.
1		Gear Wheel.
1		Pawl.
68		Nuts and Bolts.
10		Wood Screws.
9		Keys.

Parts required in addition to Outfits

No. 1	No. 2
3	—
5	—
3	2
4	—
4	—
24	24
—	—
—	—
1	—
—	—
1	1
1	1
1	1
—	—
38	18
5	—
—	—

The construction of the framework of the building is clearly shown in the picture, and should present no difficulties.

The cage of the elevator is formed by bending two 5½" strips, and connecting them together at the top by a 2½" strip. The floor is formed by connecting an angle bracket on the inside of each corner of the strip so bent, and attaching a piece of cardboard.

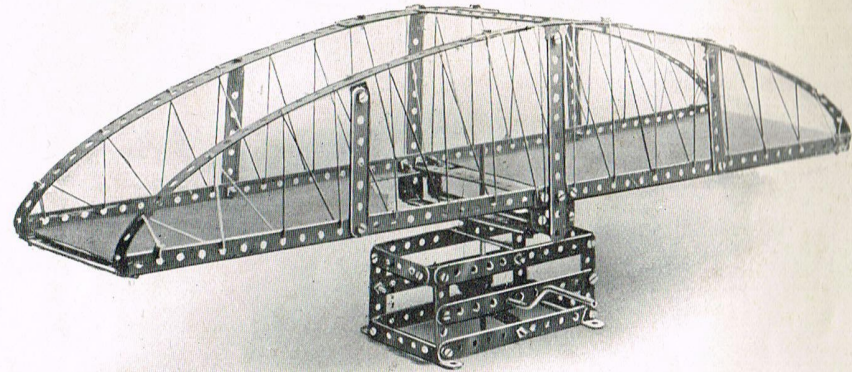
The cat-head at the top, to which the guides are attached, is formed by bolting an angle bracket on each side of the roof four holes down from the ridge, and to each of these attaching a 5½" strip bolted in the sixth hole and fastened at the back to two 5½" strips, connected with the eave and ridge of the roof. This, in addition to supporting the guides, also supports the pulley over which the winding rope passes. The guides at the bottom are connected to two 2½" strips screwed to the floor.

Fig. No. 32. Swing Bridge.

(MADE WITH MECCANO OUTFIT NO. 3 OR NO. 2 AND NO. 2A)

*Parts required in addition
to Outfits*

PARTS REQUIRED.		No. 1	No. 2
4	12 $\frac{1}{2}$ " Perforated Strips.	—	—
16	5 $\frac{1}{2}$ " " "	6	—
4	3 $\frac{1}{2}$ " " "	3	2
10	2 $\frac{1}{2}$ " " "	—	—
4	Angle Girders.	4	—
34	" Brackets.	16	16
1	5" Rod.	—	—
1	Crank Handle.	—	—
1	Bush Wheel.	—	—
1	$\frac{1}{2}$ " Pinion.	—	—
1	Worm Wheel.	1	1
78	Nuts and Bolts.	48	28
6	Keys.	—	—

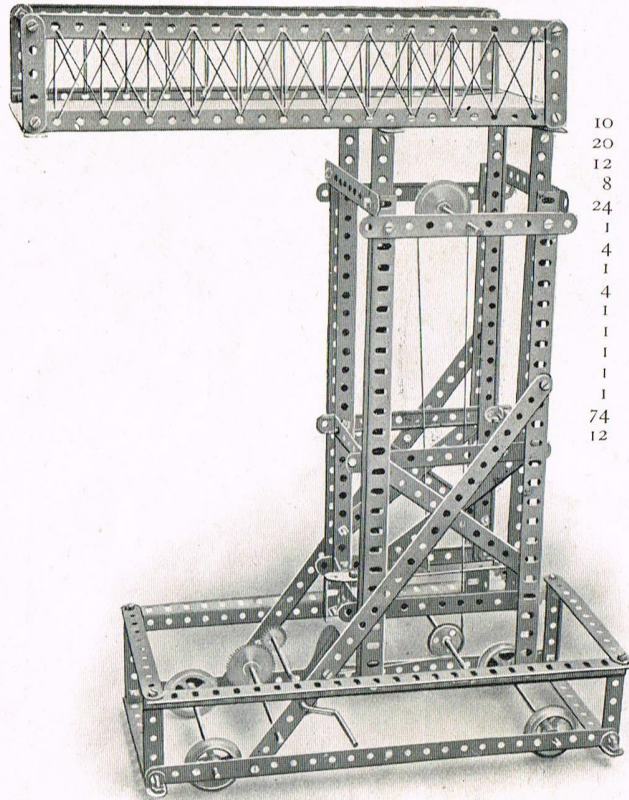


This is a fine engineering model of the highest value to the young student, and any thought and care expended on its construction will be well repaid.

The base portion containing the perpendicular axle actuated by the worm and pinion should be constructed first. This, as will be seen by the illustration, is formed by connecting three 5 $\frac{1}{2}$ " strips in alternate holes to two 2 $\frac{1}{2}$ " strips, with an angle bracket at each corner to form one side. The other side is constructed in a similar manner. These two sides are then connected together by a 2 $\frac{1}{2}$ " strip at each end, top and bottom. A 2 $\frac{1}{2}$ " strip is then connected by two angle brackets to the two bottom 5 $\frac{1}{2}$ " strips in the centre hole, and one in a similar position to the two top 5 $\frac{1}{2}$ " strips. These carry the perpendicular axle upon which the bridge swings. A $\frac{1}{2}$ " pinion is keyed to this axle, which is operated by the horizontal spindle upon which is keyed a worm wheel. The platform is constructed by connecting two angle girders in the third holes, then bending two 12 $\frac{1}{2}$ " strips and one 5 $\frac{1}{2}$ " strip to form the top side, which is connected to each end of the angle girders. This is further strengthened by attaching two 3 $\frac{1}{2}$ " strips and one 5 $\frac{1}{2}$ " strip as shown in the illustration, thus forming one side. The other side is formed similarly, and both are connected together by 5 $\frac{1}{2}$ " strips at each end. The upper platform, it will be noticed, has, besides the framework forming the continuous floor, a secondary and shorter lower framework formed by two 5 $\frac{1}{2}$ " strips connected at each end by two angle brackets. Into the centre of this lower framework is built the bush wheel upon which the platform rotates.

Fig. No. 33. Tower Wagon.

(MADE WITH MECCANO OUTFIT NO. 3 OR NO. 2 AND NO. 2A)

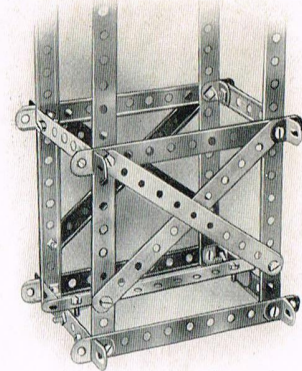


PARTS REQUIRED.

10	12 $\frac{1}{2}$ "	Perforated Strips.
20	5 $\frac{1}{2}$ "	" "
12	2 $\frac{1}{2}$ "	" "
8		Angle Girders.
24		" Brackets.
1	6"	Rod.
4	5"	Rods.
1		Crank Handle.
4		Flanged Wheels.
1	1 $\frac{1}{2}$ "	Pulley.
1	1"	" "
1	$\frac{3}{4}$ "	Pinion.
1		Gear Wheel.
1		Pawl.
74		Nuts and Bolts.
12		Keys.

Parts required in addition to Outfits

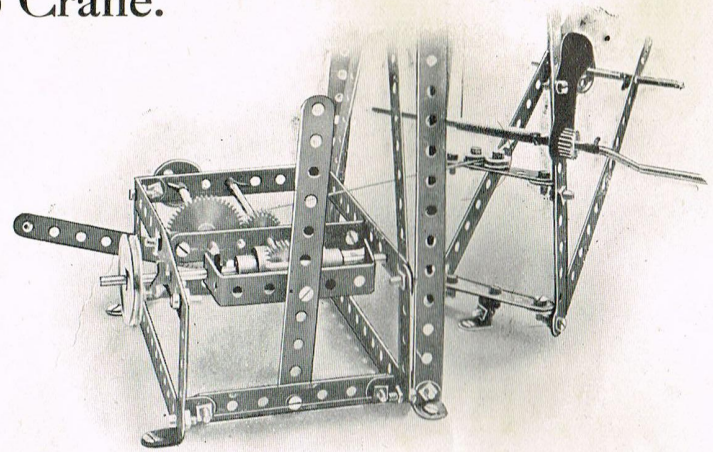
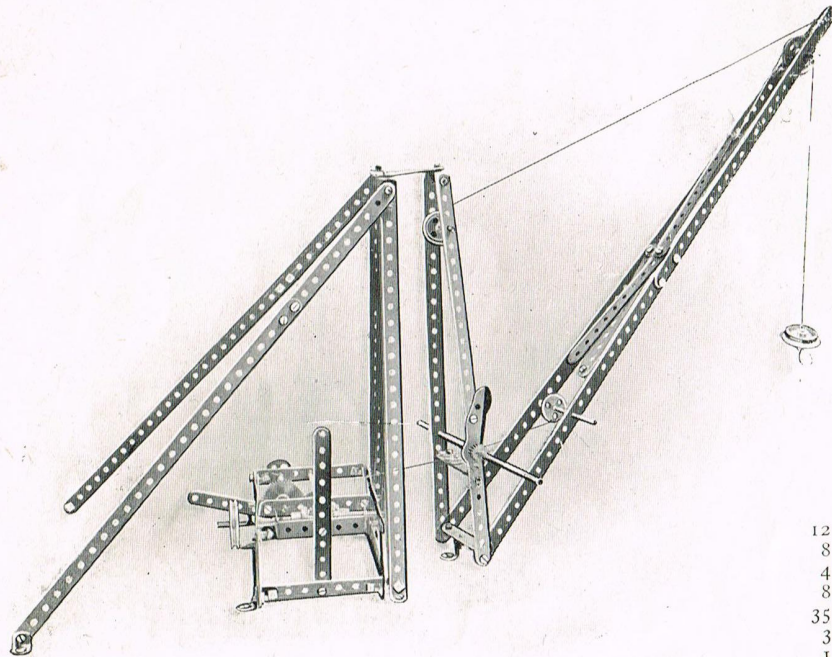
No. 1	No. 2
4	—
10	—
—	—
8	4
6	6
1	1
2	1
—	—
4	—
1	1
—	—
1	1
1	1
—	—
44	24
—	—



This is a representation of a wagon used for repairing overhead electrical wires carrying the current for street cars. Each part is shown clearly in our illustration, and little difficulty will be experienced in its construction.

Fig. No. 34. Swivelling and Luffing Jib Crane.

(MADE WITH MECCANO OUTFIT NO. 3 OR NO. 2 AND NO. 2A)



PARTS REQUIRED.		<i>Parts required in addition to Outfits</i>		PARTS REQUIRED.		<i>Parts required in addition to Outfits</i>	
		No. 1	No. 2			No. 1	No. 2
12	12 1/2" Perforated Strips.	6	2	3	1" Pulleys.	—	1
8	5 1/2" " "	—	—	2	1 1/2" " "	2	2
4	3 1/2" " "	3	2	2	3/4" Pinions.	2	2
8	2 1/2" " "	—	—	1	1 1/2" " "	—	—
35	Angle Brackets.	17	17	1	Gear Wheel.	1	1
3	5" Rods.	1	—	2	3/4" Contrites.	2	2
1	3 1/2" " "	—	—	1	Pawl.	—	—
2	2" " "	—	—	71	Nuts and Bolts.	41	21
1	Crank Handle	—	—	5	Wood Screws.	—	—
1	1 1/2" Pulley.	1	1	1	Hook.	—	—
				19	Keys.	7	1

This model is interesting as affording an example of a crane used to transport the load from, say, a ship's deck on to a quay, by "luffing" or altering the angle of the jib. The apparatus consists of two parts, a fixed frame and a swivelling and luffing jib. The construction of the fixed frame with the reversing frame and lever should present no difficulties.

The two 12 1/2" uprights are braced together as shown, and are held in vertical position by the two 12 1/2" connected to two 5 1/2" strips rearwardly sloping pieces, and from the structure so formed the reversing frame is carried.

The swivelling piece of the jib consists of two $1\frac{1}{2}$ " pieces bent as shown, connected at the bottom by a $2\frac{1}{2}$ " piece. This $2\frac{1}{2}$ " piece is provided with a screw in the centre hole, which fits in a double angle bracket screwed to the bench, and this forms the lower pivot; the upper pivot is formed with an angle bracket, having a screw, carried in the triangle formed of $2\frac{1}{2}$ " pieces attached to the fixed frame.

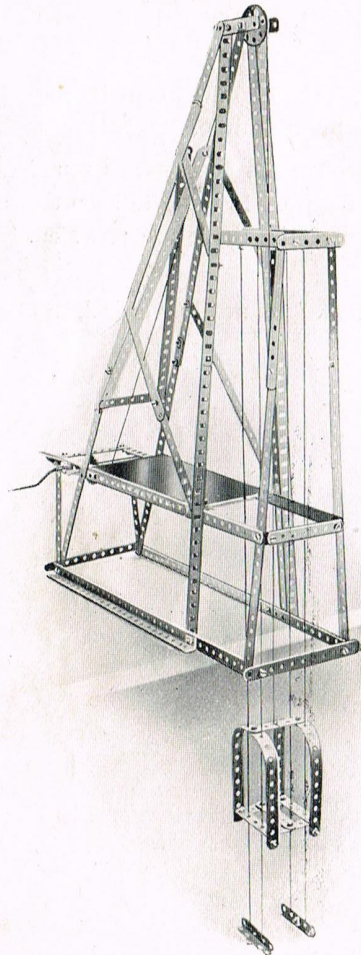
The jib itself consists of two pairs of $1\frac{1}{2}$ " pieces connected and braced together as shown. The jib luffs about its connection to the swivelling frame, and is thus capable of two motions—a swivelling motion and a luffing motion.

The luffing motion is effected by the luffing rope, which is coiled round the handle shown, and then passes round the pulley at the top of the swivelling frame, the other end being attached to the head of the jib. In order to keep the hoisting rope in position when the crane is swivelled, the two guide rollers carried on the swivelling frame are provided. These are attached by screws to two angle brackets connected with a $2\frac{1}{2}$ " piece as shown.

By operating the luffing handle the jib may be put at any angle from nearly horizontal to nearly vertical, the crane thus acting as a transporter of the load.

Fig. No. 35. Pit Headgear.

(MADE WITH MECCANO OUTFIT NO. 3 OR NO. 2 AND NO. 2A)



PARTS REQUIRED.		Parts required in addition to Outfits		PARTS REQUIRED.		Parts required in addition to Outfits	
		No. 1	No. 2			No. 1	No. 2
10	12½" Perforated Strips.	4	—	1	Crank Handle.	—	—
20	5½" " "	10	2	1	1½" Pulley.	1	1
4	3½" " "	3	2	1	¾" Pinion.	1	1
1	3" " "	1	1	1	¾" " "	—	—
10	2½" " "	—	—	1	Gear Wheel.	1	1
8	Angle Girders.	8	4	1	Pawl.	—	—
20	" Brackets.	2	2	76	Nuts and Bolts.	46	26
1	5" Rod.	—	—	6	Keys.	—	—
1	2" " "	—	—				

This is a most interesting model, showing the principle upon which minerals are raised from below the ground.

The front main uprights are formed by two angle girders overlapped in the third hole. Each of these two uprights are fastened together at the top by two angle brackets. Two 2½" strips are bolted horizontally at the top to carry the wheel over which the winding rope runs, and to connect the diagonal stays. To stiffen the structure one 5½" strip is fixed on each side connected in the eighteenth hole down on the upright, and the eleventh hole down on the stays. Two more 5½" strips are bolted together, and fastened on each side lower down.

The framework in which the cage moves is formed by connecting a 5½" strip with a 12½" strip in the fourth hole to form the uprights. These are connected by 5½" strips to the main uprights. The framework takes the same angle as the main uprights, and is connected in the front at the top by a 3" strip bolted one hole from the end on each side of the strip. The next lower down is a 3½" strip bolted at the extreme holes of the strip, and the bottom is a 5½" strip.

The cage is formed by bending two 12½" strips, and connecting them at the bottom by five 2½" strips to form the floor, and one 2½" strip to connect them at the top. The guide ropes are connected to the cross pieces at the top of the framework, passed through the holes at each side of the cage, and connected with two 2½" strips screwed to the floor.

The hoisting mechanism is operated by the crank handle, upon which is keyed a ¾" pinion engaging a gear wheel connected with the spindle over which the hoisting rope is wound.

Fig. No. 36. Level Crossing Gates.

(MADE WITH MECCANO OUTFIT NO. 3 OR NO. 2 AND NO. 2A)

*Parts required in addition
to Outfits*

PARTS REQUIRED.

18	5½" Perforated Strips.
4	3½" " "
17	2½" " "
6	Angle Girders.
32	" Brackets.
4	1" Pulley Wheels.
75	Nuts and Bolts.

No. 1	No. 2
8	—
3	2
5	1
6	2
14	14
—	2
45	25

This model, if constructed with care, is a most admirable one, as the gates are opened simultaneously by the operation of one lever.

To construct it, commence by taking two angle girders and connecting them together in the second hole at each end with a 5½" strip placed perpendicularly between them to form the supports of one pair of gates as shown in Figure A. The supports for the other pair of gates is arranged in a similar manner. These two structures are connected by two other angle girders, and braced by four 3½" cross pieces as shown in the illustration.

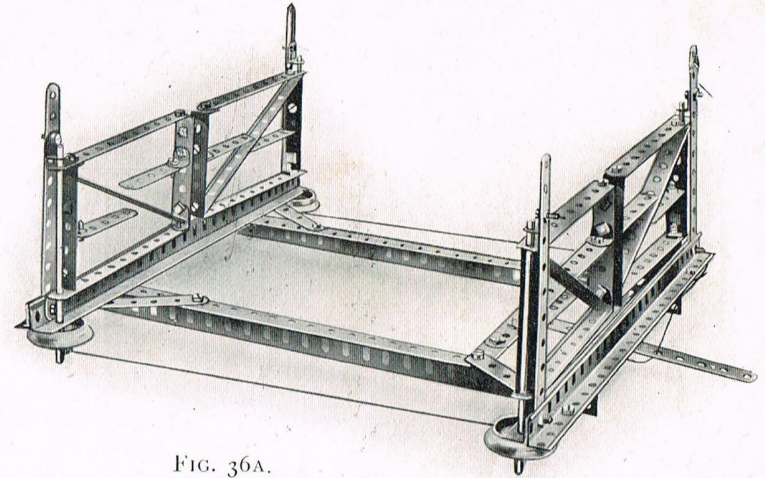


FIG. 36A.

The gates are formed by connecting two 5½" strips with a 2½" strip and angle brackets in the end holes at one side. At the other side the 2½" strip is connected in the second holes from the end to permit the axle rod to pass through upon which the gate swings.

Figure 36B is an inverted perspective view showing the arrangement of operating cord 1 which is passed from the operating lever 2, around the corner pulleys 3, and back to the lever 2. In order to obtain a better grip on the pulleys, it is desirable to wind the operating cord twice around them. It is to be noted that the cord 1 is wound in opposite directions around the diagonal pairs of pulleys 3.

Figure C is a side detail showing the method in which the operating pulley 3 is keyed upon the spindle 4 by the key 5. The gate 6 rests upon the angle bracket 7, and a pinching screw 8 is fitted in the inner side to grip it to the spindle 4, so that all rotate together.

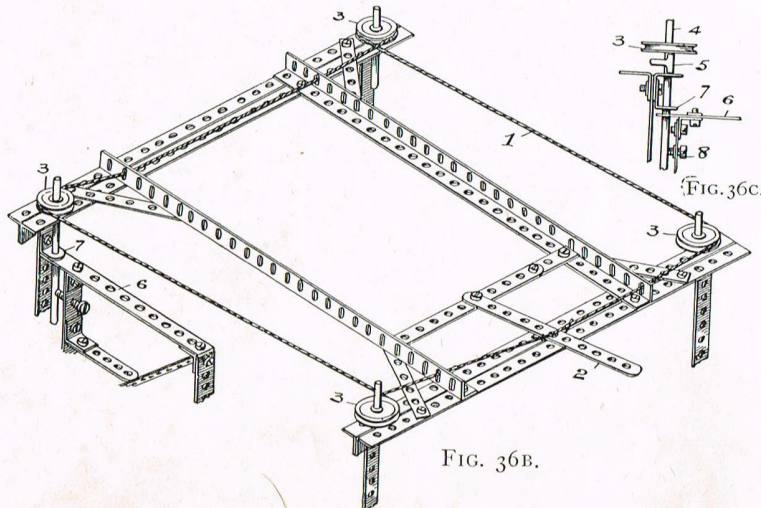


FIG. 36B.

Fig. No. 37. Fire Escape.

(MADE WITH MECCANO OUTFIT NO. 3 OR NO. 2 AND NO. 2A)

PARTS REQUIRED.		<i>Parts required in addition to Outfits</i>	
		No. 1	No. 2
2	12½" Perforated Strips.	—	—
4	5½" " "	—	—
3	3½" " "	2	1
2	3" " "	2	2
5	2½" " "	—	—
4	" Angle Girders.	4	—
25	" Brackets.	7	7
2	5" Axle Rods.	—	—
3	3½" " "	2	2
2	Crank Handles.	1	1
4	Flanged and Grooved Wheels.	4	—
3	1" Pulley Wheels.	—	1
1	½" Pulley Wheel.	1	1
2	½" Pinions.	1	1
2	Pawls.	1	1
50	Nuts and Screws.	20	—
19	Keys.	7	1

In constructing this model, take two angle girders and tie these together with 3½" strips at top and bottom. A 5½" strip is then attached at right angles to one end of the frame, diagonal stays tying these short strips to the angle brackets attached to the frame. The sliding frame is constructed from two angle girders reversed to those of the main frame, the angle girders of the sliding frame being tied together by two 2½" strips, and being retained and guided in the main carriage by the short angle brackets which act as clips. The framework of the running truck is very simply constructed, and is pivotally attached by angle brackets to the main frame.

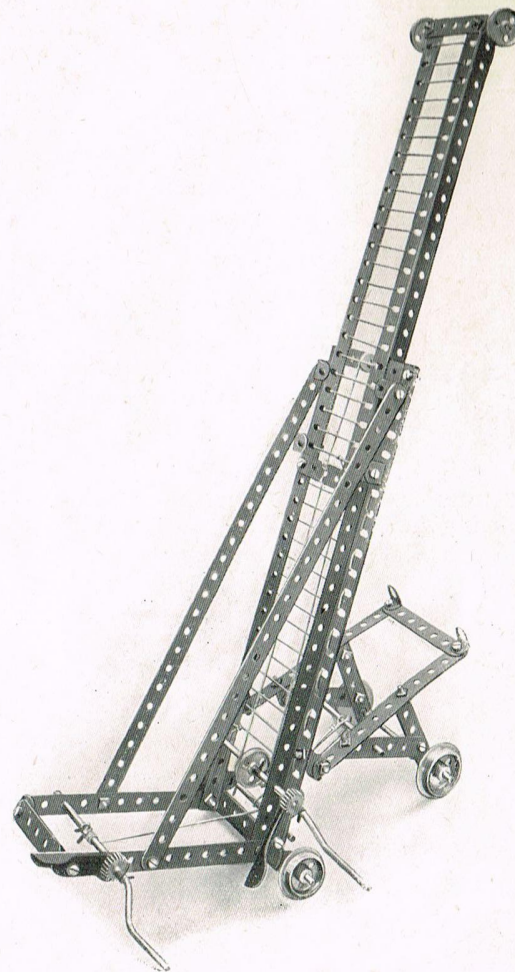
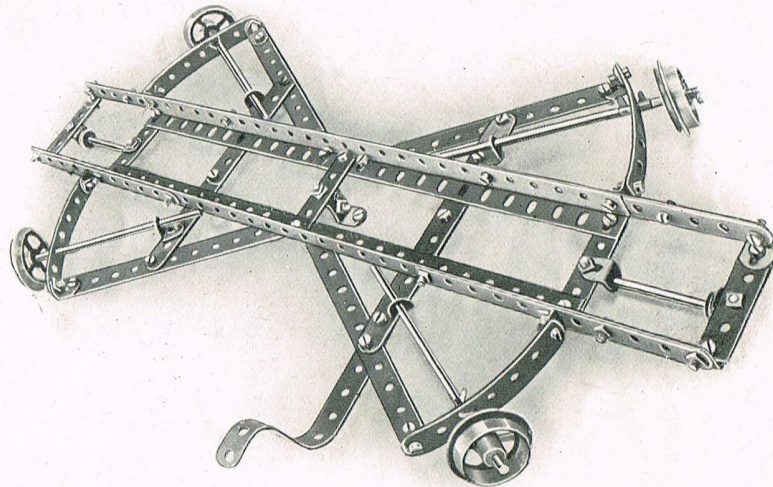
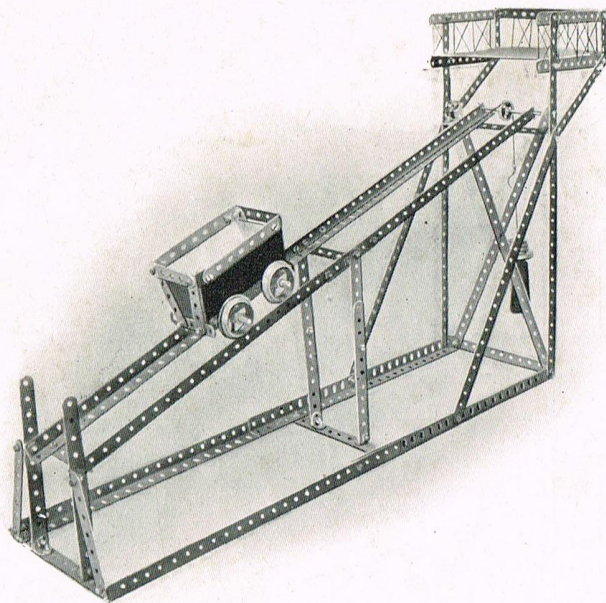


Fig. No. 38. Inclined Delivery Shoot. Fig. No. 39. Loco Turntable.

(MADE WITH MECCANO OUTFIT NO. 3 OR WITH NO. 2. AND NO. 2A)



*Parts required
in addition
to Outfits.*

PARTS REQUIRED.

PARTS REQUIRED.

*Parts required
in addition
to Outfits*

No. 1	No. 2				No. 1	No. 2
—	—	6	12½" Perforated Strips.	28	Angle Brackets.	10
9	1	19	5½" " "	2	3½" Rods.	1
5	4	6	3½" " "	4	Flanged Wheels.	4
2	2	2	3½" " "	1	Pulley Wheel	—
—	—	12	2½" " "	50	Nuts and Bolts.	50
8	4	8	Angle Girders	1	Hook.	—
				8	Keys.	—

The model furnishes an illustration of the inclined plane. The loading platform at the extreme right delivers a load into the truck, which, being now heavier than the balance weight, runs down the incline, and when at the bottom discharges its load by tipping. The weight immediately overcoming the empty truck returns it quickly to the loading platform.

*Parts required
in addition
to Outfits.*

PARTS REQUIRED.

PARTS REQUIRED.

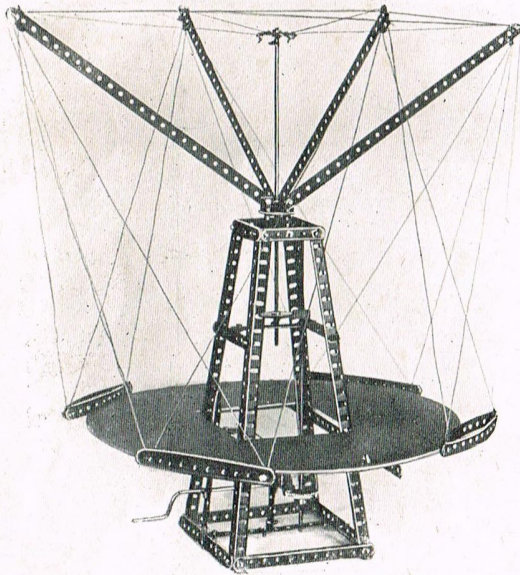
*Parts required
in addition
to Outfits*

No. 1	No. 2			No. 1	No. 2
3	—	9	5½" Perforated Strips.	4	5" Rods.
5	4	6	3½" " "	2	2" " "
2	2	2	3" " "	4	Flanged Wheels.
—	—	9	2½" " "	2	½" Pulley Wheels.
2	—	2	Angle Girders.	61	Nuts and Bolts.
4	4	22	" Brackets	12	Keys.

This is an extremely simple yet interesting model to construct. The shafts carrying the running wheels are disposed so as to converge to the central bolt in the middle cross-bar of the apparatus, so that it may rotate accurately thereon, and the short shafts parallel to the track rails are each provided with small pulleys to take the weight of the train as it enters upon the turntable.

Fig. No. 40. Flying Machine.

(MADE WITH MECCANO OUTFIT
No. 4 OR No. 3 AND No. 3A)



PARTS REQUIRED.		<i>Parts required in addition to Outfits.</i>		
		No. 1	No. 2	No. 3
8	12½" Perforated Strips.	2	—	—
15	5½" " "	5	—	—
3	3½" " "	2	1	—
4	2½" " "	—	—	—
4	Angle Girders.	4	—	—
18	" Brackets.	—	—	—
2	11½" Rods.	2	1	1
1	Crank Handle.	—	—	—
2	Bush Wheels.	1	1	1
2	¾" Pinions.	2	2	—
1	Gear Wheel.	1	1	—
1	1½" Contrite.	1	1	1
72	Nuts and Bolts.	42	22	—
4	Wood Screws.	—	—	—
8	Keys.	—	—	—

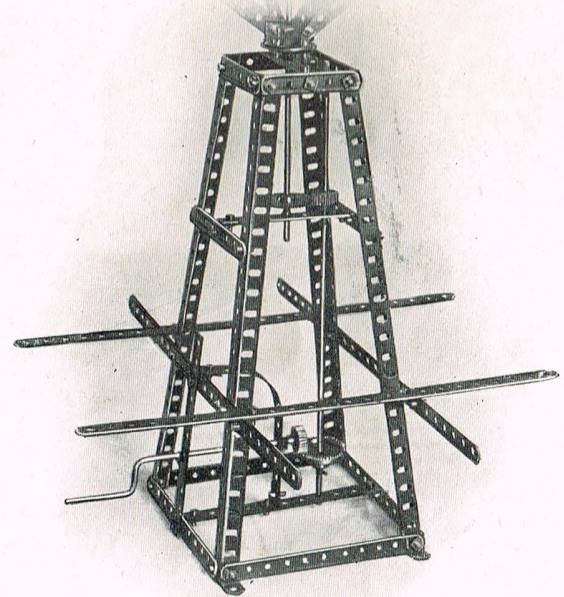


FIG. 40A.

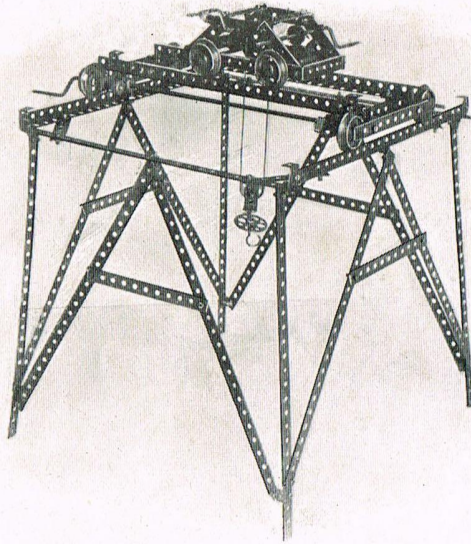
Most boys will have seen the Maxim Flying Machine at work, and will hardly fail to be interested in constructing a working model of it.

The main frame is composed of four angle girders connected at the bottom by four 5½" strips and at the top by four 2½" strips. Across the centre at the top of the frame is connected a 2½" strip, and a 3½" strip is attached on opposite sides in the ninth hole down connected in the centre of each of these by another 3½" strip. This transverse 2½" and 3½" strip carry the perpendicular spindle upon which the upper structure revolves. A bush wheel is keyed to this spindle to support the four arms, which are attached by four angle brackets. The outer ends of the arms are supported by means of tie rods formed of string to a bush wheel keyed on the top of the spindle, and the boats are connected to these by string arranged as shown in the illustration. The platform is supported by four 12½" strips as shown in Figure 40A.

Figure 40A also illustrates the manner of constructing the mechanism to operate the model.

Fig. No. 41. Travelling Crane.

(MADE WITH MECCANO OUTFIT NO. 4 OR NO. 3 AND NO. 3A)



*Parts required
in addition
to Outfits.*

No. 1	No. 2	No. 3	PARTS REQUIRED.	
8	4	2	14	12 1/2" Perforated Strips
—	—	—	10	5 1/2" " "
4	4	2	4	3" " "
—	—	—	8	2 1/2" " "
4	—	—	4	Angle Girders.
16	16	—	34	" Brackets.
1	—	—	1	1 1/2" Rod.
—	—	—	2	5" " "
1	1	—	3	2" " "
2	2	1	3	Crank Handles.

*Parts required
in addition
to Outfits.*

PARTS REQUIRED.		No. 1	No. 2	No. 3
8	Flanged Wheels.	8	4	4
1	1" Pulley.	—	—	—
1	Bush Wheel.	—	—	—
1	3/4" Pinion.	1	1	—
5	1/2" " "	4	4	4
1	Gear Wheel.	1	1	—
1	Pawl.	—	—	—
82	Nuts and Bolts.	52	32	2
1	Hook.	—	—	—
18	Keys.	6	—	—

Separate views are given of three distinct parts composing the travelling crane. The first view, Fig. 41A, shows the braced gantry structure carrying a rail at each side. The two pairs of running wheels in the travelling gantry, Fig. 41B, must be keyed on the small axles, so as to fit the gauge of these rails. The gantry is caused to travel to and fro on these rails by rotating the cranked axle. The winch, Fig. 41C, again, is arranged to run on the gantry rails of Fig. 41B, and is provided with a hoisting axle, and one for traversing the winch.

Fig. 41 shows a general arrangement of the complete model.

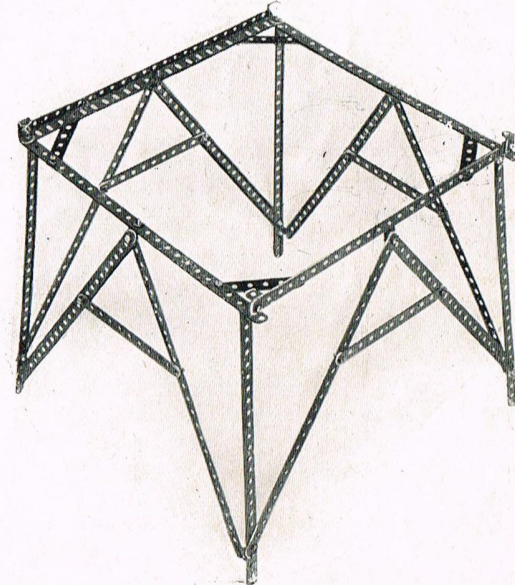


FIG. 41A.

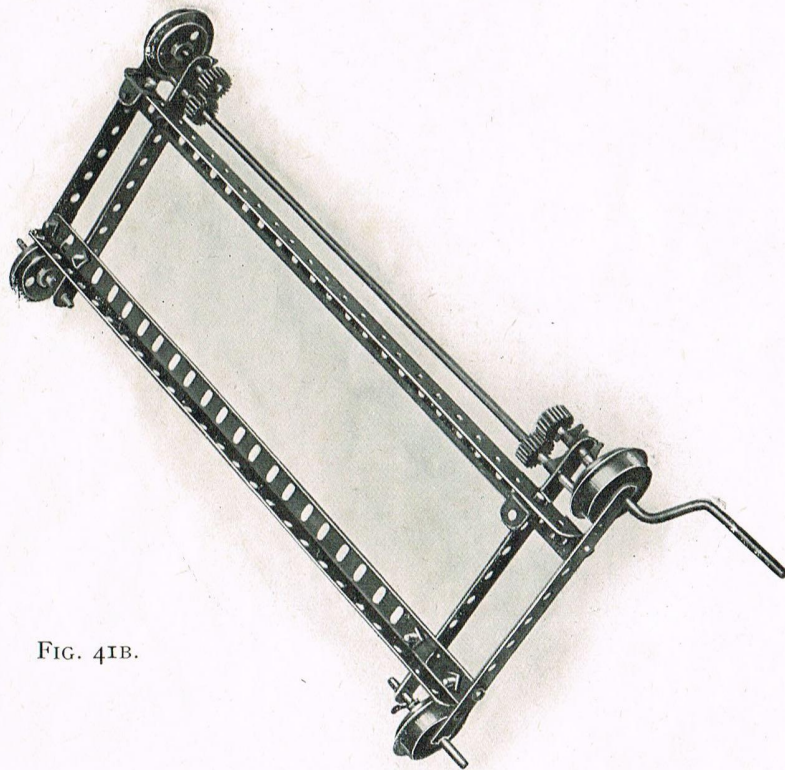


FIG. 41B.

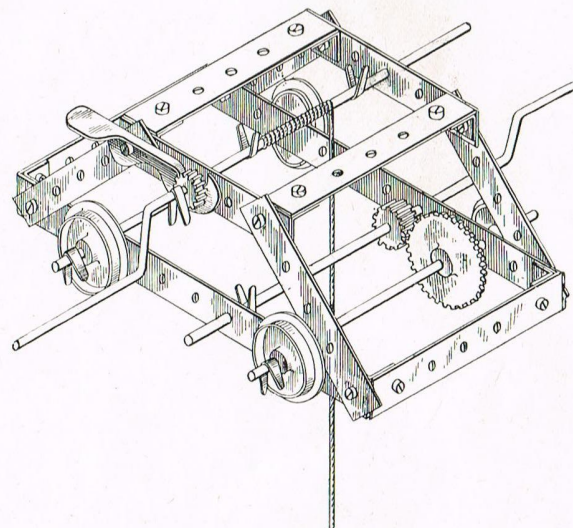
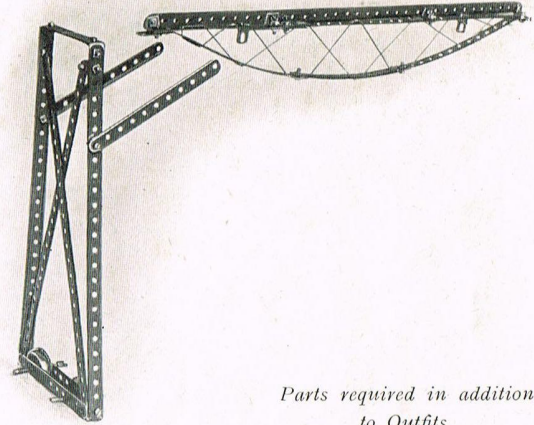
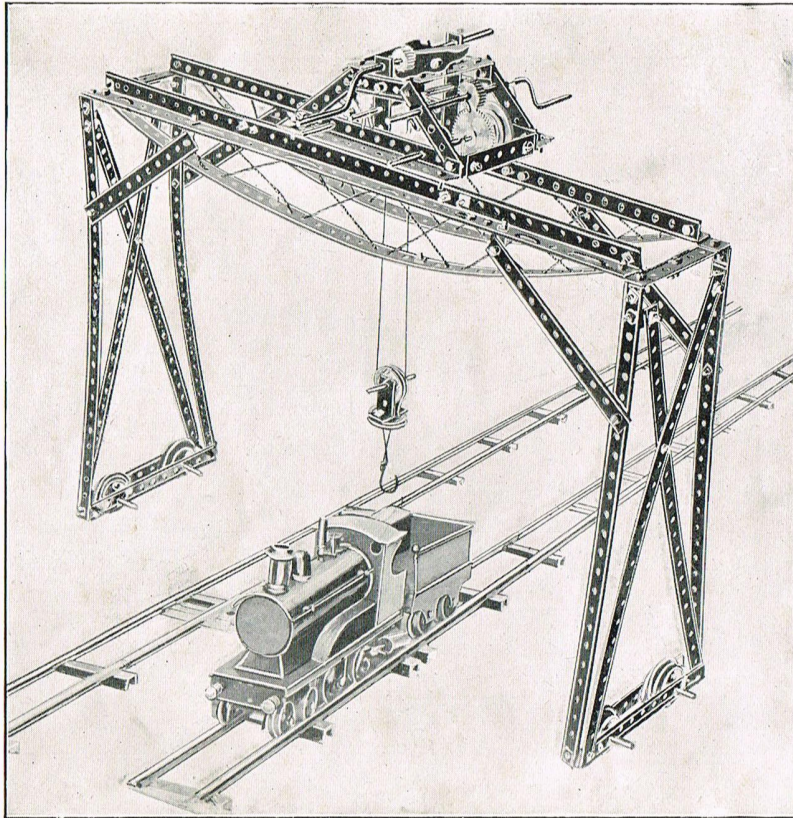


FIG. 41C.

Fig. No. 42. Travelling Crane.

(MADE WITH MECCANO OUTFIT NO. 4 OR NO. 3 AND NO. 3A)



*Parts required in addition
to Outfits.*

PARTS REQUIRED.		No. 1	No. 2	No. 3
18	12 1/2" Perforated Strips.	12	8	6
14	5 1/2" " "	4	—	—
2	3 1/2" " "	1	—	—
14	2 1/2" " "	2	—	—
40	Angle Brackets.	22	22	—
3	5" Rods.	1	—	—
5	2" " "	3	3	2
2	Crank Handles.	1	1	—
8	Flanged Wheels.	8	4	4
2	1" Pulleys.	—	—	—
2	3/4" Pinions.	2	2	—
1	1 1/2" " "	—	—	—
2	Gear Wheels.	2	2	1
1	Pawl.	—	—	—
88	Nuts and Bolts.	58	38	8
1	Hook.	—	—	—
20	Keys.	8	2	—

This is a model of a crane used in large engineering works, or in places where heavy loads are to be conveyed from one place to another.

The construction of the gantry should be proceeded with first. The side frames, both of which are identical, are formed by taking two $12\frac{1}{2}$ " strips, and bolting two angle brackets together at each of their lower ends ; connect these with a $5\frac{1}{2}$ " strip on the inner side. With a similar $5\frac{1}{2}$ " strip on the outer side connect with the same screws two $12\frac{1}{2}$ " strips to form the diagonal braces, the upper ends being connected by angle brackets to the side pieces. These are screwed at the middle where they cross.

The flanged wheels bearing the gantry are supported by 2" pieces of shafting, and threaded through the third hole in the lower strip, and keyed. The tops of the side strips are connected by a $3\frac{1}{2}$ " strip.

To form the top girder, commence by constructing one side first. This is done by placing a $12\frac{1}{2}$ " and a $5\frac{1}{2}$ " strip end to end and backing these by a $5\frac{1}{2}$ " and $12\frac{1}{2}$ " strip, so that they break joint. These are bolted together to form the upstanding ridge. The flat strip completing this angle piece is made up of a $12\frac{1}{2}$ " and $5\frac{1}{2}$ " strip placed end to end, and bolted by angle brackets to the upstanding ridge. The curved lower strip is formed of two $12\frac{1}{2}$ " strips overlapped at the centre, and bolted together ; the ends of the curved strip being bolted to the angle bars in the second hole from the ends so as to leave a clear hole in the curved strip projecting, for attaching it to the top of the side frame. The other side of the girder is similarly constructed.

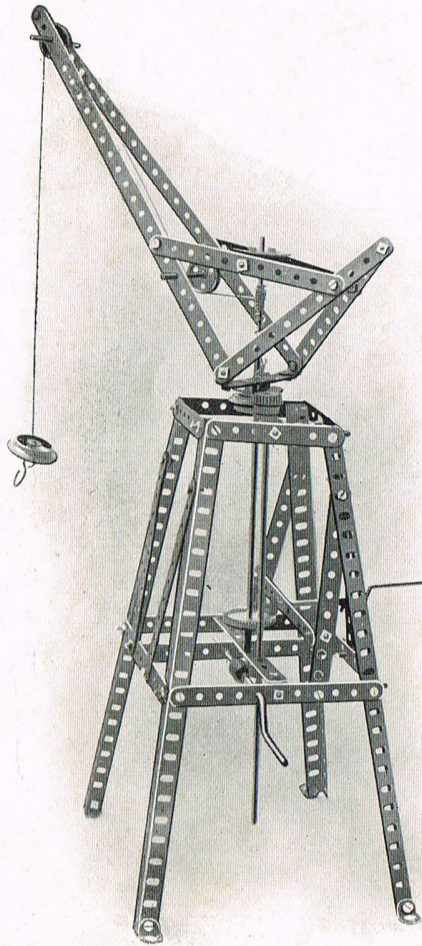
$5\frac{1}{2}$ " strips are used to connect the sides of the gantry diagonally with the girder.

Fig. No. 43. Elevated Jib Crane.

(MADE WITH MECCANO OUTFIT NO. 4 OR NO. 3 AND NO. 3A)

*Parts required in addition
to Outfits.*

PARTS REQUIRED.		No. 1	No. 2	No. 3
2	12½" Perforated Strips.	—	—	—
15	5½" " "	5	—	—
6	3½" " "	5	4	—
2	2½" " "	—	—	—
4	Angle Girders.	4	—	—
16	" Brackets.	—	—	—
2	11½" Rods.	2	1	1
1	3½" "	—	—	—
1	2" "	—	—	—
2	Crank Handles.	1	1	—
2	1" Pulleys.	—	—	—
1	¾" Pinion.	1	1	—
1	½" "	—	—	—
1	Gear Wheel.	1	1	—
1	1½" Contrite,	1	1	1
1	Worm Wheel.	1	1	—
63	Nuts and Bolts.	33	13	—
1	Hook.	—	—	—
13	Keys.	1	—	—



The general construction of this crane will be understood from the photograph, Fig. 43, which shows the different parts of the structure assembled ready for use. The details of the hoisting and swivelling gear are shown in the separate views, Fig. 43A and Fig. 43B.

It is desirable that the model should be fixed in position, and for this purpose the four angle brackets at the bottom of the up-rights are provided. These may be attached by screwing to a wood base, as shown in Fig. 43, or where no damage is likely to result they may be screwed directly to a bench or the like.

The main frame on which the jib rests is composed of four angle girders forming the main uprights, braced together by four 3½" strips at the top, and four 5½" strips at the fourteenth hole down. The structure is further stiffened by 5½" strips placed diagonally as shown in Fig. 43.

The hoisting arrangement is operated by the upper handle, upon which is keyed a $\frac{1}{2}$ " pinion, engaging a $1\frac{1}{2}$ " contrite wheel keyed on to the centre spindle. One end of the winding rope is carried under a 1" pulley on the jib and fastened to the spindle, so that by turning the handle the rope is wound round the spindle, and the load raised.

The mechanism for swinging the jib is operated by the lower handle, upon which is fixed a worm wheel geared into a $\frac{1}{2}$ " pinion keyed to a second spindle. On the upper end of this spindle is keyed a $\frac{3}{4}$ " pinion engaging a gear wheel bolted securely to the base of the jib, but revolving freely on the centre spindle. Between the gear wheel and a $3\frac{1}{2}$ " strip fastened across the top of the pedestal is a flanged wheel which raises the gear wheel high enough to engage the $\frac{3}{4}$ " pinion as shown in Fig. 43B.

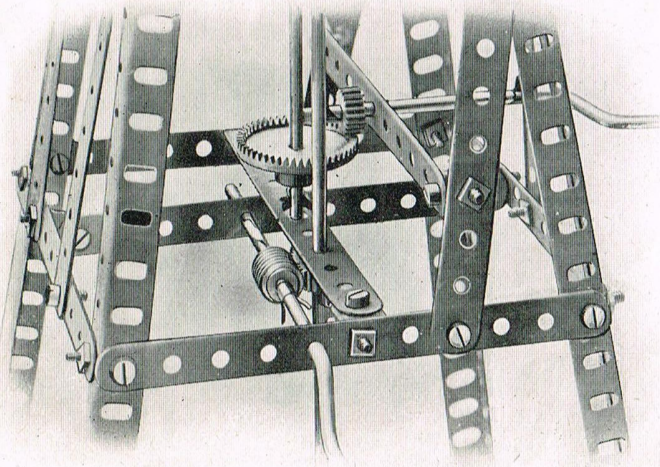


FIG. 43A

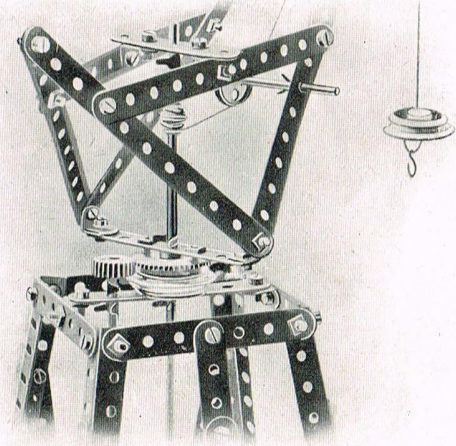
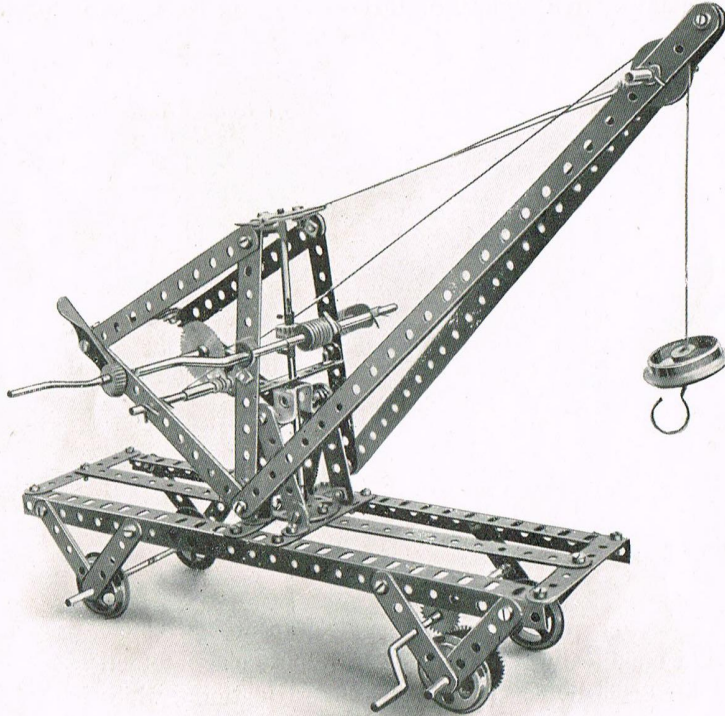


FIG. 43B

Fig. No. 44. Trolley Crane.

(MADE WITH MECCANO OUTFIT No. 4 OR
No. 3 AND No. 3A)



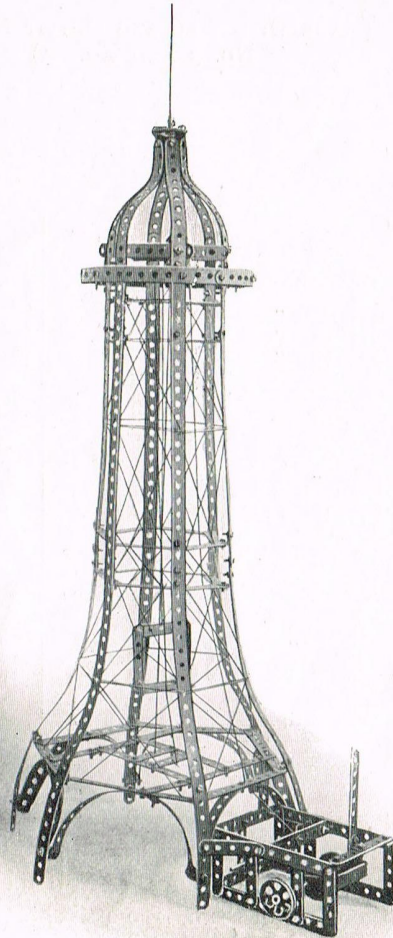
*Parts required in addition
to Outfits.*

PARTS REQUIRED.	No. 1		
	No. 1	No. 2	No. 3
3 12 $\frac{1}{2}$ " Perforated Strips.	—	—	—
6 5 $\frac{1}{2}$ " " "	—	—	—
4 3 $\frac{1}{2}$ " " "	3	2	—
15 2 $\frac{1}{2}$ " " "	3	—	—
2 Angle Girders.	2	—	—
16 " Brackets.	—	—	—
1 6" Rod.	1	1	—
2 5" Rods.	—	—	—
1 3 $\frac{1}{2}$ " Rod.	—	—	—
1 2 $\frac{1}{2}$ " "	—	—	—
3 Crank Handles.	2	2	1
5 Flanged Wheels.	5	1	1
1 1" Pulley Wheel.	—	—	—
1 Bush Wheel.	—	—	—
1 3" Pinion Wheel.	1	1	—
2 1 $\frac{1}{2}$ " " Wheels.	1	1	1
1 Gear Wheel.	1	1	—
1 Worm "	1	1	—
1 Pawl.	—	—	—
51 Nuts and Bolts.	21	1	—
17 Keys.	5	—	—
1 Bent Strip.	1	—	—

THE remaining models up to No. 61 represent some of the finest achievements in the engineering world. It would be impossible for us to give here a detailed description or full instructions how to erect them. If the student has made up all our previous models, he will have no particular difficulty with any one of them. To assist him, we have had our illustrations made on as large a scale as possible, showing every little detail.

Fig. No. 50. Tower.

(MADE WITH MECCANO OUTFIT NO. 5 OR NO. 4 AND NO. 4A)



PARTS REQUIRED.

13	12 1/2"	Perforated Strips.
28	5 1/2"	" "
6	3 1/2"	" "
13	3"	" "
40	2 1/2"	" "
82		Angle Brackets.
4	5"	Rods.
1	2"	Rod
2	1 1/2"	Pulleys.
1		Bush Wheel.
1	3/4"	Pinion.
1	1 1/2"	" "
2	1 1/2"	Contrites.
1		Worm Wheel.
188		Nuts and Bolts.
12		Keys.

Parts required in addition to Outfits.

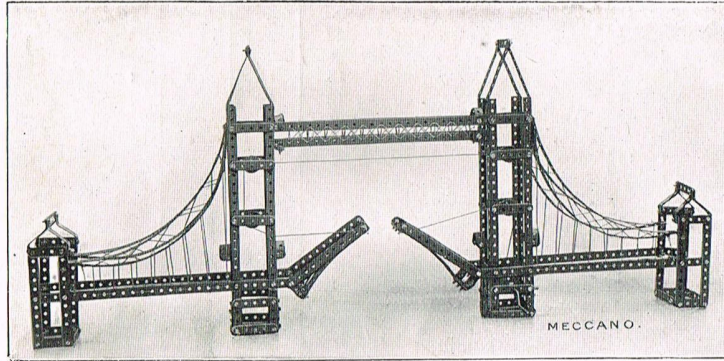
No. 1	No. 2	No. 3	No. 4
7	3	1	—
18	10	7	—
5	4	—	—
13	13	11	9
28	24	16	12
64	64	37	28
3	1	—	—
—	—	—	—
2	2	1	1
—	—	—	—
1	1	—	—
—	—	—	—
2	2	2	1
1	1	—	—
158	138	108	66
—	—	—	—

A few particulars may be given regarding the construction of the main features of this model without going into details.

Begin by constructing the lowest platform, which is made by bolting together six 5 1/2" strips to form a hexagon, attaching at the same time an angle bracket to each corner. In the same way make a higher platform of six 3" strips. The main upright corner strips forming the tower are then bolted to these angle brackets, care being taken to bend the strips so as to follow the curvature indicated in the illustration.

Fig. No. 51. Tower Bridge.

(MADE WITH MECCANO OUTFIT NO. 5 OR NO. 4 AND NO. 4A)



PARTS REQUIRED.

*Parts required in
addition to Outfits.*

No. 1 No. 2 No. 3 No. 4

35	12½"	Perforated Strips.	29	25	23	15
28	5½"	"	18	10	7	—
66	2½"	"	54	50	42	38
8	2"	"	8	8	8	8
92		Angle Brackets.	74	74	47	38
5	3½"	Rods.	4	4	2	2
1		Crank Handle.	—	—	—	—
4	1"	Pulleys.	—	2	1	—
1	½"	Pinion.	—	—	—	—
1		Worm Wheel.	1	1	—	—
214		Nuts and Bolts.	184	164	134	92
16		Wood Screws.	11	11	4	4
15		Keys.	3	—	—	—

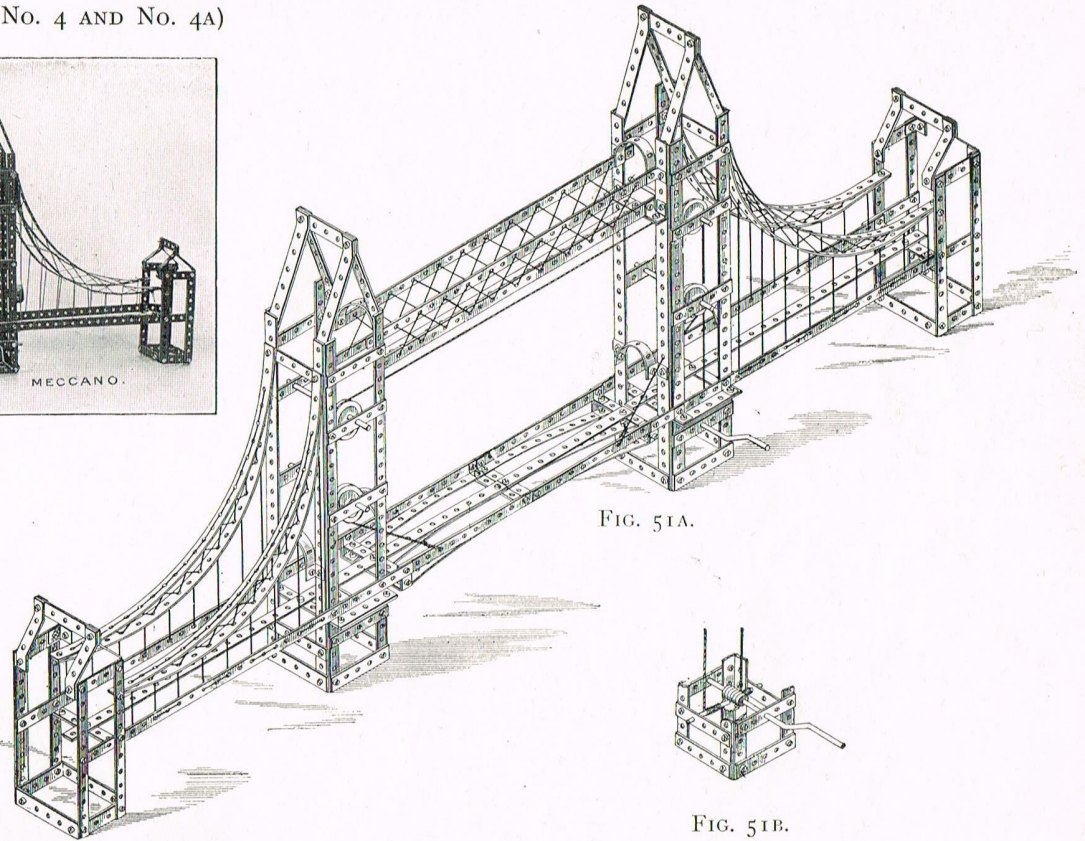


FIG. 51A.

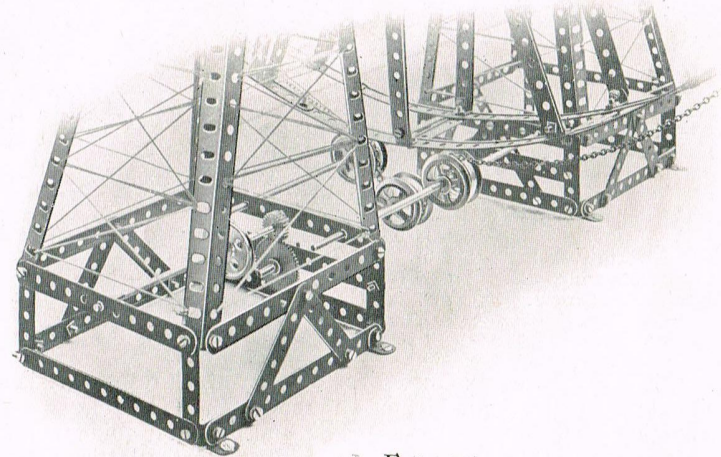
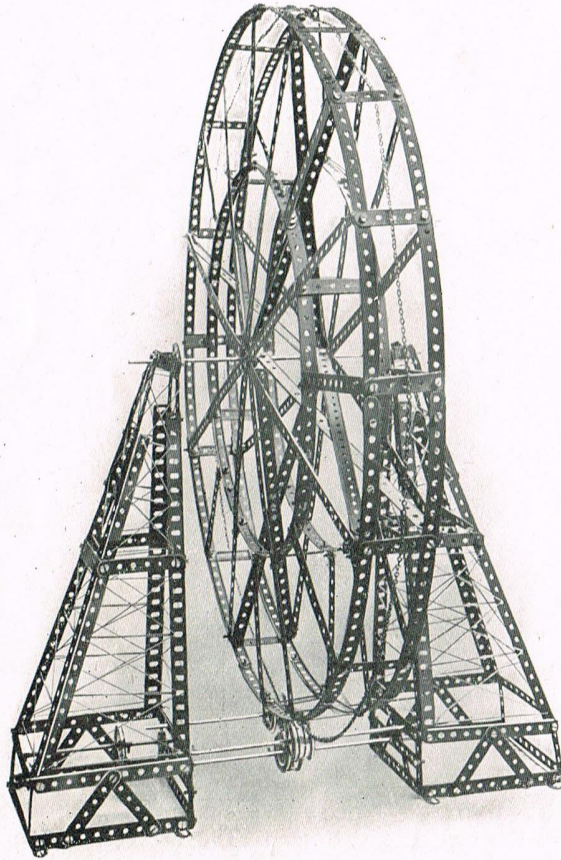
FIG. 51B.

The two sides of this model are alike in every respect, except the gear for raising the bascules, which consists of a worm and pinion, operated by a cranked axle as shown, and is located in the right one of the two central towers. The two cords for operating the bascule are wound on the same axle, and pass over guide pulleys in the towers. The suspension rods are imitated by lacing cords from the lower side strips to the curved strips, the lattice work on the sides of the upper gangway being similarly done with cord.

Fig. 51A shows the details of construction, Fig. 51B the details of the hoisting gear, and Fig. 51C is a photograph of the complete structure.

Fig. No. 52. Big Wheel.

(MADE WITH MECCANO OUTFIT NO. 5 OR NO. 4 AND NO. 4A)



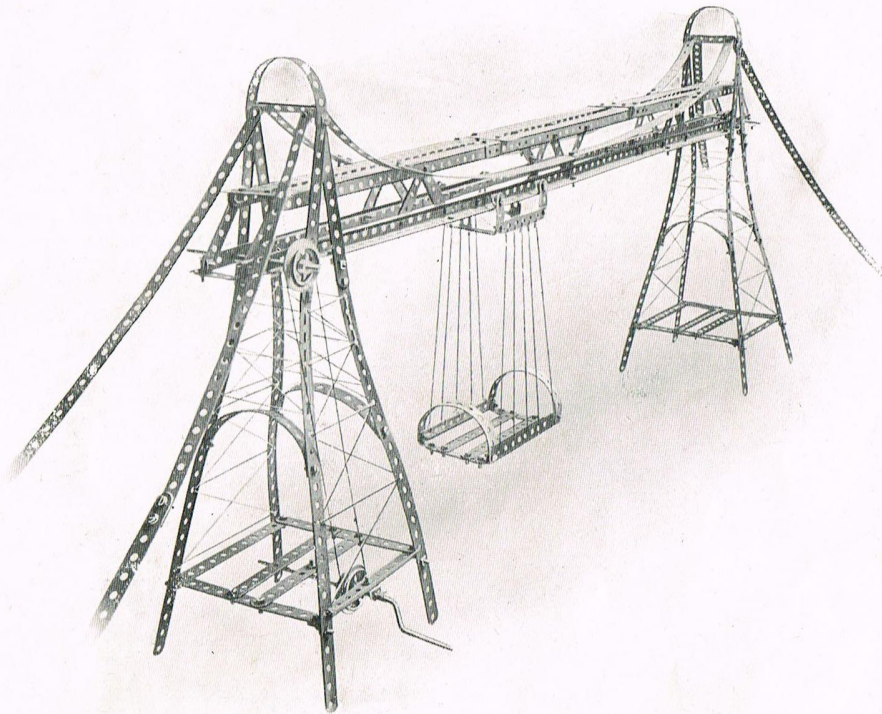
*Parts required in addition
to Outfits.*

PARTS REQUIRED.		No. 1	No. 2	No. 3	No. 4
46	12½" Perforated Strips.	40	36	34	26
38	5½" " "	28	20	17	10
4	3½" " "	3	2	—	—
18	3" " "	18	18	16	14
26	2½" " "	14	10	2	—
8	Angle Girders.	8	4	—	—
96	" Brackets.	78	78	51	42
4	11½" Rods.	4	3	3	2
1	6" Rod	1	1	—	—
6	Flanged Wheels.	6	2	2	—
1	1½" Pulley.	1	1	—	—
4	Bush Wheels.	3	3	3	3
1	¾" Pinion.	1	1	—	—
1	Gear Wheel.	1	1	—	—
268	Nuts and Bolts.	238	218	188	146
23	Keys.	11	5	1	—
1	Length of Chain.	1	1	1	1
8	Wood Screws.	3	3	—	—

FIG. 52A.

Fig. No. 53. Transporter Bridge.

(MADE WITH MECCANO OUTFIT NO. 5 OR NO. 4 AND NO. 4A)



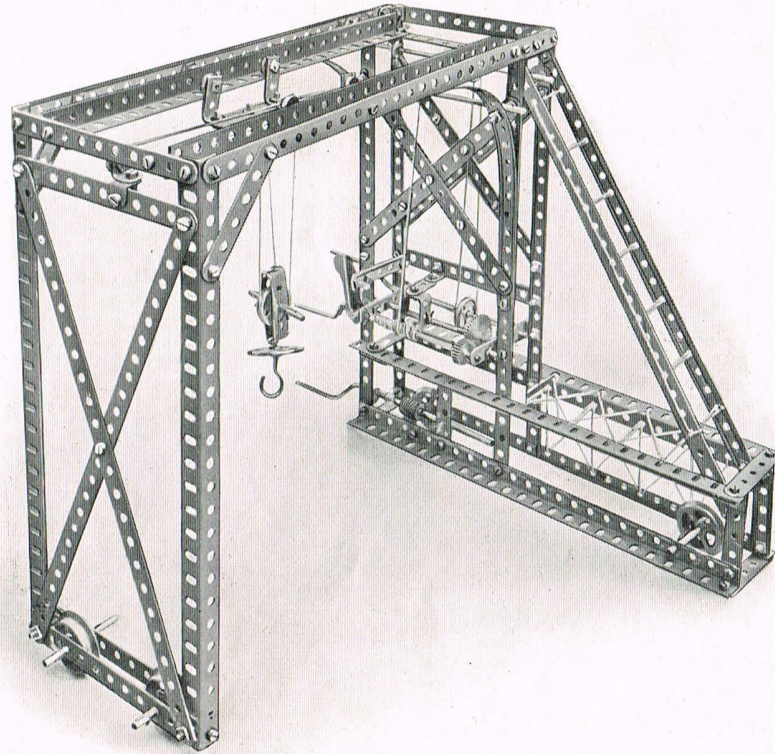
PARTS REQUIRED.

*Parts required in addition
to Outfits.*

		No. 1	No. 2	No. 3	No. 4
20	12 $\frac{1}{2}$ "	14	10	8	—
38	5 $\frac{1}{2}$ "	28	20	17	10
2	3 $\frac{1}{2}$ "	1	—	—	—
33	2 $\frac{1}{2}$ "	21	17	9	5
12		12	8	4	4
32		14	14	—	—
1	5"	—	—	—	—
1	3 $\frac{1}{2}$ "	—	—	—	—
1		—	—	—	—
2	1 $\frac{1}{2}$ "	2	2	1	1
2	1"	—	—	—	—
4	$\frac{1}{2}$ "	4	4	2	2
167		137	117	87	45
7		—	—	—	—

Fig. No 54. Travelling Gantry.

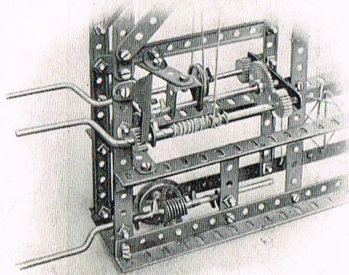
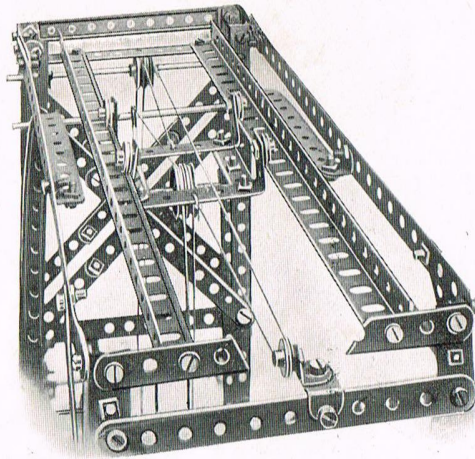
(MADE WITH MECCANO OUTFIT NO. 5 OR NO. 4 AND NO. 4A)



A most interesting Model to the student of mechanics. If carefully constructed the mechanism will be found to work with the utmost precision and smoothness, and much instruction can be gained by a study of its parts.

The construction is quite straightforward, and hardly needs any description. Care should be taken as to the construction of the clutch mechanism, which is clearly shown in the illustration.

As regards the Cord for operating the travelling carriage, care must be taken to wind this Cord twice around the pulley on the spindle of the traversing handle.



PARTS REQUIRED.

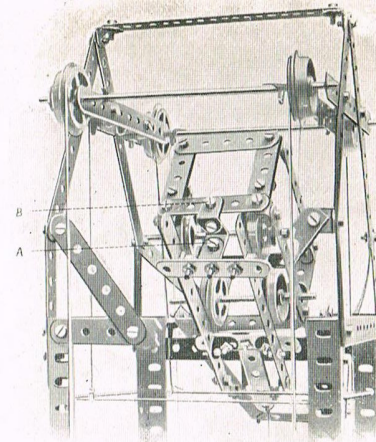
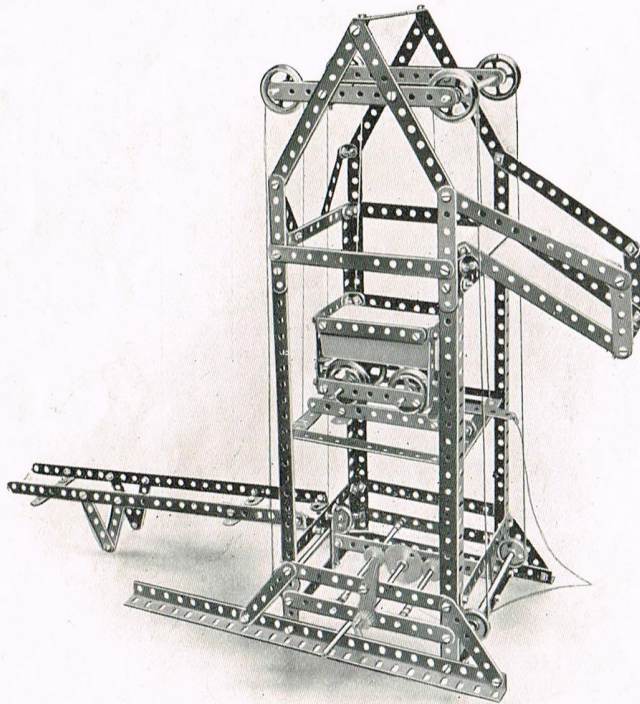
12	12 1/2"	Perforated Strips.
15	5 1/2"	" "
4	3"	" "
13	2 1/2"	" "
8		Angle Girders.
29		Angle Brackets.
2	6"	Rods.
1	5"	Rod.
6	2"	Rods.
3		Crank Handles.
4		Flanged and Grooved Wheels.
6	1"	Pulleys.
6	1/2"	" "
1		Bush Wheel.
2	3/4"	Pinion Wheels.
2	1/2"	" "
1		Gear Wheel.
1		Worm Wheel.
125		Nuts and Screws.
1		Pawl.
1		Hook.
31		Keys.

*Parts required in addition
to the following Outfits.*

No. 1	No. 2	No. 3	No. 4
6	2	—	—
5	—	—	—
4	—	—	—
1	—	—	—
8	4	—	—
11	11	—	—
2	2	1	—
—	—	—	—
5	4	3	1
2	2	1	—
4	—	—	—
—	4	3	2
6	6	4	4
—	—	—	—
2	2	—	—
1	1	1	—
1	1	—	—
1	1	—	—
95	75	45	3
—	—	—	—
—	—	—	—
18	12	8	2

Fig. No. 55. Coal Tip.

(MADE WITH MECCANO OUTFIT
NO. 5, OR NO. 4 AND NO. 4A)



PARTS REQUIRED.

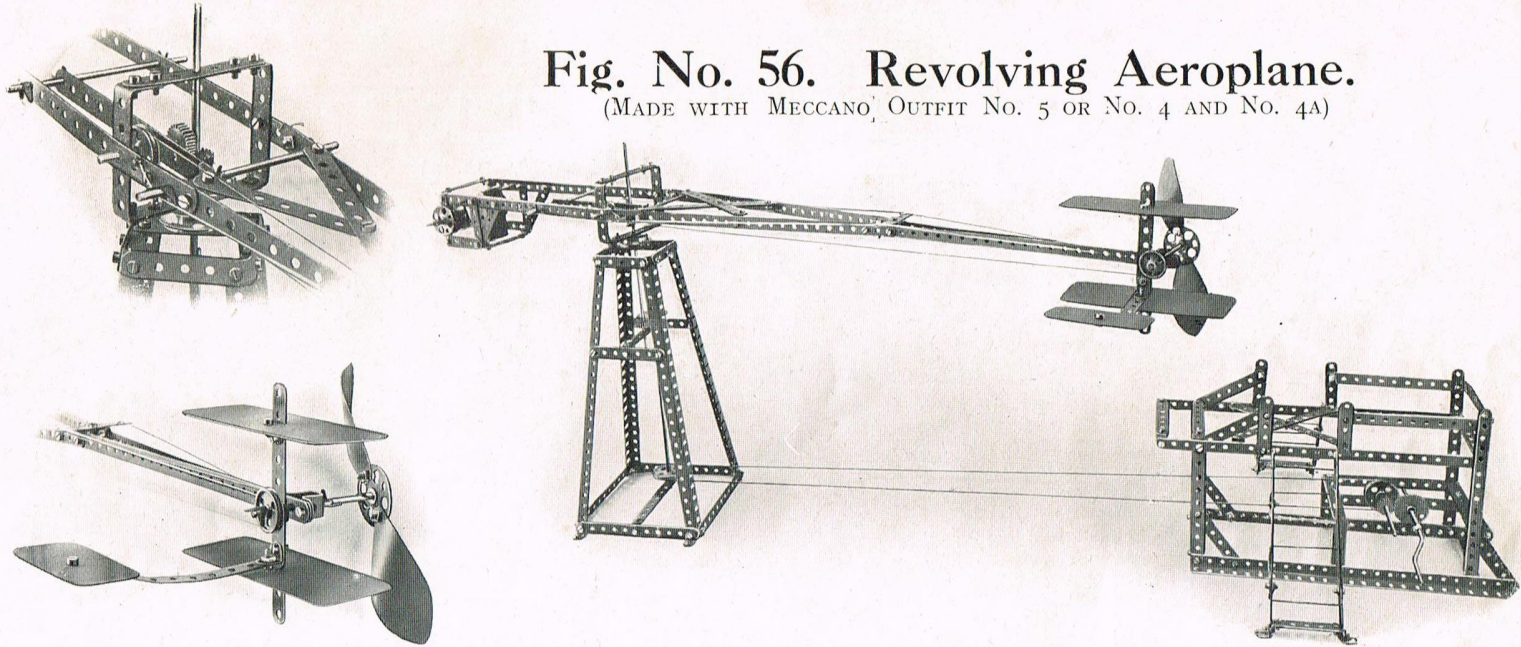
2	12 1/2"	Perforated Strips.
34	5 1/2"	" "
8	3 1/2"	" "
6	3"	" "
20	2 1/2"	" "
6		Angle Girders.
53		" Brackets.
4	6"	Rods.
3	5"	" "
2	3 1/2"	" "
1		Crank Handle.
8		Flanged Wheels.
4	1"	Pulley "
2	3/4"	Pinion "
1	1/2"	" "
1		Gear Wheel.
1		Pawl.
149		Nuts and Bolts.
23		Keys.

*Parts required in addition
to Outfits*

No. 1	No. 2	No. 3	No. 4
—	—	—	—
24	16	13	6
7	6	2	2
6	6	4	2
8	4	—	—
6	2	—	—
35	35	8	—
4	4	3	2
1	—	—	—
1	1	—	—
—	—	—	—
8	4	4	—
—	2	1	—
2	2	—	—
—	—	—	—
1	1	—	—
—	—	—	—
119	99	69	27
11	5	1	—

Fig. No. 56. Revolving Aeroplane.

(MADE WITH MECCANO, OUTFIT NO. 5 OR NO. 4 AND NO. 4A)



Parts required in addition to Outfits

PARTS REQUIRED.		No. 1	No. 2	No. 3	No. 4
8	12 1/2" Perforated Strips.	2	—	—	—
25	5 1/2" " "	15	7	4	—
15	3 1/2" " "	14	13	9	9
6	3" " "	6	6	4	2
26	2 1/2" " "	14	10	2	—
6	Angle Girders.	6	2	—	—
54	Angle Brackets.	36	36	9	—
2	1 1/2" Rods.	2	1	1	—
4	5" " "	2	1	—	—
2	3 1/2" " "	1	—	—	—
1	2" " "	—	—	—	—

Parts required in addition to Outfits

PARTS REQUIRED.		No. 1	No. 2	No. 3	No. 4
1	Crank Handle.	—	—	—	—
1	Flanged Wheel.	1	—	—	—
1	1 1/2" Pulley Wheel.	1	1	—	—
3	1" " "	—	1	—	—
1	Bush Wheel.	—	—	—	—
3	3/4" Pinions.	3	3	1	1
2	Gear Wheels.	2	2	1	—
1	3/4" Conditite Wheel.	1	1	—	—
162	Nuts and Bolts.	132	112	82	40
26	Keys.	14	8	4	—
2	Propeller Blades.	2	2	2	2

NOTE.—Two large bent strips are used for the frame upon which the arm swivels.

This is a very interesting little model. The driving gear is operated from the crank handle shown on the right in the sketch, and drives the vertical spindle in the pedestal on the left. At the upper end of this spindle is mounted the balanced swinging arm carrying the propeller and aeroplane on its longer limb, and a balance weight on the short one. The operation of the crank will cause the propeller to revolve, and the aeroplane to rise during its travel, sufficient play being allowed at the spindle to enable the arm to rise.

Fig. No. 57. Signal Gantry.

(MADE WITH MECCANO OUTFIT NO. 5 OR NO. 4 AND NO. 4A)

*Parts required in addition
to Outfits*

PARTS REQUIRED.

5	12½"	Perforated Strips.
38	5½"	" "
8	3½"	" "
12	3"	" "
30	2½"	" "
4	2"	" "
8		Angle Girders.
55		Angle Brackets.
1	6"	Rod
2	3½"	Rods
6	1"	Pulley Wheels.
203		Nuts and Bolts.
6		Keys.

No. 1	No. 2	No. 3	No. 4
—	—	—	—
28	20	17	10
7	6	2	2
12	12	10	8
18	14	6	2
4	4	4	4
8	4	—	—
37	37	10	1
1	1	—	—
1	1	—	—
—	4	2	2
173	153	123	81
—	—	—	—

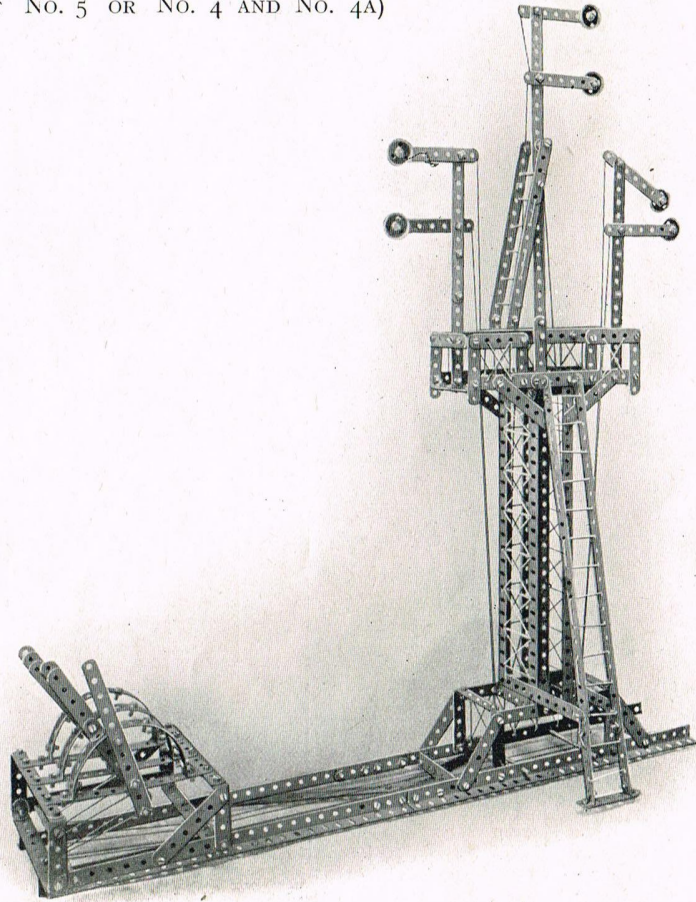
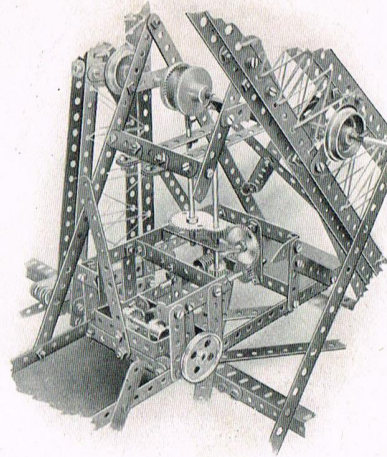
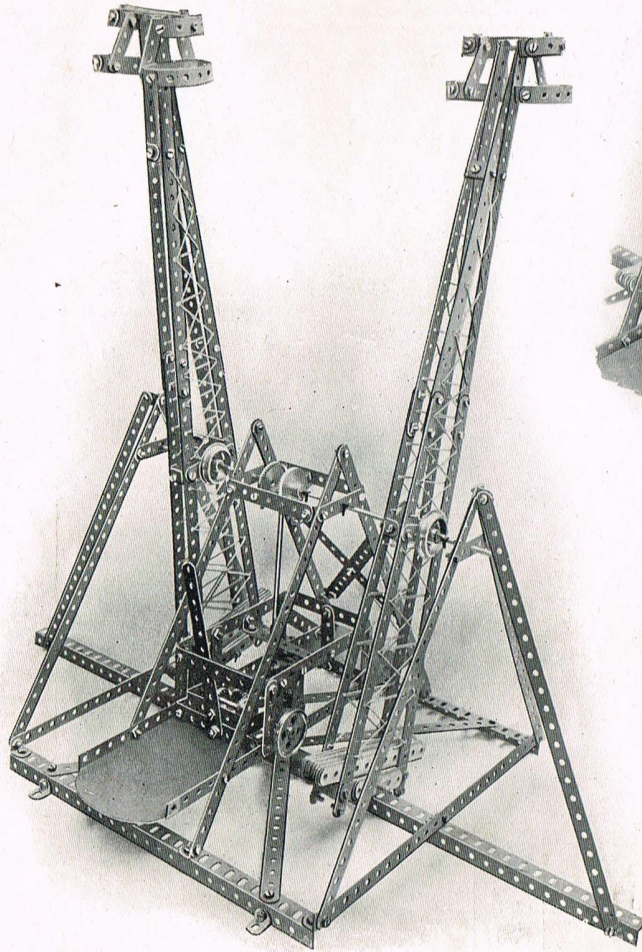


Fig. No. 60. Flip Flap.

(MADE WITH MECCANO OUTFIT NO. 6 OR NO. 5 AND NO. 5A)



PARTS REQUIRED.

		Parts required in addition to the following Outfits.				
		No. 1	No. 2	No. 3	No. 4	No. 5
30	12½" Perforated Strips	24	20	18	10	—
11	5½" " "	1	—	—	—	—
16	3½" " "	15	14	10	10	—
54	3" " "	54	54	52	50	30
26	2½" " "	14	10	2	—	—
8	2" " "	8	8	8	8	—
4	1½" " "	4	4	4	4	4
4	Angle Girders.	4	—	—	—	—
80	" Brackets.	62	62	35	26	—
1	8" Rod.	1	1	1	1	1
1	6" " "	1	1	—	—	—
5	5" Rods.	3	2	—	—	—
4	2" " "	3	2	1	—	—
4	Flanged and Grooved Wheels.	4	—	—	—	—
1	1½" Pulley Wheel.	1	1	—	—	—
3	¾" Pinion Wheels.	3	3	1	1	—
2	¾" " "	1	1	1	—	—
2	Gear Wheels.	2	2	1	—	—
2	1½" Contrite Wheels.	2	2	2	1	—
2	¾" " "	2	2	—	—	—
1	Worm Wheel.	1	1	—	—	—
225	Nuts and Screws.	195	175	145	103	—
28	Keys.	16	10	6	—	—

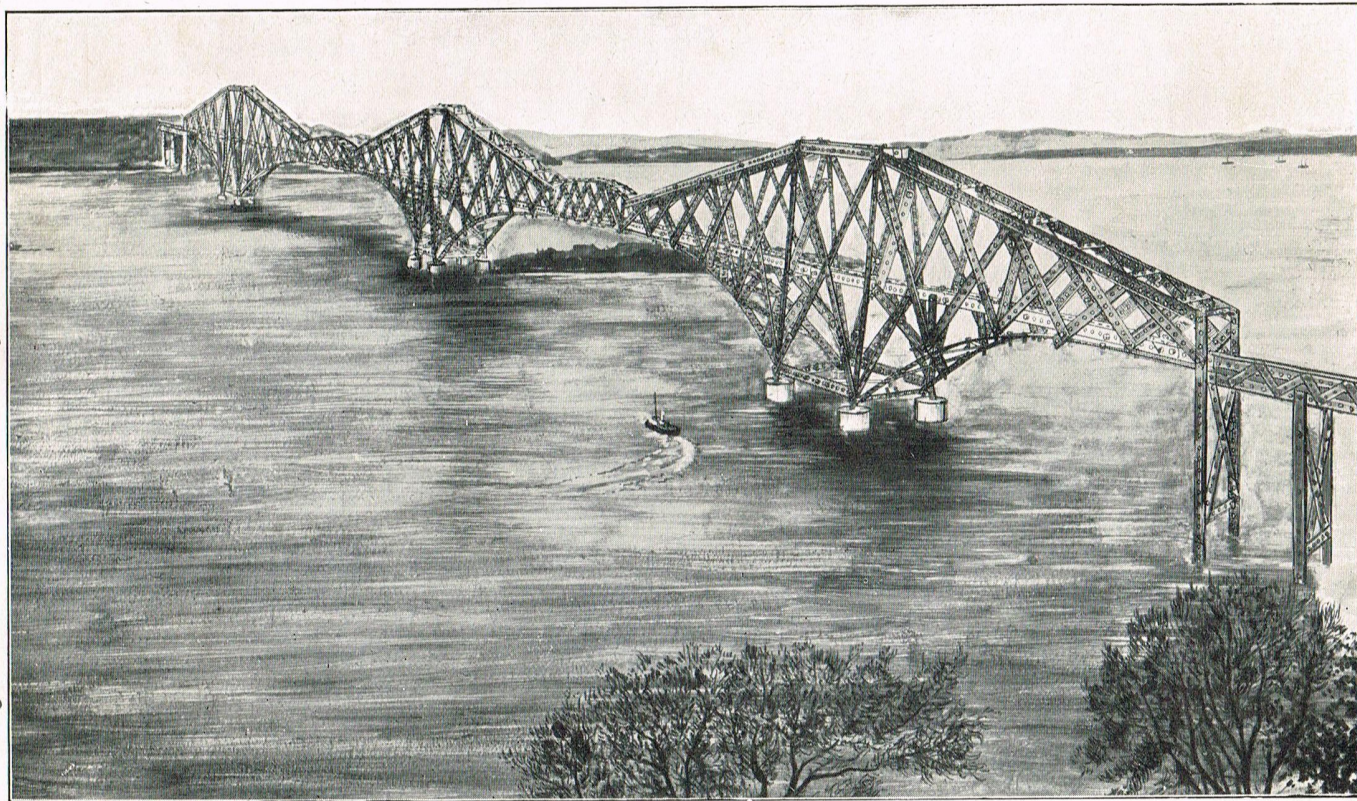
The construction of the arms and the main body of the supporting frame is clearly shown in the illustration. Care must be taken, however, when constructing the main frame that the main longitudinal rib of the base, which is made up from two angle girders, is butt-jointed, and not overlapped, the butt joint being strengthened with a 3in. strip, bolted through in every hole to the angle pieces. By this means of butt jointing the true alignment of the main axle is secured.

The cross diagonal pieces of the base are formed by joining together 12½in. and 5½in. strips and overlapping them together for five holes.

The axle is gripped to the arms by means of the keyed wheels on either side of the arms, which are in turn secured to the arms by means of a pair of screws and nuts in the holes in the wheels, the nuts binding against the short 2½in. cross strips on the arms.

Fig. No. 61. Forth Bridge.

(MADE WITH MECCANO OUTFIT NO. 6 OR NO. 5 AND NO. 5A)



Parts required in addition to Outfits.

PARTS REQUIRED.		No. 1	No. 2	No. 3	No. 4	No. 5
164	12½" Perforated Strips.	158	154	152	144	116
204	5½" " "	254	246	243	236	224
122	3½" " "	121	120	116	116	98
112	2½" " "	100	96	88	84	24
248	Angle Brackets.	230	230	203	194	128
850	Nuts and Bolts.	820	800	773	728	600

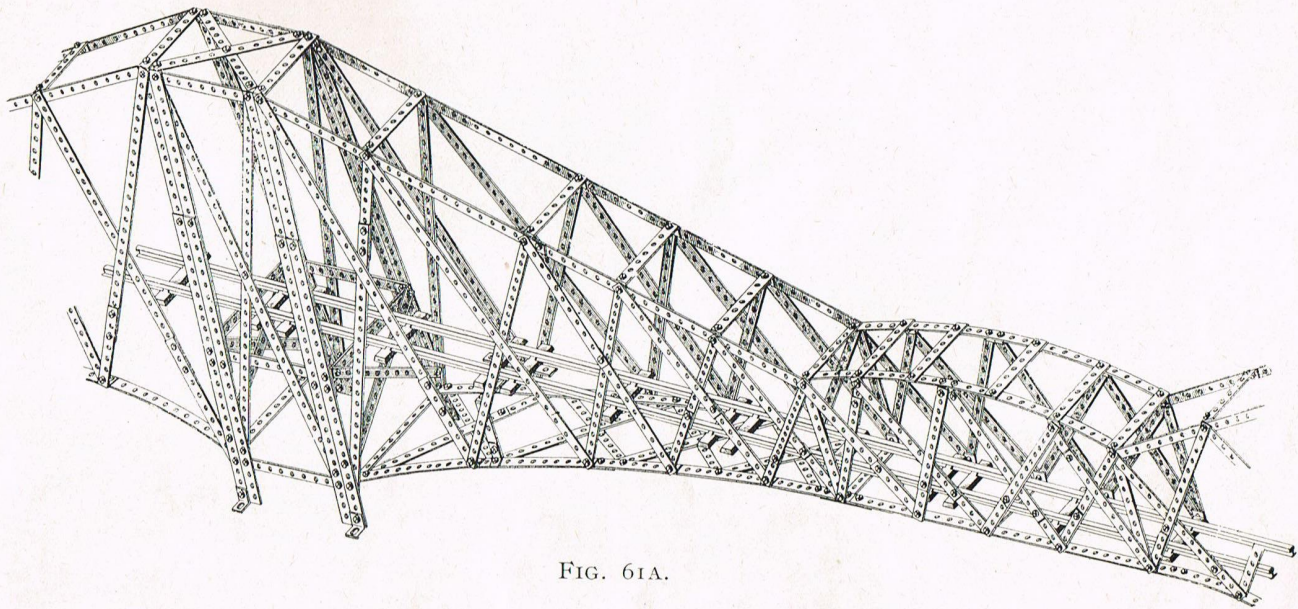


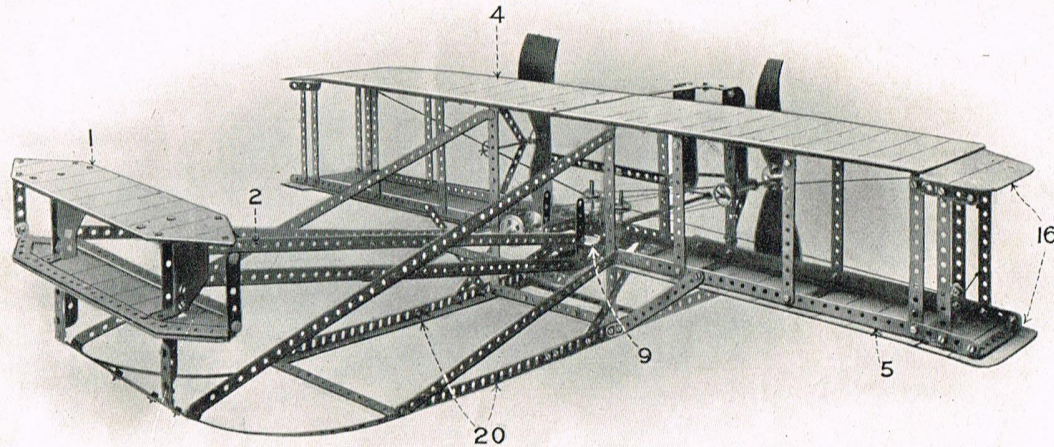
FIG. 61A.

This is one of the most interesting models which can be made with this apparatus. When completed, its length is 16 feet, and it forms a most realistic representation of the great Forth Bridge, and illustrates very clearly the cantilever principle used in its construction.

Fig. No. 62. The Meccano Model Aeroplane.

(MADE WITH MECCANO OUTFIT NO. 6 OR WITH NO. 5 AND NO. 5A.)

The Wright Brothers have acquired fame as the inventors of the most practical and satisfactory Aeroplane yet constructed, and, thanks to their genius, aviation promises soon to become a universal and safe means of rapid transit. Their famous Aeroplane has attracted world-wide interest; its principles have proved to be sound, and there is no doubt that they will be embodied in all future successful Flying Machines. Users of "Meccano" can now construct for themselves an almost exact copy of the Wright Aeroplane, capable of demonstrating all its movements, and to all our customers we recommend this as one of our most important and successful models.



(Designed on the lines of the famous Wright Aeroplane)

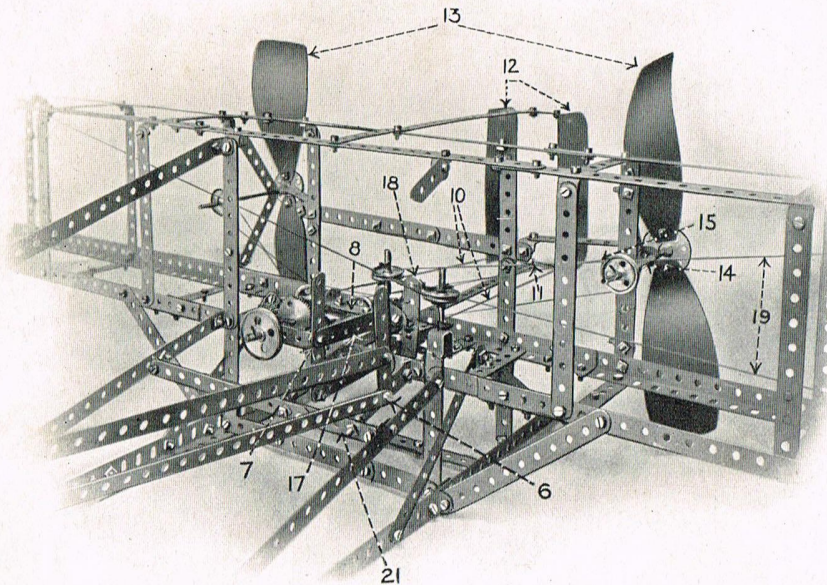
To add to the interest which we have no doubt our friends will take in the "Meccano" Model Aeroplane, we have indicated the various working parts, and we append a short description of these. A little study of same will be of material assistance in following the future progress of this new and wonderful science.

- 1—Elevating planes.
- 2—Lever arm.
- 3—Lever crank.
- 4—Upper supporting plane.
- 5—Lower supporting plane.
- 6—Lever for elevating planes.
- 7—Lever for turning rudder.

- 8—Lever crank of rudder.
- 9—Seat.
- 10—Cords operating rudder.
- 11—Pivot of rudder.
- 12—Rudder.
- 13—Propellers.
- 14—Axle of propellers.

- 15—Pulley wheels and cord (representing chains and sprocket wheels).
- 16—Flexible ends.
- 17—Lever rod for turning upright arm.
- 18—Upright arm operating flexible ends.
- 19—Cords connecting pivot with flexible ends.
- 20—Runners.
- 21—Foot rest.

Fig. No. 62. The Meccano Model Aeroplane.



Parts required in addition to Outfits

PARTS REQUIRED.		No. 1	No. 2	No. 3	No. 4	No. 5
22	12½" Perforated Strips	16	12	10	—	—
59	5½" " "	49	41	38	31	19
16	3½" " "	15	15	10	10	—
7	3" " "	7	7	5	3	—
28	2½" " "	16	12	4	—	—
2	2" " "	2	2	2	2	—
10	Angle Girders	10	6	2	2	—
91	" Brackets	73	73	46	37	—
3	5" Rods	1	—	—	—	—
4	3½" " "	3	3	1	1	—
1	1½" Pulley Wheel	1	1	—	—	—
6	1" " Wheels	—	4	2	2	—
6	" " "	6	6	4	4	—
2	Bush Wheels	1	1	1	1	—
2	3" Pinion	2	2	—	—	—
1	Gear Wheel	1	1	—	—	—
350	Nuts and Bolts	320	300	270	228	100
28	Keys	16	10	6	—	—
2	Propeller Blades	2	2	2	2	—

In building this model proceed by constructing the main frame, to which the upper and lower supporting planes are attached, the lower portion being formed of six Angle Girders, three on each side, overlapped in the third hole. At each end and in the centre they are connected together by 3½" strips, but between these 5½" strips are used both top and bottom overhanging four holes in order to support the upper and lower planes. The uprights are formed of 5½" strips, and the two front centre struts are formed by connecting two 5½" strips together, overlapped in the fifth hole, and attached at the bottom to the runners. The two struts immediately behind these are formed in the same way.

The axles of the propellers are supported by three 3" strips, with angle brackets attached to these at the outer ends to form a bearing, whilst the inner bearing is formed by the upright 5½" strip on the main frame.

The rudder swivels on two 12½" strips, one attached to the upper portion of the frame, and the other to the lower.

The manner of constructing the struts connecting the elevating planes with the main structure should present no difficulties, as they are clearly shown in the views.

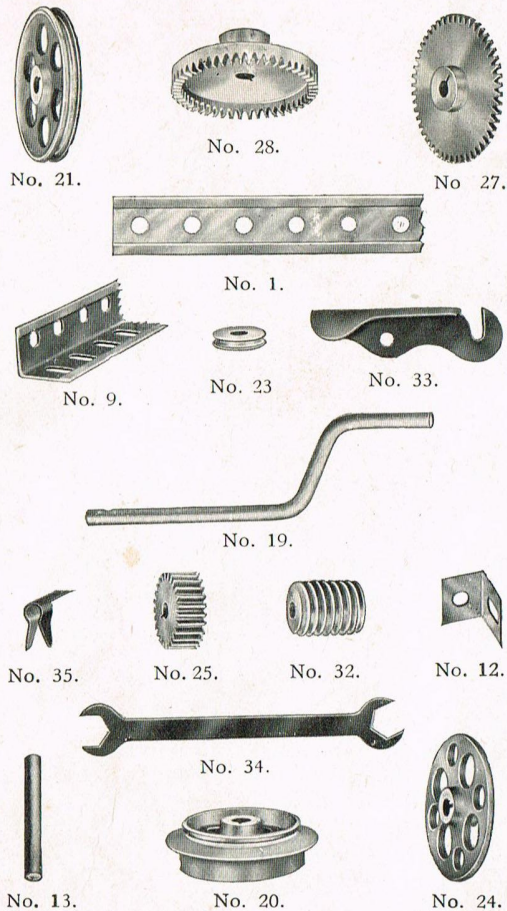
Wherever the bolts act as the pivots of movable parts, lock nuts should be fitted over the ordinary nuts.

Separate detail views are given of the elevating planes and the main operating gear.

Contents of Outfits.

Description of Parts.								1	1A	2	2A	3	3A	4	4A	5	5A	6
12 $\frac{1}{2}$ "	Perforated Strips	..	..	..	..	..	..	6	4	10	2	12	8	20	28	48	120	168
5 $\frac{1}{2}$ "	"	"	"	"	"	"	"	10	8	18	3	21	7	28	12	40	224	264
3 $\frac{1}{2}$ "	"	"	"	"	"	"	"	1	1	2	4	6	—	6	18	24	98	122
3"	"	"	"	"	"	"	"	—	—	—	2	2	2	4	20	24	36	60
2 $\frac{1}{2}$ "	"	"	"	"	"	"	"	12	4	16	8	24	4	28	60	88	112	200
2"	"	"	"	"	"	"	"	—	—	—	—	—	—	—	8	8	—	8
1 $\frac{1}{2}$ "	"	"	"	"	"	"	"	—	—	—	—	—	—	—	—	—	—	4
Angle Girders	..	..	..	..	..	..	..	—	4	4	4	8	—	8	4	12	12	24
"	Brackets	..	..	..	..	..	..	18	—	18	27	45	9	54	66	120	132	252
11 $\frac{1}{2}$ "	Rods	..	..	..	..	..	..	—	1	1	—	1	1	2	2	4	2	6
6"	"	..	..	..	..	..	..	—	—	—	1	1	1	2	2	4	—	4
5"	"	..	..	..	..	..	..	2	1	3	2	5	—	5	—	5	—	5
3 $\frac{1}{2}$"	"	..	..	..	..	..	..	1	—	1	2	3	—	3	3	6	—	6
2"	"	..	..	..	..	..	..	2	—	2	1	3	2	5	1	6	—	6
Crank Handles	..	..	..	..	..	..	..	1	—	1	1	2	2	4	—	4	—	4
Flanged and Grooved	Wheels	..	..	..	..	..	..	—	4	4	—	4	4	8	—	8	—	8
1 $\frac{1}{2}$ "	Pulley Wheels	..	..	..	..	..	..	—	—	—	1	1	—	1	1	2	—	2
1"	"	..	..	..	..	..	..	6	—	2	2	4	—	4	2	6	—	6
$\frac{1}{2}$"	"	..	..	..	..	..	..	—	—	—	2	2	—	2	4	6	—	6
Bush Wheels	..	..	..	..	..	..	..	1	—	1	—	1	—	1	3	4	—	4
$\frac{3}{4}$ "	Pinion Wheels	..	..	..	..	..	..	—	—	—	2	2	—	2	1	3	—	3
$\frac{1}{2}$"	"	..	..	..	..	..	..	1	—	1	—	1	4	5	—	5	—	5
Gear Wheels	..	..	..	..	..	..	..	—	—	—	1	1	1	2	1	3	—	3
1 $\frac{1}{2}$ "	Contrite Wheels	..	..	..	..	..	..	—	—	—	—	—	1	1	1	2	—	2
$\frac{3}{4}$"	"	..	..	..	..	..	..	—	—	—	2	2	—	2	—	2	—	2
Worm Wheels	..	..	..	..	..	..	..	—	—	—	1	1	—	1	—	1	—	1
Pawl	..	..	..	..	..	..	..	1	—	1	1	2	—	2	—	2	—	2
Spanner	..	..	..	..	..	..	..	—	1	1	—	1	—	1	1	2	—	2
Nuts and Bolts	..	..	..	..	..	..	..	30	20	50	30	80	42	122	128	250	700	950
Wood Screws	..	..	..	..	..	..	..	5	—	5	7	12	—	12	12	24	—	24
Hook	..	..	..	..	..	..	..	1	—	1	—	1	—	1	—	1	1	2
Keys	..	..	..	..	..	..	..	12	6	18	4	22	6	28	2	30	10	40
Turn Screws	..	..	..	..	..	..	..	1	—	1	—	1	—	1	—	1	—	1
Propeller Blades	..	..	..	..	..	..	..	—	—	—	—	—	—	—	—	2	—	2
Hank Cord	..	..	..	..	..	..	..	1	1	2	—	2	2	4	2	6	—	6
Ball Cord	..	..	..	..	..	..	..	1	—	1	—	1	1	2	—	2	—	2
Manual of Instruction	..	..	..	..	..	..	..	1	—	1	—	1	—	1	—	1	—	1
Length of Chain	..	..	..	..	..	..	..	—	—	—	—	—	—	—	1	1	—	1

Separate Parts.



Price List of Additional Parts.

1.—Perforated Strips	12½" long	..	..	per ½ doz.	Cents 25
2.—	" "	5½"	" "	" "	15
3.—	" "	3½"	" "	" "	10
4.—	" "	3"	" "	" "	10
5.—	" "	2½"	" "	" "	10
6.—	" "	2"	" "	" "	10
9.—Angle Girders,	12½" long	..	..	" "	30
12.—Angle Brackets	..	..	..	per dozen	15
13.—Axle Rod, 11½" long	..	..	..	each	10
14.—	" 6" "	..	..	" "	5
15.—	" 5" "	..	..	" "	5
16.—	" 3½" "	..	..	" "	5
17.—	" 2" "	..	..	" "	2½
19.—Crank Handle	..	..	..	" "	10
20.—Flanged and Grooved Wheel	..	..	..	" "	25
21.—Pulley Wheel, 1½" diameter	..	..	..	" "	15
22.—	" " 1" "	..	..	" "	10
23.—	" " ½" "	..	..	" "	5
24.—Bush Wheel	..	..	..	" "	15
25.—Pinion Wheel, ¾" diameter	..	..	..	" "	25
26.—	" " ½" "	..	..	" "	15
27.—Gear Wheel, 1½" "	..	..	..	" "	30
28.—Contrite Wheel, 1½" diameter	..	..	..	" "	40
29.—	" " ¾" "	..	..	" "	30
32.—Worm Wheel	..	..	..	" "	25
33.—Pawl	..	..	..	" "	10
34.—Spanner	..	..	..	" "	10
35.—Keys	..	..	..	per dozen	15
36.—Turn Screws	..	..	..	each	10
37.—Nuts and Bolts	..	..	..	per 2 dozen	30
39.—Ball Cord (Special)	..	..	..	each	5
40.—Hank Cord	..	..	..	" "	2½

Price List.

No. 1.	Meccano Outfit	...	...	...	...	...	\$ 2.00
No. 2.	„ „	...	...	...	...	...	„ 4.00
No. 3.	„ „	...	...	...	...	...	„ 6.00
No. 4.	„ „	...	...	...	...	...	„ 10.00
No. 5.	„ Presentation Outfit	...	...	...	...	...	„ 22.50
Packed in well made walnut stained box with lock and key.							
No. 6.	„ „	„	„	Ditto.	ditto.		45.00
No. 1A	„ Accessory Outfit	(containing sufficient parts to convert a No. 1 into a No. 2 Outfit) ...					2.00
No. 2A	„ „	„	„	(containing sufficient parts to convert a No. 2 into a No. 3 Outfit) ...			2.00
No. 3A	„ „	„	„	(containing sufficient parts to convert a No. 3 into a No. 4 Outfit) ...			4.00
No. 4A	„ „	„	„	(containing sufficient parts to convert a No. 4 into a No. 5 Outfit) ...			12.50
Packed in well made walnut stained box with lock and key.							
No. 5A	„ „	„	„	(containing sufficient parts to convert a No. 5 into a No. 6 Outfit) ...			22.50
Packed in well made walnut stained box with lock and key.							

