

MECCANO

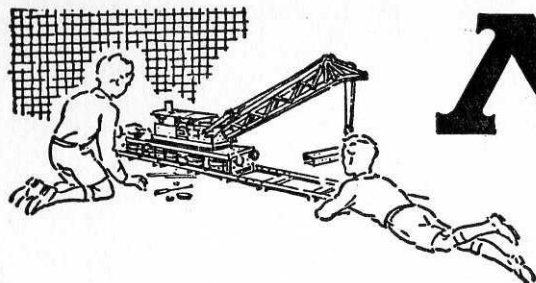
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INSTRUCTIONS FOR ACCESSORY OUTFIT No. 3A



No. 58.3A

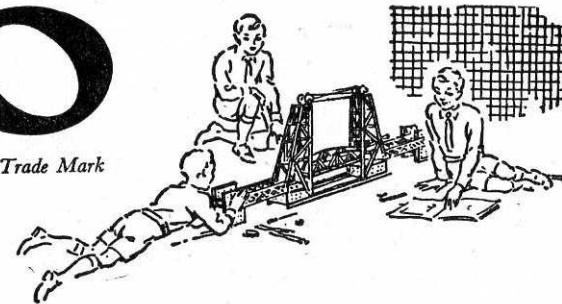
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MECCANO

Registered Trade Mark

The World's Greatest Constructional Toy



MODEL-BUILDING WITH MECCANO

SOME USEFUL HINTS

It will be noticed that with each model in this Book of Instructions is given a list of the parts required to build it. For the first few models it is a good plan to lay out on the table all the parts required for the one it is proposed to build, and put the remainder of the Outfit to one side. To help you pick out the correct parts for your model a complete list of Meccano parts is given at the back of this Book, and all the principal parts are illustrated. In the list the parts are all numbered, and in most cases, their measurements are given. There is no need, however, to measure the parts to find out which is which, as the size is easily found from the number of holes. All Meccano holes are spaced $\frac{1}{2}$ " apart, so that by counting two holes to the inch the size of a part can be found at once. For instance, Part No. 2 is listed as a $5\frac{1}{2}$ " Perforated Strip, so you look in your Outfit for a Strip with eleven holes. Similarly, No. 189 is a $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate, so you look for a Flexible Plate eleven holes in length and three holes in width.

Beginners sometimes wonder which section of a model should be built first. There cannot be any definite rule for this, as it depends on the design of the model. In stationary models the base usually should be built first. In most of the small models a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate forms an important part of the structure, and often the best plan is to start building by bolting parts to this Plate. For other models a good general rule is that the sections that form supports for a number of other parts should be built first.

THE IMPORTANCE OF LOCK-NUTTING

In some models it is necessary to join certain parts together so that, although they cannot come apart, they are free to pivot or move in relation to one another. To do this the parts are bolted together as usual but the nut is not screwed up tightly, so that the parts are not gripped. Then, to prevent the nut from unscrewing, a second nut is screwed up tightly against it, the first nut being held with a spanner. This method of using a second nut is known as *Lock-nutting*.

A Rod is usually mounted in a support or bearing, such as a hole in a strip, so that it is free to revolve. The Rod is then said to be *journalled* in the Strip.

DRIVING YOUR MODELS

Models can be driven by means of either clockwork or electric motors. Ask your dealer for details of these Meccano Motors. Small and light models can be driven direct from the driving pulley of the motor or through a belt running over two pulleys of the

same size giving what is known as a 1:1 (one-to-one) ratio. A better plan, however, is to take the drive from a small pulley on the motor shaft to a larger pulley on the driving shaft of the model. In most cases a 1" Pulley on the motor shaft and a 3" Pulley on the model shaft will be found satisfactory. This provides a reduction ratio of approximately 3:1.

Rubber bands are very convenient for driving belts. Sometimes, however, a rubber band of the right length is not available, and then Meccano Cord or thin string is used. To tie the Cord to form an endless belt you should use the familiar reef knot.

With the larger Outfits, belt drive can be replaced with advantage by gearing. To operate a slow-moving model demanding great power, such as a traction engine, gears that will provide a considerable reduction must be used. For example, a Worm meshed with a $\frac{1}{2}$ " Pinion will give a 19:1 reduction; a Worm meshed with a 57-tooth Gear will give a 57:1 reduction.

If the Motor is to operate successfully, however, you must make sure that there is no excessive friction in the mechanism of the model. This can be caused by shaft bearings being slightly out of line, or by a belt or Cord drive being too tight. Before condemning your motor, therefore, first make sure that every revolving shaft moves quite freely in its bearings, and that the bearings are in line with one another. The bearings can be brought into line by pushing through them a Drift (Part No. 36c) or a Rod, before the bolts holding the various parts are tightened up. Then apply a little light machine oil to every bearing or pivot on which moving parts are mounted.

Triangular Flexible Plates and Flexible Plates can be used for forming curved surfaces in models, but they should not be bent at a too sharp angle. With careful handling these Plates can be bent to the required curve and after use straightened again.

All Outfits from No. 2 upward include the Cord Anchoring Spring, Part No. 176. This part provides a neat and positive method of fastening a length of Cord to a Rod. The Spring is pushed on to a Rod or Crank Handle by turning it in such a way that its coils tend to unwind.

MECCANO SERVICE

If ever you are in any difficulty with your models, or if you want advice on anything connected with this great hobby, write to us. We shall be delighted to help you in any way possible. Address your letters to *Information Service*, Meccano Ltd, Binns Road, Liverpool 13.

4.1 CEMENT MIXER

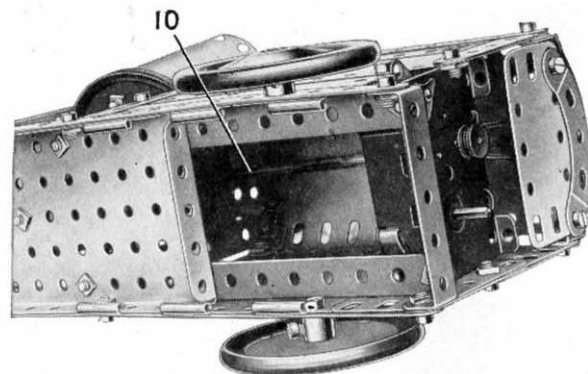


Fig. 4.1b

The chassis of the model is built by bolting a $12\frac{1}{2}$ " Strip to each of the longer flanges of a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate. Two further $12\frac{1}{2}$ " Strips are fixed to the edges of the Plate, and the outer ends of these Strips are connected by a $2\frac{1}{2}$ " Strip (1).

A support for the mixing drum is made by bolting two $2\frac{1}{2}$ " Strips to Trunnions (2) fixed to the Flanged Plate as shown. A $\frac{3}{8}$ " Bolt is passed through one of the lugs of a $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip (3), and a nut screwed loosely on to the Bolt. The shank is then passed through one of the vertical $2\frac{1}{2}$ " Strips and the centre hole of a $2\frac{1}{2}$ " Stepped Curved Strip (4), and a second nut is screwed firmly against the first. A $\frac{3}{8}$ " Bolt is fixed tightly by a nut to the opposite lug of the Double Angle Strip, and passed through the second vertical $2\frac{1}{2}$ " Strip. A 1" Pulley is then fixed on the shank of the Bolt, and connected to a second 1" Pulley (5) by a Driving Band. The Pulley (5) is fixed on a 4" Rod mounted in the $2\frac{1}{2}$ " Strips. This Rod carries at its outer end a Bush Wheel fitted with a $\frac{3}{8}$ " Bolt, and it is used for tilting the mixing drum for unloading.

The mixing drum is made by bolting two $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips at right-angles to each other across a 3" Pulley (6). Two $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates are curved and fixed to the Double Angle Strips. The Pulley (6) is fixed on a $1\frac{1}{2}$ " Rod, which is passed through the Double Angle Strip (3) and through a Reversed Angle Bracket (7) and the Rod is held in position by a Spring Clip.

The supports for the loading hopper are four $5\frac{1}{2}$ " Strips attached to Angle Brackets fixed to the chassis and connected at the top by $2\frac{1}{2}$ " Stepped Curved Strips. Two of the $5\frac{1}{2}$ " Strips are extended by $2\frac{1}{2}$ " Strips (8). The sides of the hopper are Flanged Sector Plates, and these are bolted to $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates arranged as shown. The back of the hopper is a $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate attached by Angle Brackets.

The hopper is pivoted on a built-up rod made by a $3\frac{1}{2}$ " and a 2" Rod joined by a Rod and Strip Connector. This rod is passed through a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip (9) bolted to the hopper, and is fitted with a 3" Pulley. The 3" Pulley is connected by a Driving Band to a 1" Pulley fixed on a Crank Handle that is mounted in one of the hopper supports and in the $2\frac{1}{2}$ " Stepped Curved Strip (4). Two short lengths of Cord are tied to the built-up rod, and are passed through the end holes of the $2\frac{1}{2}$ " Strips (8). The Cords are then tied to the rear of the hopper.

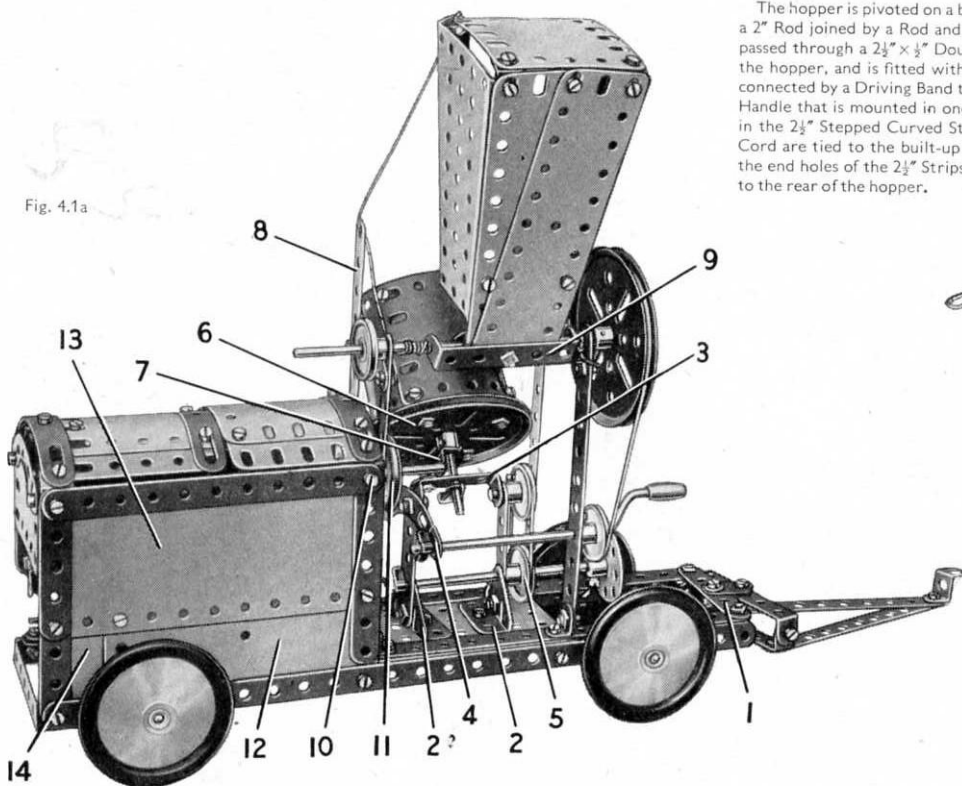


Fig. 4.1a

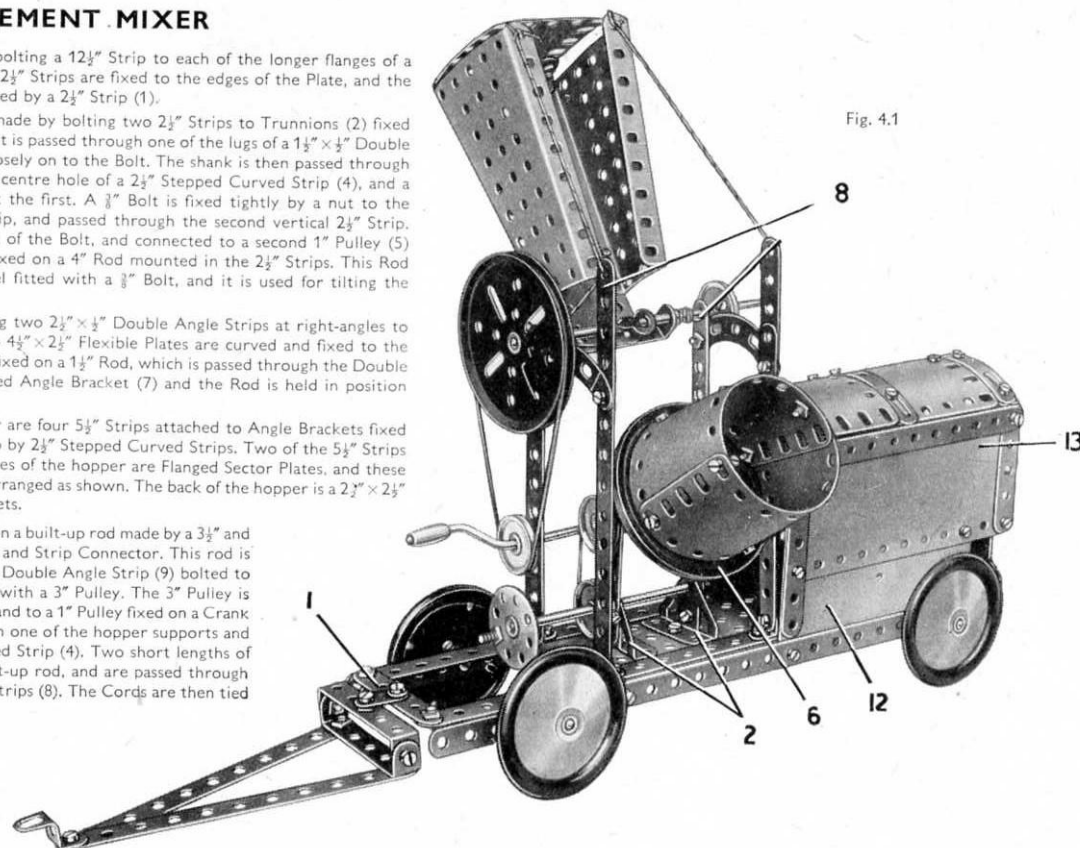


Fig. 4.1

The drum is rotated by a *Magic Motor* bolted to the $12\frac{1}{2}$ " Strips at one end of the chassis (see Fig. 4.1b). The drive from the Motor shaft is taken to a $\frac{1}{2}$ " Pulley on a built-up rod (10) made by joining two $3\frac{1}{2}$ " Rods by a Rod Connector. This rod is mounted at one end in a $2\frac{1}{2}$ " Strip bolted across two of the $5\frac{1}{2}$ " Strips used to support the hopper. The other end of the rod is supported in a Semi-Circular Plate bolted to the inner side-plate of the *Magic Motor*. The rod carries a 1" Pulley (11) fitted with a Rubber Ring, arranged so that it presses against the rim of the Pulley 6. The $\frac{1}{2}$ " Pulley is supplied with the *Magic Motor*.

The sides of the engine cover are made from the separated halves of a Hinged Flat Plate (12), $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates (13) and a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate (14). The top is formed by two $1\frac{1}{8}$ " radius Curved Plates and two curved $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates attached to Obtuse Angle Brackets fixed to the sides. The sides are edged by $5\frac{1}{2}$ ", $2\frac{1}{2}$ " and $3\frac{1}{2}$ " Strips, and the top is strengthened by Formed Slotted Strips.

Parts Required

4 of No. 1-	1 of No. 17	6 of No. 38	2 of No. 126	1 of No. 198
8 " " 2	1 " " 18a	1 " " 40	1 " " 155	2 " " 200
2 " " 3	2 " " 19b	1 " " 48	1 " " 186	1 " " 212
9 " " 5	1 " " 19g	6 " " 48a	4 " " 187	1 " " 213
3 " " 10	5 " " 22	1 " " 52	2 " " 188	1 " " 214
8 " " 12	1 " " 24	2 " " 54	2 " " 189	3 " " 215
4 " " 12c	4 " " 35	4 " " 90a	3 " " 190	
1 " " 15b	81 " " 37a	6 " " 111c	2 " " 191	<i>Magic Motor</i>
3 " " 16	77 " " 37b	2 " " 125	2 " " 192	(not included in Outfit)

4.2 PLATFORM WEIGHING MACHINE

The base of the machine is made by bolting $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates, edged by $5\frac{1}{2}"$ Strips, to the sides of a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate. The front is a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate, and the sides are connected by $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips (1) and (2). A lever (3) connected to the platform operates the recording mechanism, and it consists of two $5\frac{1}{2}"$ Strips joined by a Double Bracket (4). The lever is pivoted by lock-nutted bolts to a Double Bracket fixed by Bolt (5) to the Double Angle Strip (1). The platform is a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate edged by $2\frac{1}{2}"$ Strips, and is attached to the lever (3) by Angle Brackets.

Each side of the casing consists of two built-up strips, that at the rear being made from a $5\frac{1}{2}"$ and a $3\frac{1}{2}"$ Strip overlapped, while the front one is made from a $5\frac{1}{2}"$ and a $2\frac{1}{2}"$ Strip bolted together through their end holes. The side seen in Fig. 4.2 consists of two $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates, the upper one being bent over and bolted to a $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate that forms the upper part of the other side. The lower part of this side is formed by one half of a Hinged Flat Plate, the other half of which forms the rear door.

The front consists of a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate (6), and a $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (7) attached by Angle Brackets. The dial is a 3" Pulley. A Semi-Circular Plate (8) is attached to the Flanged Plate (6), and a similar part is fixed to a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip at the rear. A $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate is attached to a Double Angle Strip (9) fixed between the sides. The top of the casing is completed by Flat Trunnions and a 'U'-section Curved Plate attached to them by Angle Brackets.

A Rod (10) is passed through the 3" Pulley and the centre hole of Double Angle Strip (9). A Rod and Strip Connector on this Rod is separated from the Pulley by three Washers, and is held in place by a Spring Clip. A 1" Rod held in the Rod and Strip Connector engages between the lugs of the Spring Clip. Cord is tied to $1\frac{1}{2}"$ Rod (11) held by Spring Clips in the lever (3), and is wound twice round Rod (10). Then it is tied to a $2\frac{1}{2}"$ Driving Band, which is stretched slightly and attached to the casing by Bolt (12).

Fig. 4.2a

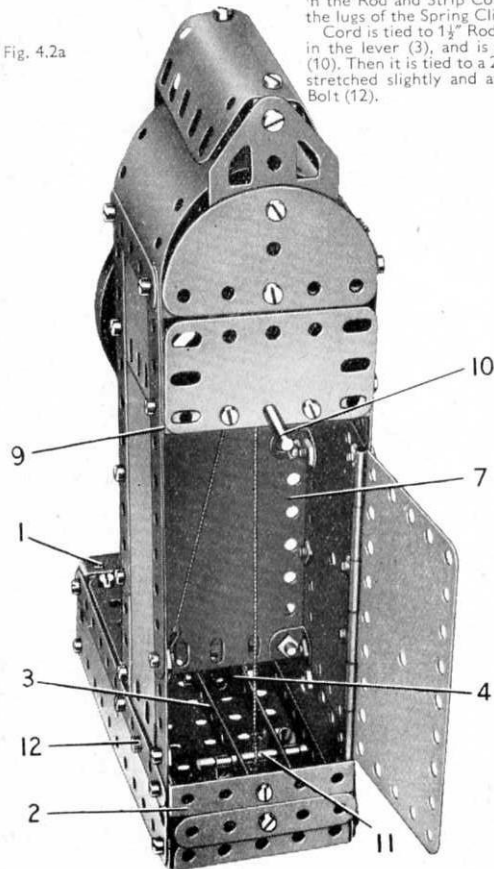
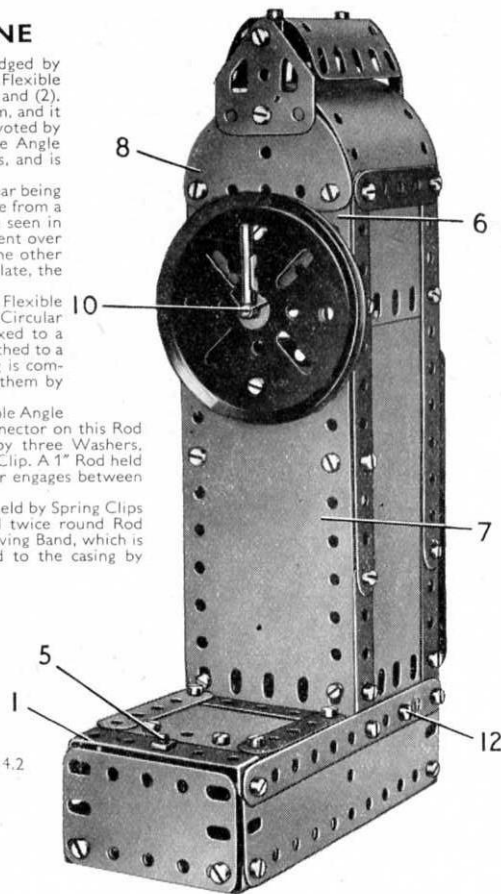


Fig. 4.2



Parts Required

8 of No. 2	4 of No. 48a
2 " " 3	1 " " 51
9 " " 5	1 " " 52
1 " " 10	2 " " 126a
2 " " 11	1 " " 186
8 " " 12	2 " " 188
1 " " 15b	2 " " 189
1 " " 18a	1 " " 190
1 " " 18b	2 " " 191
1 " " 19b	2 " " 192
3 " " 35	1 " " 198
65 " " 37a	1 " " 199
65 " " 37b	1 " " 212
3 " " 38	2 " " 214
1 " " 40	

4.3 CARAVAN

Parts Required

8 of No. 2	
2 " " 3	
9 " " 5	
5 " " 10	
1 " " 11	
7 " " 12	
2 " " 15b	
2 " " 17	
1 " " 18b	
4 " " 35	
73 " " 37a	
71 " " 37b	
10 " " 38	
1 " " 44	
3 " " 48a	
1 " " 51	
1 " " 52	
2 " " 54	
4 " " 90a	
1 " " 111c	
2 " " 125	
1 " " 126	
2 " " 187	
2 " " 188	
4 " " 190	
2 " " 191	
1 " " 192	
1 " " 198	
2 " " 200	
1 " " 212	
2 " " 212a	
2 " " 214	
4 " " 215	
4 " " 221	

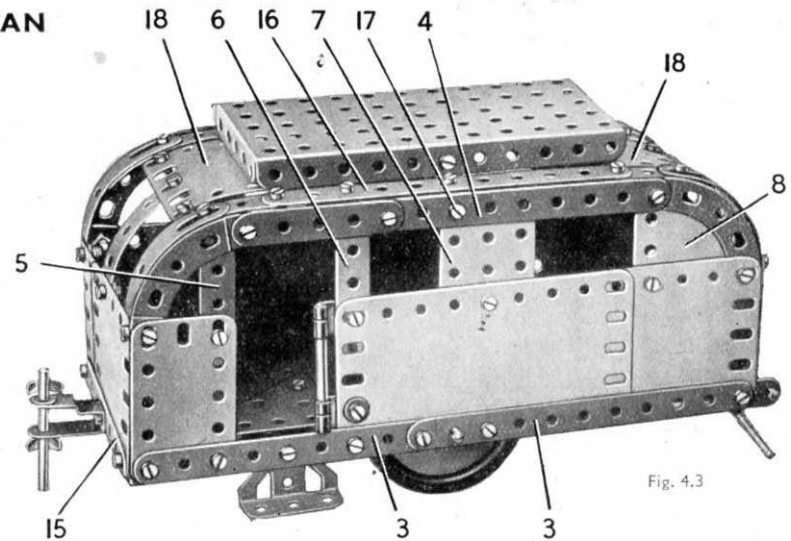


Fig. 4.3

The floor of the caravan is made by joining two Flanged Sector Plates to a $2\frac{1}{2}"$ Strip (1). Two $2\frac{1}{2}" \times 1\frac{1}{2}"$ Triangular Flexible Plates (2) are bolted to each Flanged Sector Plate.

The side of the model seen in the general view consists of a $5\frac{1}{2}" \times 2\frac{1}{2}"$ and a $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate overlapped seven holes, and a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate. The Plates are bolted to two $5\frac{1}{2}"$ Strips (3) overlapped three holes. The top edge of the side consists of a $5\frac{1}{2}"$ Strip (4) lengthened by a $2\frac{1}{2}"$ Strip that overlaps it by three holes, and the made-up strip thus formed is connected to the Flexible Plates at each end by a $2\frac{1}{2}"$ Stepped Curved Strip. The window frames are provided by a $2\frac{1}{2}"$ Strip (5), a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (6), a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate (7) and a Semi-Circular Plate (8). A handrail is provided at one side of the door. It is made from a 2" Rod held in Right-Angle Rod and Strip Connectors.

The side seen in Fig. 4.3a consists of the separated halves (9) of a Hinged Flat Plate bolted to a $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate and to two $5\frac{1}{2}"$ Strips (10) overlapped three holes. The window frames are provided by a Semi-Circular Plate (11), a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (12) and a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (13). The top edge of the roof is made from a $5\frac{1}{2}"$ and a $2\frac{1}{2}"$ Strip overlapped three holes to make a built-up strip (14), and the curved ends are $2\frac{1}{2}"$ Stepped Curved Strips.

The sides are connected at each end by a $3\frac{1}{2}"$ Strip (15) attached to Angle Brackets. One end consists of a $2\frac{1}{2}" \times 2\frac{1}{2}"$ and a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate, and the other is made from two $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates. The curved end windows consist of Formed Slotted Strips bolted to the Flexible Plates, and each Formed Slotted Strip is extended by a $2\frac{1}{2}"$ Strip that is bolted to a $5\frac{1}{2}"$ Strip (16). The Strips (16) are attached to the sides by $\frac{1}{2}"$ Reversed Angle Brackets held by bolts (17). The centre division of the curved window at one end is a $2\frac{1}{2}"$ Strip, and at the other end a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip is used.

The roof consists of a $1\frac{1}{2}"$ radius Curved Plate (18) at each end that is attached to the Formed Slotted Strips by Fishplates. The centre section of the roof is a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate, and this is bolted to the lugs of the Reversed Angle Brackets held by the Bolts (17).

The body is attached to the Flanged Sector Plates by an Angle Bracket and a Double Bracket as shown in Fig. 4.3a. The towing attachment is a Stepped Bent Strip fitted with a 2" Rod that serves also as a support at one end of the caravan. At the other end the support is a 1" Rod in a Rod and Strip Connector that is lock-nutted to one of the Flanged Sector Plates.

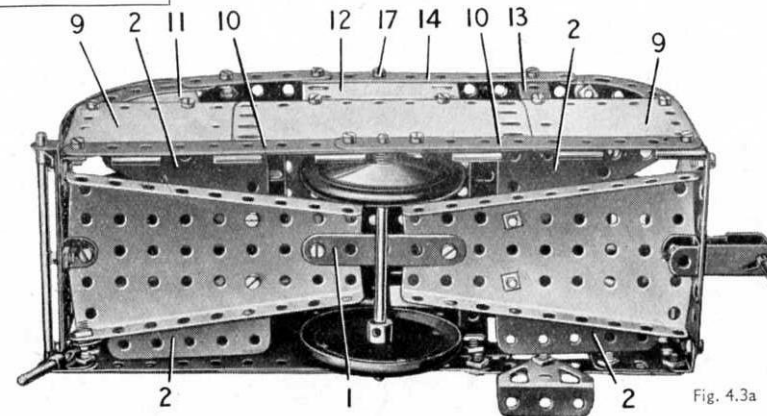


Fig. 4.3a

4.4 ELEVATED JIB CRANE

Parts Required

4 of No.	1	3 of No.	16
6 " "	2	1 " "	17
2 " "	3	1 " "	18b
7 " "	5	1 " "	19b
5 " "	10	1 " "	19g
1 " "	11	5 " "	22
4 " "	12	1 " "	23
4 " "	12c	1 " "	24
1 " "	15b	8 " "	35

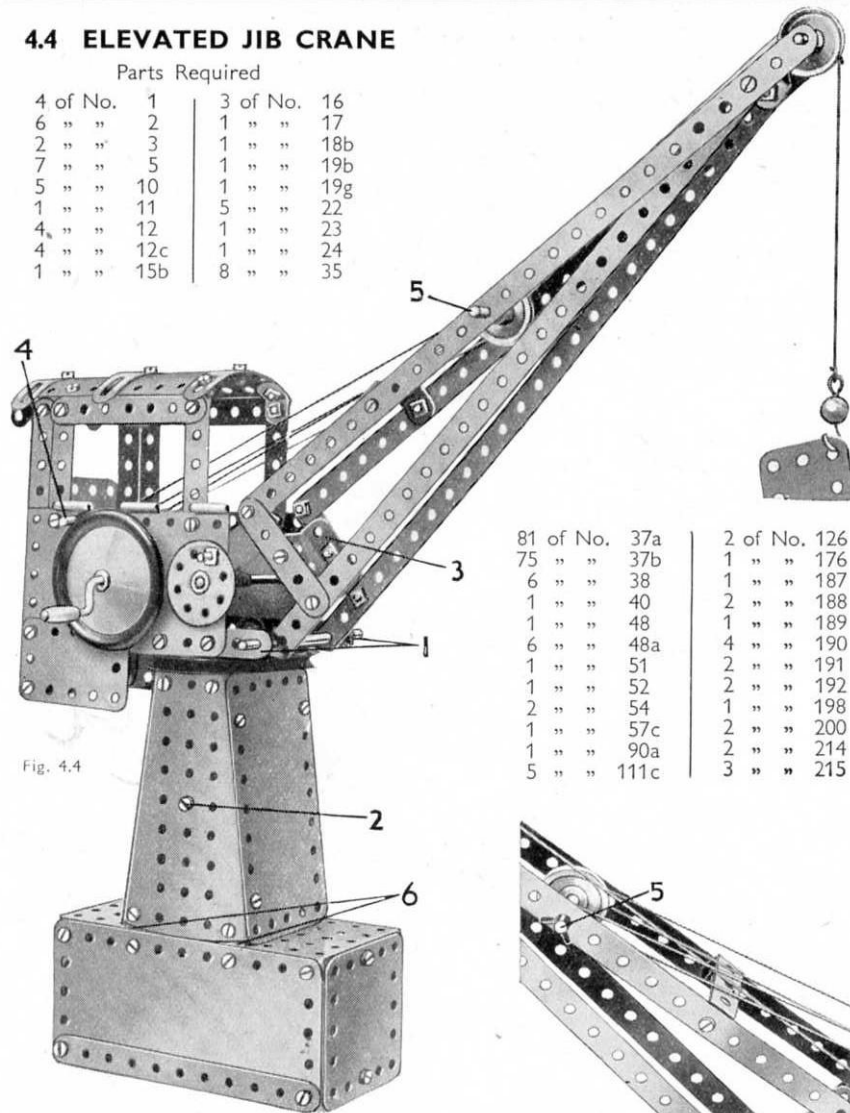


Fig. 4.4

81 of No.	37a	2 of No.	126
75 " "	37b	1 " "	176
6 " "	38	1 " "	187
1 " "	40	2 " "	188
1 " "	48	1 " "	189
6 " "	48a	4 " "	190
1 " "	51	2 " "	191
1 " "	52	2 " "	192
2 " "	54	1 " "	198
1 " "	57c	2 " "	200
1 " "	90a	2 " "	214
5 " "	111c	3 " "	215

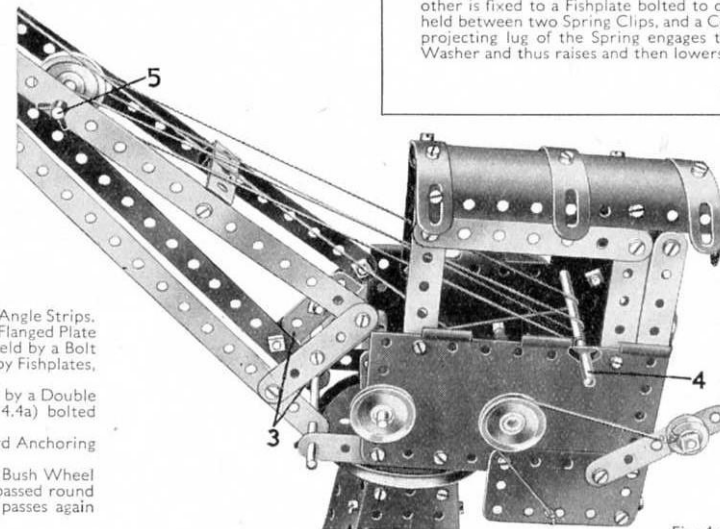


Fig. 4.4a

4.5 SEWING MACHINE

The base of the model is a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate, fitted at each side with two $5\frac{1}{2}''$ Strips. These Strips are arranged so that two clear holes overhang each end of the Flanged Plate. Flanged Sector Plates are bolted between the Strips as shown. A $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate is bolted to each side, and the narrow ends of the Flanged Sector Plates are connected by made-up strips (1), consisting of $5\frac{1}{2}''$ and $2\frac{1}{2}''$ Strips bolted together.

A $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate (2) is bolted to a $1\frac{1}{2}'' \times \frac{3}{4}''$ Double Angle Strip held by a Bolt (3) on each side, and to Angle Brackets attached by Bolts (4) on each side. The Flexible Plate is bolted also to a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate fixed to the strips (1) by Angle Brackets, which are secured by the Bolts (5).

Two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips (6) are arranged so that their turned-up ends overlap, and they are fixed to the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate. A second pair of Double Angle Strips (7) is similarly arranged, and these also are bolted to the Flanged Plate. The two sets of Double Angle Strips are connected at the top by a $5\frac{1}{2}''$ Strip (8) and a $3\frac{1}{2}''$ Strip (9) on each side, and a Double Bracket is held between the Double Angle Strips (6) by the Bolts (10).

A $2\frac{1}{2}''$ Strip (11) on each side is bolted to the Strip (8), and is connected by a Stepped Curved Strip to the Strip (9). The Bolt (12) is fitted with a nut before it is passed through the Strips, and it serves to support a Double Bracket between the ends of Strips (9). Strips (8) are connected by a 'U'-shaped piece made from two Angle Brackets. This is attached by a Bolt (13) on each side, and two $2\frac{1}{2}''$ Strips (14) are fixed to the Angle Brackets. A $1\frac{1}{2}''$ Rod held by two Spring Clips in one of the Strips (14), and a 1" Rod fixed in a Bush Wheel (15), represent the bobbin spindles.

A Magic Clockwork Motor is bolted by its lugs to the $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate of the base, and it is connected by a Driving Band to a 1" Pulley (16). The Pulley (16) is fixed on a 4" Rod supported in the Double Brackets held by Bolts (10) and (12), and this Rod is lengthened by a $1\frac{1}{2}''$ Rod (17) fitted in a Rod Connector.

The needle is represented by a $3\frac{1}{2}''$ Rod passed through two Angle Brackets (18). One of these is bolted to the end of one of the Strips (8), and the other is fixed to a Fishplate bolted to one of the $2\frac{1}{2}''$ Strips (11). The $3\frac{1}{2}''$ Rod carries a Washer (19) held between two Spring Clips, and a Cord Anchoring Spring (20) on Rod (17) is arranged so that the projecting lug of the Spring engages the Washer. As Rod (17) rotates the lug catches under the Washer and thus raises and then lowers the $3\frac{1}{2}''$ Rod.

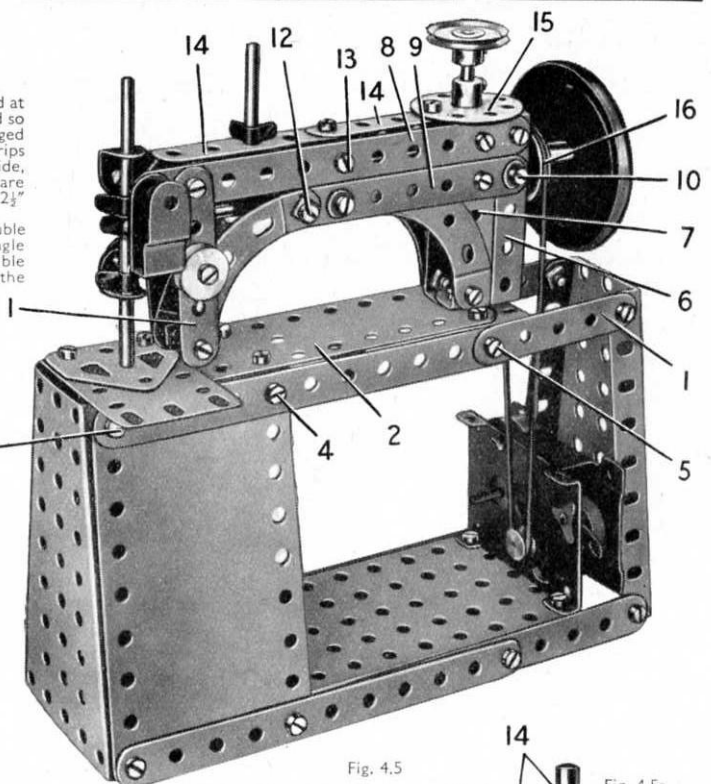


Fig. 4.5

Parts Required

8 of No.	2	1 of No.	44
2 " "	3	1 " "	48
6 " "	5	4 " "	48a
3 " "	10	1 " "	51
2 " "	11	1 " "	52
8 " "	12	2 " "	54
1 " "	15b	4 " "	90a
1 " "	16	1 " "	111c
1 " "	17	1 " "	126a
2 " "	18a	1 " "	176
2 " "	22	1 " "	187
1 " "	23	1 " "	188
1 " "	24	1 " "	189
5 " "	35	2 " "	191
55 " "	37a	1 " "	213
53 " "	37b	1 Magic Motor (not included in Outfit)	
8 " "	38		

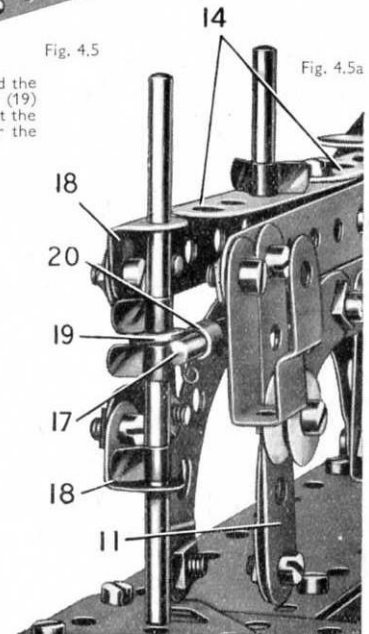


Fig. 4.5a

A 3" Pulley is attached to $5\frac{1}{2}''$ Strips (1) by means of two Double Angle Strips. A 4" Rod fixed in this Pulley passes through a hole in a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate bolted to the Flanged Sector Plates and a Double Angle Strip held by a Bolt (2) on each side of the tower. The tower is attached to the base by Fishplates, two of which are seen marked (6).

The jib consists of four $12\frac{1}{2}''$ Strips joined at their outer ends by a Double Bracket and at their inner ends by two Trunnions (3) (Fig. 4.4a) bolted together.

Hoisting is carried out by a length of Cord attached to a Cord Anchoring Spring placed on the Crank Handle.

Luffing, or raising and lowering of the jib, is controlled by a Bush Wheel locked on a $3\frac{1}{2}''$ Rod. A length of Cord fastened to this Rod is passed round Rod (4) and then round the Rod (5) (Fig. 4.4a) in the jib. It passes again round Rods (5) and (4) and finally is tied to Rod (4).

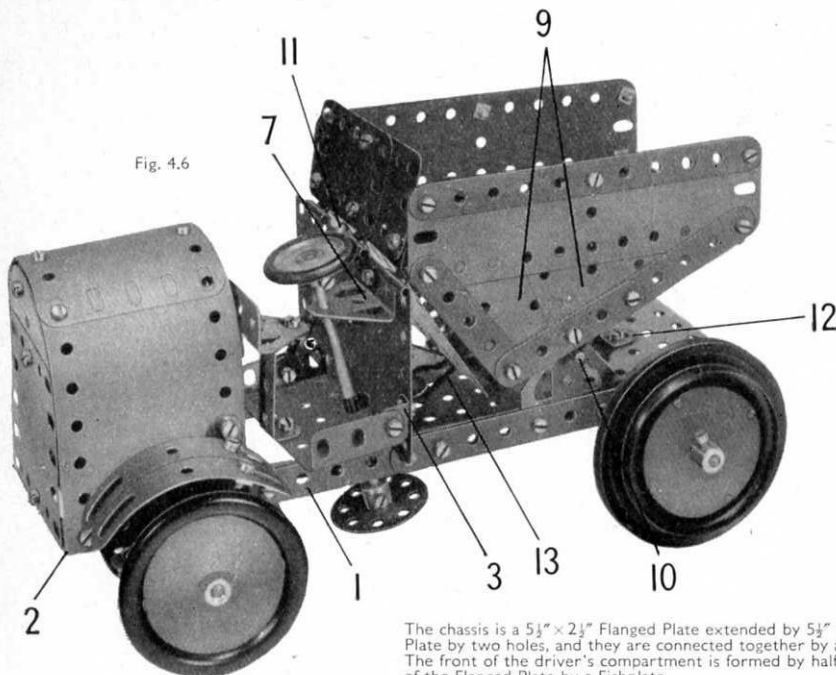


Fig. 4.6

4.6 DUMPER TRUCK

Parts Required

6 of No.	2	4 of No.	48a
2 " "	3	1 " "	51
9 " "	5	1 " "	52
4 " "	10	3 " "	90a
2 " "	11	3 " "	111c
8 " "	12	2 " "	125
4 " "	12c	2 " "	126
1 " "	15b	2 " "	126a
2 " "	16	1 " "	155
2 " "	17	1 " "	186
2 " "	18a	4 " "	187
2 " "	19b	2 " "	188
3 " "	22	2 " "	189
1 " "	24	4 " "	190
5 " "	35	2 " "	191
87 " "	37a	2 " "	192
81 " "	37b	1 " "	198
6 " "	38	1 " "	212
1 " "	38d	1 " "	213
1 " "	40	2 " "	214
1 " "	48	4 " "	215
		4 " "	221

The chassis is a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate extended by $5\frac{1}{2}"$ Strips (1). These Strips overlap the Flanged Plate by two holes, and they are connected together by a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (2) (Fig. 4.6a). The front of the driver's compartment is formed by half of a Hinged Flat Plate attached to one end of the Flanged Plate by a Fishplate.

The engine housing is formed by two $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates bolted to the Strips (1) and bent over and joined together at the top. The front and rear of the housing each consists of a Semi-Circular Plate and a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate. The rear is fixed to the Double Angle Strip (2), and the front is attached to a similar Double Angle Strip bolted between the Strips (1). A $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate fixed to an Angle Bracket (3) forms the floor of the driver's compartment, and the seat is a Trunnion bolted to a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip.

A $3\frac{1}{2}"$ Strip (4) (Fig. 4.6a) is bolted to a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip secured to the Strips (1). The $2\frac{1}{2}"$ Strips (5) and the Double Brackets (6) are free to turn on $\frac{1}{2}"$ Rods passed through the Double Brackets (6).

The steering column is a $4"$ Rod, which is passed through a Trunnion (7) and the $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate. A Fishplate is bolted to a Bush Wheel on this Rod and a $2\frac{1}{2}"$ Stepped Curved Strip is fixed tightly to the Fishplate. The Curved Strip is connected by a $2\frac{1}{2}"$ Strip (8) to one of the Strips (5). The Bolts used to attach Strip (8) at each end are fitted with lock-nuts.

The driving axle is supported in $2\frac{1}{2}"$ Stepped Curved Strips bolted to the Flanged Plate, and it consists of a $3\frac{1}{2}"$ and a $2"$ Rod joined by a Rod Connector.

Each side of the load carrier is formed by two $2\frac{1}{2}" \times 1\frac{1}{2}"$ Triangular Flexible Plates (9) and a $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate edged by Strips as shown. The bottom consists of two $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates, and the sides are connected to it by Angle Brackets. The back is made from two $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates and two $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates attached to the sides and bottom by Angle Brackets and Obtuse Angle Brackets. The load carrier pivots about a $3\frac{1}{2}"$ Rod (10), which is passed through Flat Trunnions bolted to the chassis and through an Angle Bracket fixed on each side of the carrier.

The mudguard over each of the rear wheels is represented by two Formed Slotted Strips. These are joined together by a Fishplate, and attached to the side of the engine housing by an Angle Bracket.

The carrier is tipped for unloading by a $2"$ Rod (11), held in a Rod and Strip Connector that is lock-nutted to the side of the $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate. A length of Cord from this Rod passes through an Obtuse Angle Bracket (12), and is fastened to the front of the carrier. The carrier is returned to its normal position by the $2\frac{1}{2}"$ Driving Band (13).

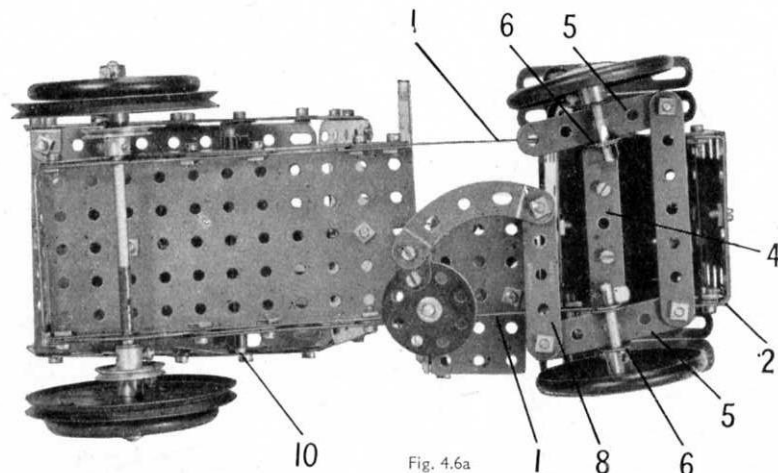


Fig. 4.6a

4.7 TELPHER SPAN

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

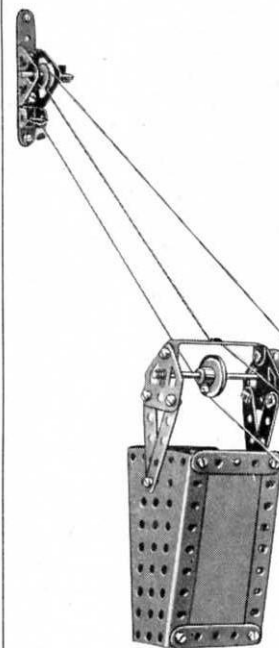


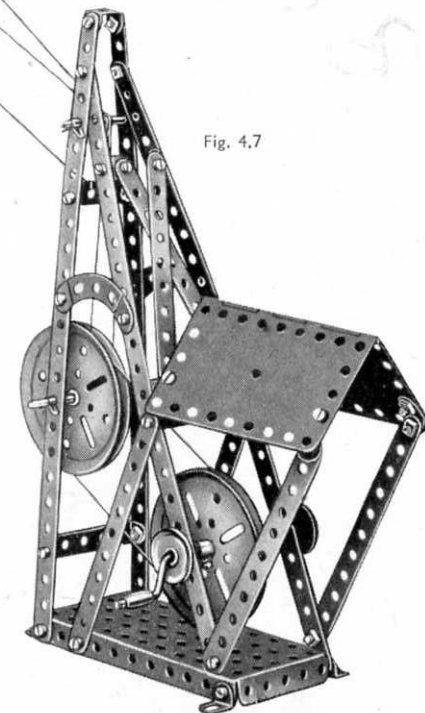
Fig. 4.7

The anchorage is formed by bolting two Trunnions to a $3\frac{1}{2}"$ Strip. A Double Bracket also is bolted to this Strip.

Two Flanged Sector Plates connected by four $2\frac{1}{2}"$ Strips and two $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates form the carriage. The carriage superstructure consists of four $2\frac{1}{2}"$ Strips bolted to two Flat Trunnions, which are joined by a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip. A $3\frac{1}{2}"$ Rod is passed through the Flat Trunnions. It is held in place by a Spring Clip and a Bush Wheel.

Parts Required

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



4.8 LIFTING BRIDGE

The base for the two towers consists of two Flanged Sector Plates connected at their narrow ends by three $2\frac{1}{2}$ " Strips. A $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip (1) is bolted across each Flanged Sector Plate, and two $12\frac{1}{2}$ " Strips, are bolted to the Double Angle Strip as shown. The Strips are connected at their upper ends by a second $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip, and a 'U'-section Curved Plate (2) is bolted to it but is spaced from the Double Angle Strip by two Washers on the Bolt.

The approach road at one side consists of a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " and a $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate. It is fixed to a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip bolted between the $12\frac{1}{2}$ " Strips of the tower, and is attached to a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate (3). At the other side the Flanged Plate is replaced by Angle Brackets. A $1\frac{1}{16}$ " radius Curved Plate (5) is attached to Obtuse Angle Brackets. The approach roads are edged by $5\frac{1}{2}$ " Strips (6) and $3\frac{1}{2}$ " Strips.

The lifting span consists of a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, and the arch girders are $5\frac{1}{2}$ " Strips curved as shown and attached by Angle Brackets to Flat Trunnions bolted to the Flanged Plate.

A length of Cord (7) is fastened to a Cord Anchoring Spring on a Crank Handle (8), is passed over a Rod (9) and is tied to the lifting span at one end as shown. A second length of Cord is tied to Cord (7) at a point (12), is taken over Rod (9) and a similar Rod (10), and is fastened to the opposite end of the span. The lifting span is guided at each end by a length of Cord (11) tied to the 'U'-section Curved Plate (2) and passed through a hole in the Flanged Sector Plate and a second hole in the Flanged Plate, and is again tied to the 'U'-section Curved Plate.

A length of Cord (7) is fastened to a Cord Anchoring Spring on a Crank Handle (8), is passed over a Rod (9) and is tied to the lifting span at one end as shown. A second length of Cord is tied to Cord (7) at a point (12), is taken over Rod (9) and a similar Rod (10), and is fastened to the opposite end of the span. The lifting span is guided at each end by a length of Cord (11) tied to the 'U'-section Curved Plate (2) and passed through a hole in the Flanged Sector Plate and a second hole in the Flanged Plate, and is again tied to the 'U'-section Curved Plate.

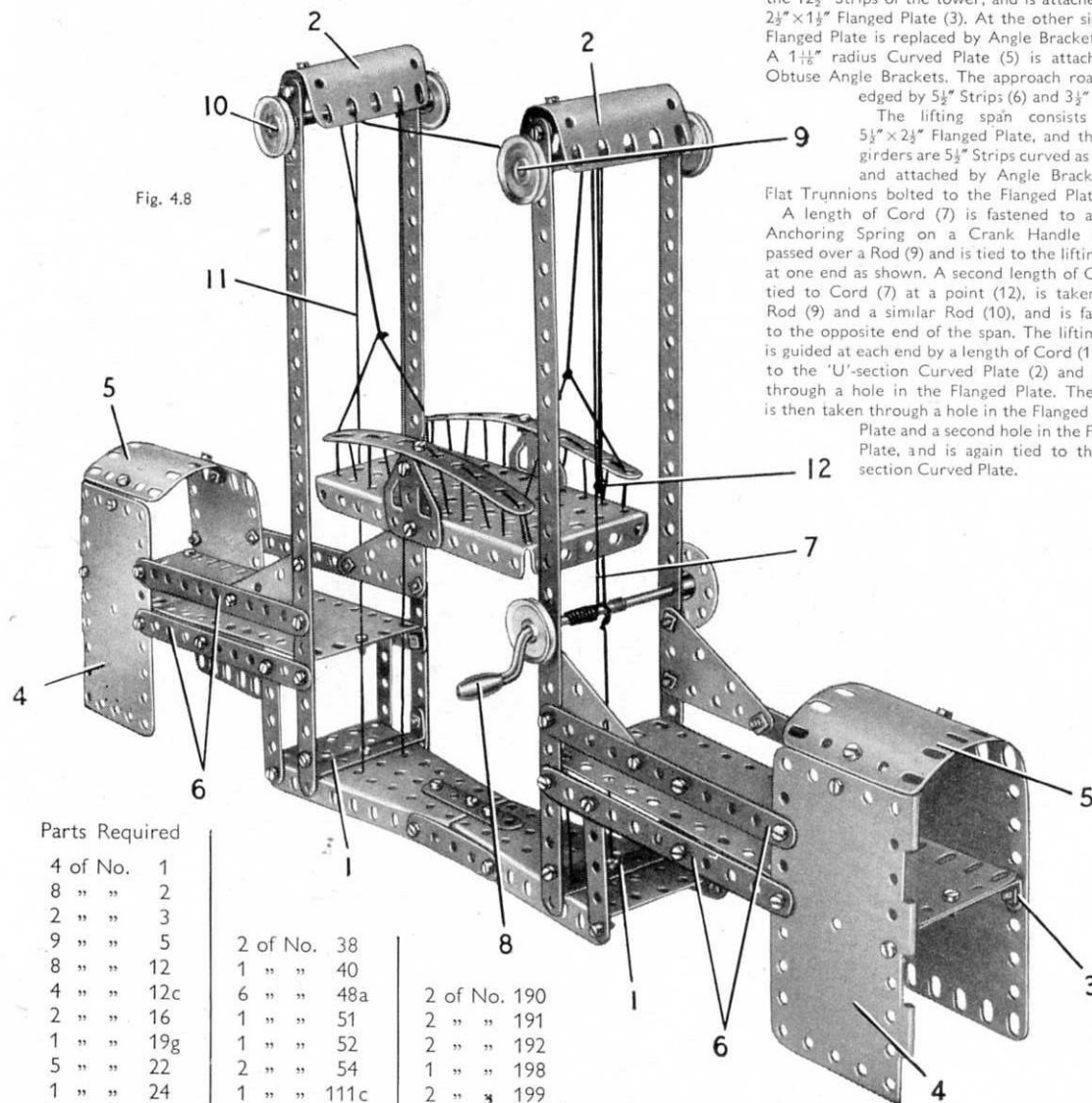


Fig. 4.8

Parts Required

4 of No. 1	2 of No. 38	2 of No. 190
8 " " 2	1 " " 40	1 " " 191
2 " " 3	6 " " 48a	2 " " 192
9 " " 5	1 " " 51	2 " " 192
8 " " 12	1 " " 52	1 " " 198
4 " " 12c	2 " " 54	2 " " 199
2 " " 16	1 " " 111c	2 " " 200
1 " " 19g	2 " " 126a	4 " " 221
5 " " 22	1 " " 176	
1 " " 24		
82 " " 37a		
81 " " 37b		

4.9 FLYBOATS

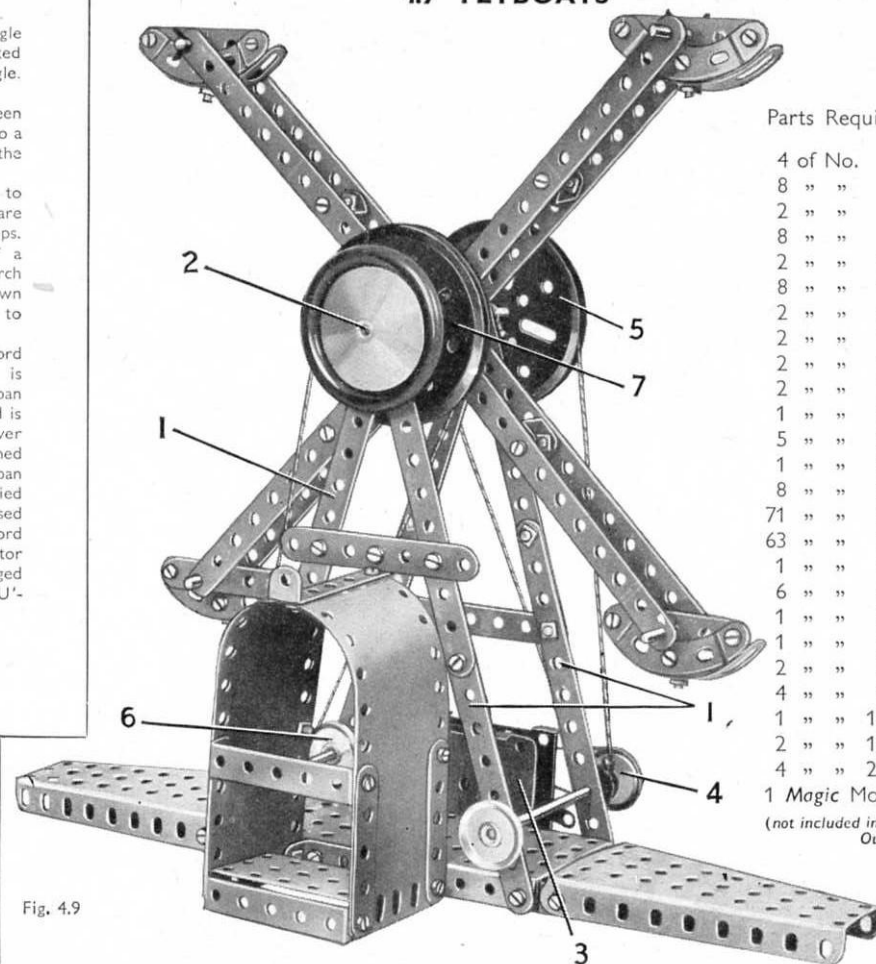


Fig. 4.9

Parts Required

4 of No. 1	1
8 " " 2	2
2 " " 3	3
8 " " 5	5
2 " " 11	11
8 " " 12	12
2 " " 15b	15b
2 " " 17	17
2 " " 18a	18a
2 " " 19b	19b
1 " " 19g	19g
5 " " 22	22
1 " " 24	24
8 " " 35	35
71 " " 37a	37a
63 " " 37b	37b
1 " " 40	40
6 " " 48a	48a
1 " " 51	51
1 " " 52	52
2 " " 54	54
4 " " 90a	90a
1 " " 187	187
2 " " 192	192
4 " " 215	215
1 Magic Motor	(not included in Outfit)

Building of this popular fairground model is commenced by making four long strips (1), each formed from two $5\frac{1}{2}$ " Strips overlapped on each other four holes. These made-up strips support the flyboat arms, and they are bolted to a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate that forms the centre part of the base of the model. To each end of this Flanged Plate a Flanged Sector Plate is attached by means of a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip.

The flyboat arms are $12\frac{1}{2}$ " Strips and they are connected in pairs by two Double Brackets, and also by two built-up double brackets, each made from two Angle Brackets. The arms are bolted at right-angles across the face of a Bush Wheel, which is fixed on the main shaft (2). This shaft is supported in the strips (1).

The entrance is built on a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate, and each side of it is a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate strengthened by $2\frac{1}{2}$ " Strips. The unit is attached to the front side of the $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate by a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip.

The Magic Motor (3) is bolted to the flange of the $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, and the drive is taken from the pulley of the Motor to a 1" Pulley (4). A $\frac{1}{2}$ " fast Pulley (this is supplied with the Magic Motor) also is secured on this Rod, and it drives through a belt of Cord a 3" Pulley (5) on the main shaft.

Each of the boats consists of a $2\frac{1}{2}$ " Strip and a $2\frac{1}{2}$ " stepped Curved Strip bolted together, and a Formed Slotted Strip is attached to the Curved Strip by an Angle Bracket.

If a Magic Motor is not available the model can be operated by hand. For this purpose a 1" Pulley (6) is fastened on a Crank Handle supported in two of the Strips (1), and is connected by a Cord belt to a 3" Pulley (7).

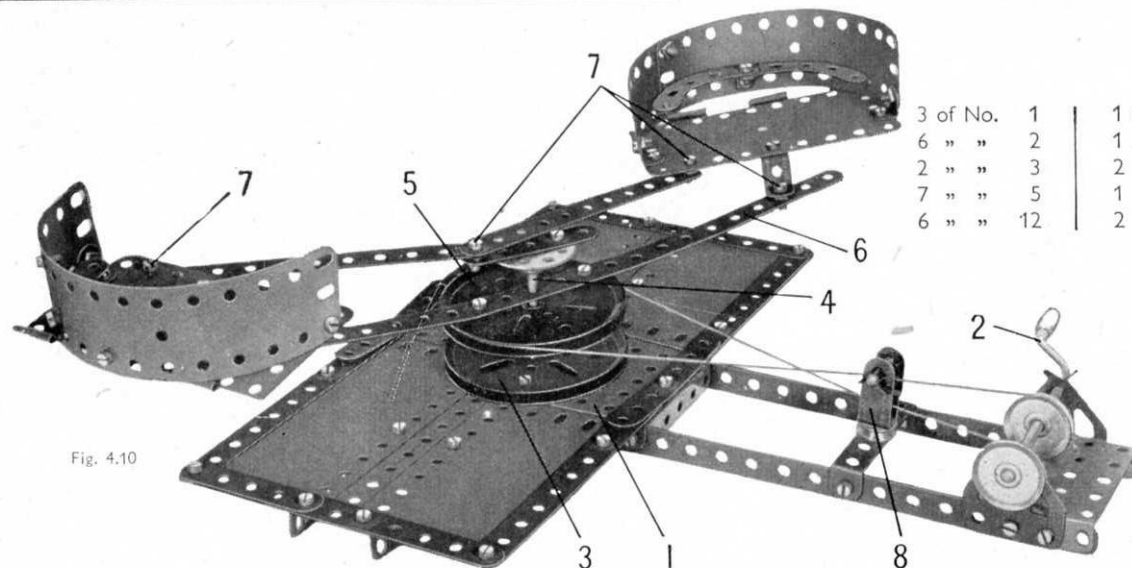


Fig. 4.10

4.10 WHIP ROUNDABOUT

Parts Required

3 of No. 1	1 of No. 17	1 of No. 23	1 of No. 38	1 of No. 52	2 of No. 126a
6 " " 2	1 " " 18b	1 " " 24	1 " " 40	2 " " 54	2 " " 188
2 " " 3	2 " " 19b	6 " " 35	1 " " 44	4 " " 90a	2 " " 189
7 " " 5	1 " " 19g	67 " " 37a	3 " " 48a	6 " " 111c	2 " " 191
6 " " 12	2 " " 22	56 " " 37b	1 " " 51	2 " " 125	2 " " 192
					1 " " 198

The base of the model is formed by a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate (1) extended on each side by a Flanged Sector Plate connected to the base by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip. A $5\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate are bolted to each Flanged Sector Plate, and the edges of the Plates are strengthened as shown by Strips. Two $12\frac{1}{2}''$ Strips are bolted to the side flanges of the Flanged Plate (1) and their ends are connected by a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate. Two Flat Trunnions bolted to the ends of the $12\frac{1}{2}''$ Strips support a Crank Handle (2).

A 3" Pulley (3) is bolted to Flanged Plate (1) and in its boss is fixed a 2" Rod (4). A second 3" Pulley (5) is spaced from Pulley (3) by a Spring Clip and is free to turn on Rod (4). Across its face is bolted a $12\frac{1}{2}''$ Strip (6), which is spaced from the Pulley by a Spring Clip placed on the shank of each of the $\frac{3}{8}''$ Bolts that fix the Strip to the Pulley.

A Bush Wheel with a $2\frac{1}{2}''$ Strip bolted tightly to it is secured at the top of Rod (4), and the end of the Strip is connected to the roundabout cars by $5\frac{1}{2}''$ Strips. The Bolts (7) are lock-nutted.

The bases of the cars are the separated halves of a Hinged Flat Plate, and the backs consist of $5\frac{1}{2}'' \times 1\frac{1}{2}''$ and $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates connected to the bases by Angle Brackets.

The 3" Pulley (5) is driven by a belt of Cord passed round a 1" Pulley on the Crank Handle (2). The Cord is guided by a Stepped Bent Strip (8) bolted to a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip fixed across the $12\frac{1}{2}''$ Strips of the base. A 1" Rod is held in the Stepped Bent Strip by Spring Clips.

4.11 STREAMLINED SPORTS CAR

Parts Required

8 of No. 2	2 of No. 22	5 of No. 38	1 of No. 48	6 of No. 111c	2 of No. 189
2 " " 3	1 " " 23	2 " " 38d	6 " " 48a	1 " " 125	2 " " 190
9 " " 5	1 " " 24	1 " " 40	1 " " 51	2 " " 126	2 " " 192
5 " " 10	2 " " 24a	1 " " 44	4 " " 90a	2 " " 126a	1 " " 198
2 " " 11	3 " " 35			4 " " 187	2 " " 199
8 " " 12	87 " " 37a			2 " " 199	2 " " 200
3 " " 12c	78 " " 37b			2 " " 212a	2 " " 213
2 " " 15b				1 " " 213	2 " " 214
1 " " 16				2 " " 214	3 " " 215
2 " " 17				4 " " 221	
2 " " 18a					

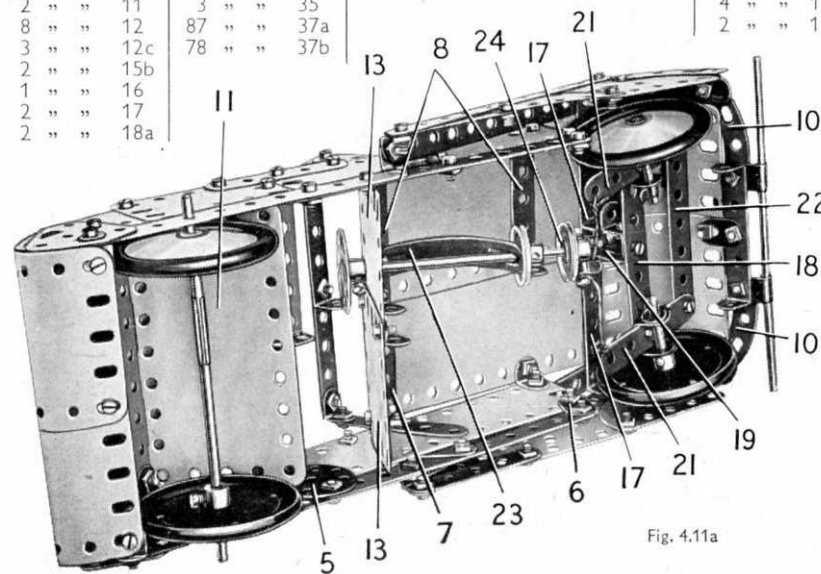


Fig. 4.11a

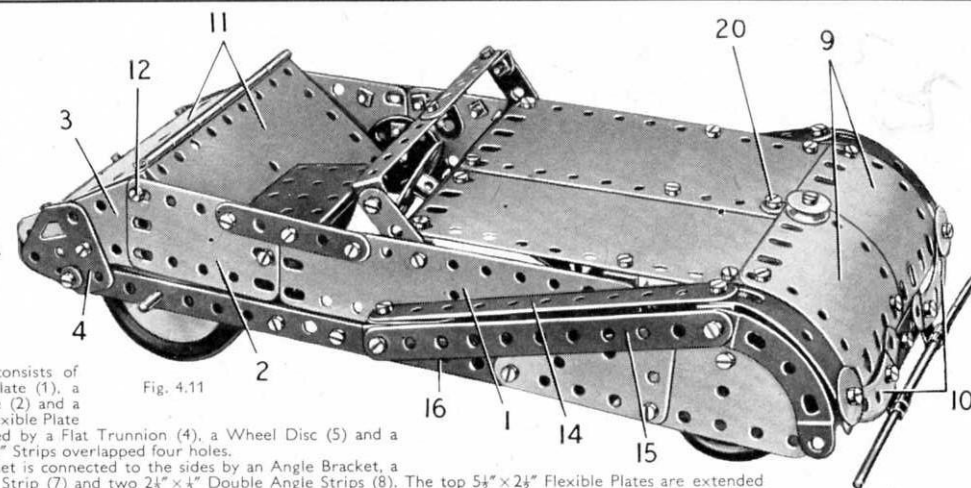


Fig. 4.11

Each side of the car consists of a $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate (1), a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate (2) and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plate (3). These are connected by a Flat Trunnion (4), a Wheel Disc (5) and a Fishplate (6) to two $5\frac{1}{2}''$ Strips overlapped four holes.

The top of the bonnet is connected to the sides by an Angle Bracket, a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip (7) and two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips (8). The top $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates are extended by a Fishplate, and by two $1\frac{1}{2}''$ radius Curved Plates (9). A $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip is attached to the Curved Plates by a Fishplate, and the two $2\frac{1}{2}''$ Stepped Curved Strips (10) are fixed to the Double Angle Strip. The bolts holding the Curved Strips in place fix also two Right-Angle Rod and Strip Connectors, and a 2" and a 4" Rod held in these form the bumper.

The tail of the car is formed by a Hinged Flat Plate 11, attached to Angle Brackets held by a Bolt (12) on each side. Two 'U'-section Curved Plates are bolted to the rear edge of the Hinged Flat Plate, and they are connected to the sides by Angle Brackets. Two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates (13) are attached to the bonnet by three Obtuse Angle Brackets. The seat is a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate.

The front wings each consist of two $5\frac{1}{2}''$ Strips (14) and (15), a $2\frac{1}{2}''$ Strip (16), a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plate, a $2\frac{1}{2}''$ Stepped Curved Strip and a Formed Slotted Strip. The Strip (14) is bolted to a Trunnion fixed to the side of the car, and Strips (15) and (16) are connected to the Trunnion by an Angle Bracket. The Formed Slotted Strip is used to extend Strip (14), and the Curved Strip extends Strip (15). The Semi-Circular Plate is attached to a Fishplate bolted to the front end of Strip (15), and the Formed Slotted Strip is attached to one of the Curved Strips (10). The wings are connected to the bonnet by $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips (17).

The front axle is a $3\frac{1}{2}''$ Strip (18), which is connected by a $\frac{3}{8}''$ Reversed Angle Bracket to a Stepped Bent Strip (19) that is fixed to the bonnet by a Bolt (20). A $2\frac{1}{2}''$ Strip (21) at each side is placed between the lugs of a Double Bracket, and a $\frac{3}{8}''$ Bolt is passed through the Strip and the Double Bracket. The Bolt is then inserted in one of the end holes of Strip (18), and is fitted with lock-nuts. A $\frac{3}{8}''$ Strip (22) is connected by lock-nutted bolts to the front ends of Strips (21). The front wheels are fixed on $1\frac{1}{2}''$ Rods held in the Double Brackets by Spring Clips.

The steering column is a 4" Rod mounted in one of the Flexible Plates (13), and in a Formed Slotted Strip (23) bolted under the bonnet. The 4" Rod is held in place by a 1" Pulley, and it carries a second 1" Pulley (24) fitted with a $\frac{3}{8}''$ Bolt. A length of Cord is tied at its centre to the $\frac{3}{8}''$ Bolt, and each end is fastened to one of the Strips (21). A Spring Clip on the $\frac{3}{8}''$ Bolt keeps the Cord close to the head of the Bolt.

The rear axle consists of a $3\frac{1}{2}''$ and a 2" Rod joined by a Rod Connector.

4.12 HAMMERHEAD CRANE

The base of the tower that supports the jib is a $5\frac{1}{2}'' \times 2\frac{1}{8}''$ Flanged Plate, and two Flanged Sector Plates are attached to it by Angle Brackets. The rounded portion on each side is made by attaching a Semi-Circular Plate to the Flanged Plate by an Angle Bracket, and two Formed Slotted Strips are fixed to a Double Bracket bolted to the Semi-Circular Plate.

The narrow ends of the Flanged Sector Plates are connected by two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips, and a 3" Pulley (1) is bolted to them. The jib is attached to two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips bolted to a second 3" Pulley (2) that has a 2" Rod fixed in its boss. This Rod is passed through the boss of the Pulley (1), and a Bush Wheel fixed on the Rod underneath Pulley (1) is used to hold it in place.

The jib is made by bolting a 2nd Strip (3) at each end to the turned-up ends of the Double Angle Strips fixed to Pulley (2). The Strip (3) is extended forward by a 12th Strip (4), and to the rear by a 5th Strip (5). The outer ends of Strips (4) and (5) are joined to a made-up Strip (6), consisting of a 12th, a 5th, and a 3rd Strip bolted together. Strip (6), and two 2nd Strips are added to brace the assembly. The Double Angle Strips are joined to the rear by a 12th Double Angle Strip (7), and at the front by a Stepped Bent Strip.

The cab is made by bolting a 24" x 24" Flexible Plate, strengthened by 2½" Stepped Curved Strips, to each side of the top, and these Plates are connected at the top by a 21½" x 24" Flexible Plate attached to Angle Brackets. The four Road Wheels are fixed on a 4" Rod passed through Flat Trunnions bolted to two of the Stepped Curved Strips. A Crank Handle is passed through the other two Curved Strips, and a length of Cord tied to the Crank Handle is led over a ½" Pulley on a 1½" Rod (8).

Parts Required		Parts Required	
4 of No. 1	1 of No. 24		
8 " " 2	4 " " 35a		
2 " " 3	64 " " 37a		
8 " " 5	64 " " 37b		
2 " " 11	2 " " 38		
8 " " 12	1 " " 40		
1 " " 15b	1 " " 44		
1 " " 17	1 " " 48		
1 " " 18a	5 " " 48a		
2 " " 19b	1 " " 52		
1 " " 19g	2 " " 54		
1 " " 23	1 " " 57c		

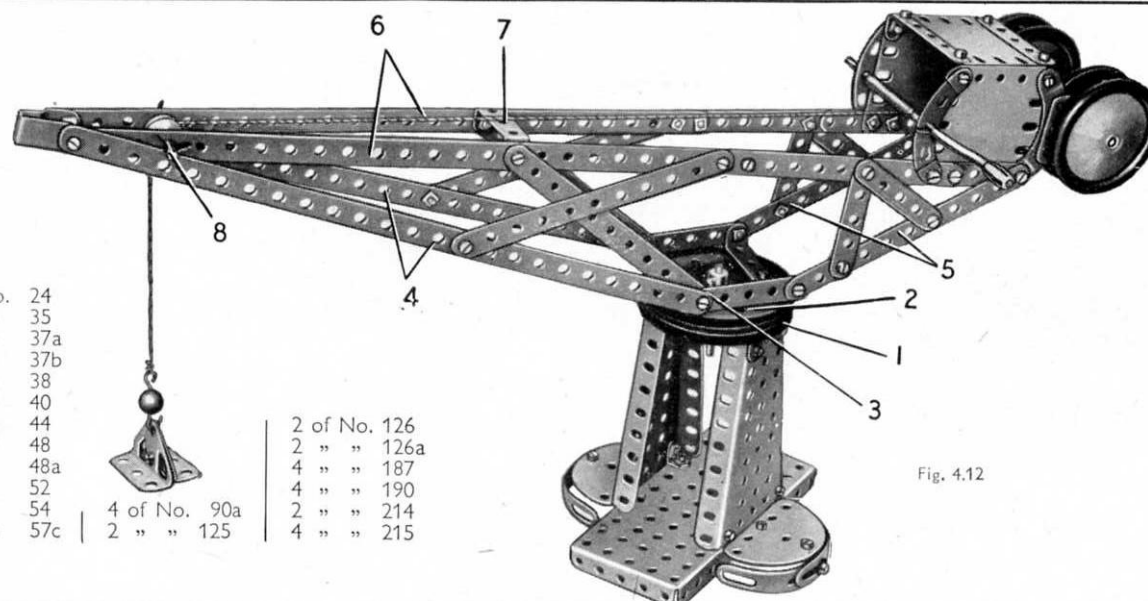


Fig. 4.12

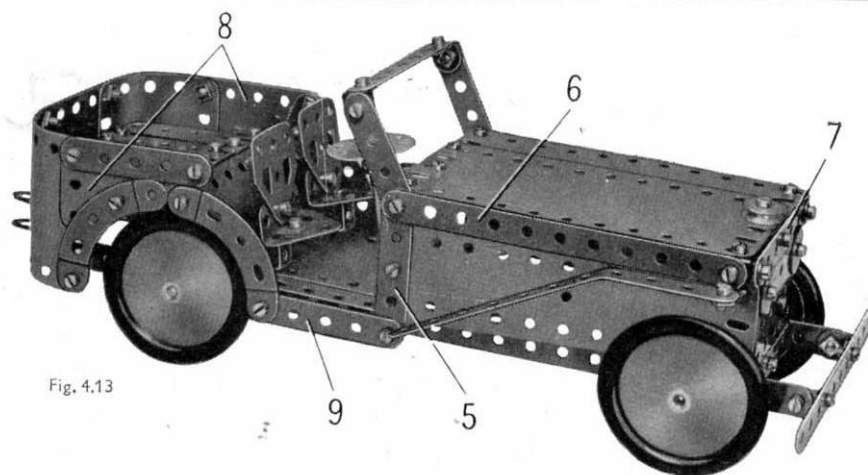


Fig. 4.13

Each seat is a Flat Trunion bolted to a Trunion, and is fixed to the floor by a $\frac{1}{2}$ " Reversed Angle Bracket. The steering column is a 2" Rod held by a Spring Clip in a 2 $\frac{1}{2}$ " Strip bolted to the top of the bonnet.

Parts Required									
2 of No. 1	4 of No. 12c	78 of No. 37b	4 of No. 90a	2 of No. 189					
4 " " 2	2 " " 15b	8 " " 38	1 " " 111c	4 " " 190					
2 " " 3	1 " " 17	2 " " 38d	2 " " 125	1 " " 191					
9 " " 5	1 " " 23	1 " " 44	2 " " 126	2 " " 192					
2 " " 10	1 " " 24	1 " " 48	2 " " 126a	2 " " 200					
2 " " 11	5 " " 35	6 " " 48a	4 " " 187	2 " " 215					
8 " " 12	80 " " 37a	1 " " 51	2 " " 188	2 " " 221					

4.13 JEEP

The chassis consists of two 12 $\frac{1}{2}$ " Strips connected by three 2 $\frac{1}{2}$ " x $\frac{1}{4}$ " Double Angle Strips, numbered (1), (2) and (3) (Fig. 4.13a). The axes of the wheels are supported in the 12 $\frac{1}{2}$ " Strips. An upright 2 $\frac{1}{2}$ " x $\frac{1}{4}$ " Double Angle Strip (4) is bolted to Double Angle Strip (1), and it supports a 2 $\frac{1}{2}$ " x $\frac{1}{4}$ " Flanged Plate that represents the radiator. Each side of the bonnet is a 5 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ " Flexible Plate bolted between the flange of the Flanged Plate and a 2 $\frac{1}{2}$ " Strip (5), which is connected to the chassis by a Double Bracket. The top consists of two 5 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ " Flexible Plates overlapped and bolted to the top of Double Angle Strip (4) and to Angle Brackets fixed to Strips (5). A 5 $\frac{1}{2}$ " Strip (6) at each side of the bonnet is connected by Angle Brackets to the Flexible Plates. The radiator is completed by a 3 $\frac{1}{2}$ " Strip (7) bolted to Double Angle Strip (4).

The body at the rear is made by bolting a $2\frac{1}{2} \times 2\frac{1}{2}$ Flexible Plate to the Double Angle Strip (3). This Plate is fitted with two $1\frac{1}{16}$ radius Curved Plates, and the latter are extended by $2\frac{1}{2} \times 1\frac{1}{2}$ Triangular Flexible Plates (8), edged by $2\frac{1}{2}$ Strips. Two $2\frac{1}{2}$ Stepped Curved Strips on each side are connected by $2\frac{1}{2}$ Strips (9) to the lower ends of Strips (5).

The floor of the driving compartment is a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate (10) bolted to Double Angle Strip (2), and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate fixed to the Double Brackets used to connect Strips (5) to the chassis. The raised floor is made by attaching a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate (11) to Obtuse Angle Brackets bolted to Double Angle Strip (2). Two $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates (12) are connected to Flexible Plate (11) by Obtuse Angle Brackets, and to the rear of the body by $2\frac{1}{2}'' \times \frac{1}{2}''$ and $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips (13) and (14). Formed Slotted Strips bolted to the Flexible Plates (12) fill in the gaps between Flexible Plate (11) and the sides of the body, and provide guards over the rear wheels.

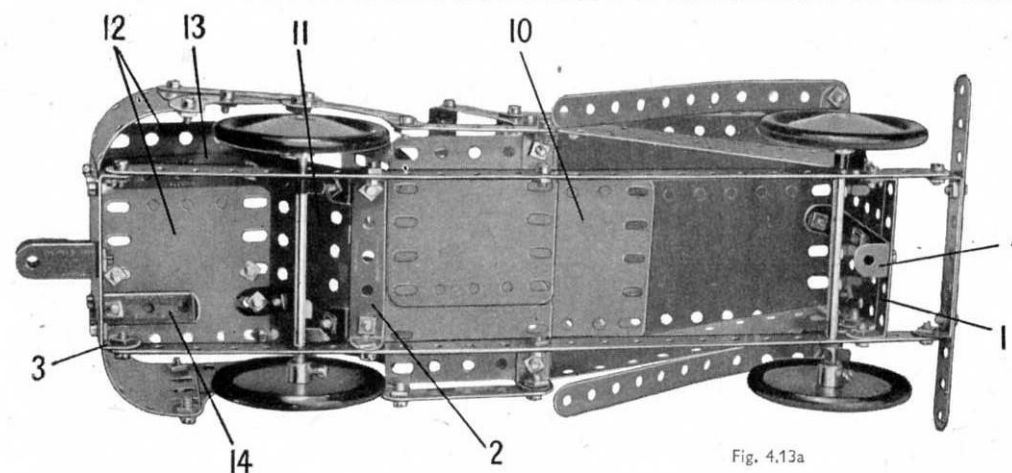


Fig. 4.13a

4.14 THREE-WHEEL SPORTS CAR

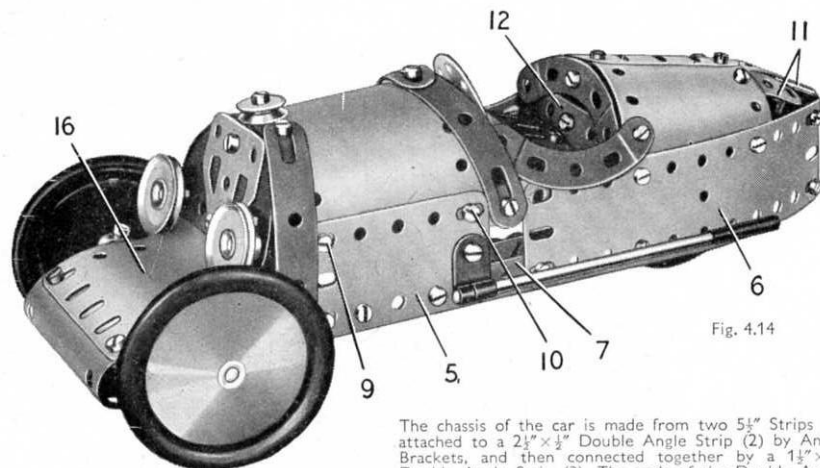


Fig. 4.14

The chassis of the car is made from two $5\frac{1}{2}$ " Strips (1) attached to a $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip (2) by Angle Brackets, and then connected together by a $1\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip (3). The ends of the Double Angle Strip (2) and the $\frac{1}{2}$ " Reversed Angle Brackets (4) are made

use of to attach the sides of the body to the chassis. Each side uses a $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plate (5) and a $5\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plate (6), which are bolted to a $5\frac{1}{2}$ " Strip (7). The rear ends of the $5\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plates are connected by four Obtuse Angle Brackets, arranged in sets of two (see Fig. 4.14a). A $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flanged Plate (8) bolted between the sides of the body overhangs by one hole the front ends of Strips (7).

The bonnet top is a $4\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plate bent to shape and bolted between the Plates (5). Bolts (9) and (10) that fix it in place are used also to attach $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strips between the sides to give strength to the bonnet.

The tail cowl is formed by two $1\frac{1}{2}$ " radius Curved Plates, and three $2\frac{1}{2}$ " Strips (11) fixed to their rear edges complete the tail. The seat is a 'U'-section Curved Plate attached by a Trunnion to a $2\frac{1}{2}$ " Strip (12). This Strip is connected by a Fishplate to a $2\frac{1}{2}$ " Stepped Curved Strip, and the complete assembly is fixed to an Angle Bracket bolted to the $1\frac{1}{2}$ " radius Curved Plates.

The rear wheel is fixed on a 2" Rod supported in Strips (1) and held in place by 1" Pulleys. The front axle is a $3\frac{1}{2}$ " Strip (13), which is bolted tightly to two face-to-face $2\frac{1}{2}$ " Strips (14) fixed to the Flanged Plate (8). Each front wheel is fixed on a $1\frac{1}{2}$ " Rod mounted in a Double Bracket and held in place by a Spring Clip. A Fishplate is held tightly by a nut on a $\frac{1}{2}$ " Bolt in the centre hole of the Double Bracket, and the Bolt is then passed through the Strip (13) and fitted with lock-nuts. A second $3\frac{1}{2}$ " Strip (17) is lock-nutted to the ends of the Fishplates, and two Angle Brackets, arranged to form a 'U'-shaped piece, are fixed to it by a Bolt (15). The steering column is a Crank Handle, and is supported in the Double Angle Strip held by the Bolts (9) and in a Fishplate fixed to the Double Angle Strip held by Bolts (10). Its cranked end engages between the turned-up ends of the Angle Brackets attached by the Bolt (15).

The radiator and front cowl consist of a $2\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plate (16) attached to a Semi-Circular Plate. A 'U'-section Curved Plate is fixed to the front edge of Plate (16), and the headlamps are 1" Pulleys fastened on $\frac{1}{2}$ " Bolts. The radiator and cowl assembly is attached to the bonnet by an Angle Bracket.

The exhaust pipe is a 4" Rod held in a Right-Angle Rod and Strip Connector.

Parts Required

6 of No. 2	59 of No. 37b	2 of No. 200
2 " " 3	1 " " 38	1 " " 212
6 " " 5	1 " " 48	1 " " 212a
4 " " 10	3 " " 48a	1 " " 213
2 " " 11	1 " " 51	1 " " 214
7 " " 12	3 " " 90a	4 " " 215
4 " " 12c	5 " " 111c	
1 " " 15b	2 " " 125	
2 " " 17	1 " " 126	
2 " " 18a	1 " " 126a	
1 " " 19g	3 " " 187	
4 " " 22	2 " " 188	
1 " " 23	2 " " 189	
1 " " 24	1 " " 190	
2 " " 35	1 " " 191	
69 " " 37a	2 " " 199	

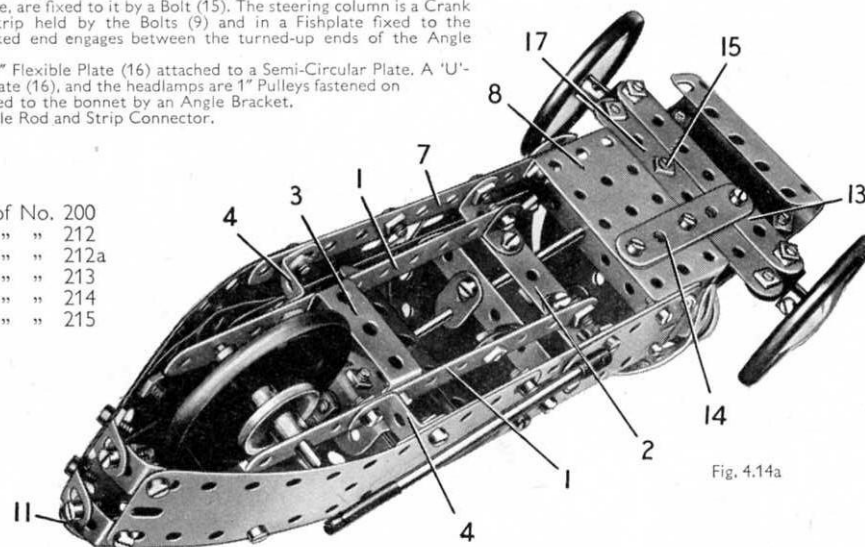


Fig. 4.14a

4.15 BASCULE BRIDGE

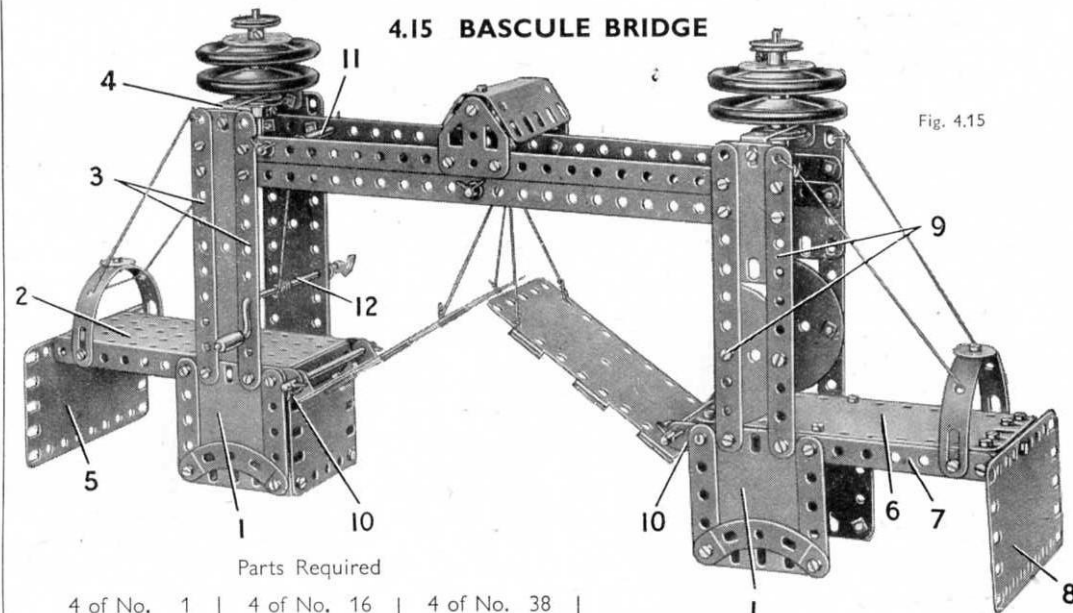


Fig. 4.15

Parts Required

4 of No. 1	4 of No. 16	4 of No. 38	1 of No. 126	2 of No. 189	1 of No. 199
8 " " 2	1 " " 19g	2 " " 38d	2 " " 126a	4 " " 190	2 " " 200
2 " " 3	4 " " 22	1 " " 40	6 " " 48a	2 " " 191	1 " " 212
8 " " 5	2 " " 24a	1 " " 51	1 " " 176	1 " " 192	2 " " 214
4 " " 10	8 " " 35	1 " " 52	4 " " 187	1 " " 198	4 " " 215
7 " " 12	81 " " 37a	4 " " 90a	2 " " 188		
2 " " 15b	81 " " 37b				

The two towers of the model Bascule Bridge are built first. They are similar to each other in general design, but they differ in some details. The left-hand tower is made by bolting a $2\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plate (1) to each side of a $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate (2). The Flexible Plates are edged by $2\frac{1}{2}$ " Strips and $2\frac{1}{2}$ " Stepped Curved Strips and they are bridged by a $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip. A $1\frac{1}{2}$ " radius Curved Plate is flattened and then bolted to the Double Angle Strip and to the Flanged Plate (2). Two $5\frac{1}{2}$ " Strips (3) on each side are fixed to the edges of a $5\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plate, and the upper ends of the Flexible Plates are connected by a $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip (4). A $3\frac{1}{2}$ " Rod passed through the centre hole of the Double Angle Strip is fitted with a 1" Pulley, a Wheel Disc and two Road Wheels, and is held in place by a second 1" Pulley fixed underneath the Double Angle Strip. The outer end of the Flanged Plate (2) is supported by a $4\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plate (5), and the arch is made from two Formed Slotted Strips.

The base of the right-hand tower is made in the same way as the left-hand tower already described, but the Plates (1) are bolted to a $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flanged Plate in place of the $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate (2). A $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plate (6) is fixed to the $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flanged Plate, and it is edged by a $3\frac{1}{2}$ " Strip (7) on each side. These Strips are connected to the Plate (6) by Angle Brackets at their outer ends, and a $4\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plate (8) is also attached by an Angle Bracket. The base is extended upward by two $5\frac{1}{2}$ " Strips (9) on each side, and the space between these Strips is filled by a Semi-Circular Plate and a $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plate. The top of this tower is completed in the same way as its companion.

The towers are connected together by two $12\frac{1}{2}$ " Strips on each side, and a 'U'-section Curved Plate, which is attached to Flat Trunnions by Angle Brackets, is bolted to the centre of the $12\frac{1}{2}$ " Strips.

The centre pin of the Hinged Flat Plate is removed and the separated halves are used to form the lifting spans of the bridge. A $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip is bolted to each half of the Plate, and a 4" Rod is passed through its lugs and through Fishplates (10) on each side.

Two lengths of Cord are fastened to the Hinged Flat Plate sections, and the ends of these Cords are tied together. A single length of Cord attached to the knotted ends of the short Cords is led over a $3\frac{1}{2}$ " Rod (11) and is tied to a Cord Anchoring Spring on a Crank Handle (12). A Rod and Strip Connector is placed on the Crank Handle to hold it in position in the tower.

4.16 GANTRY CRANE

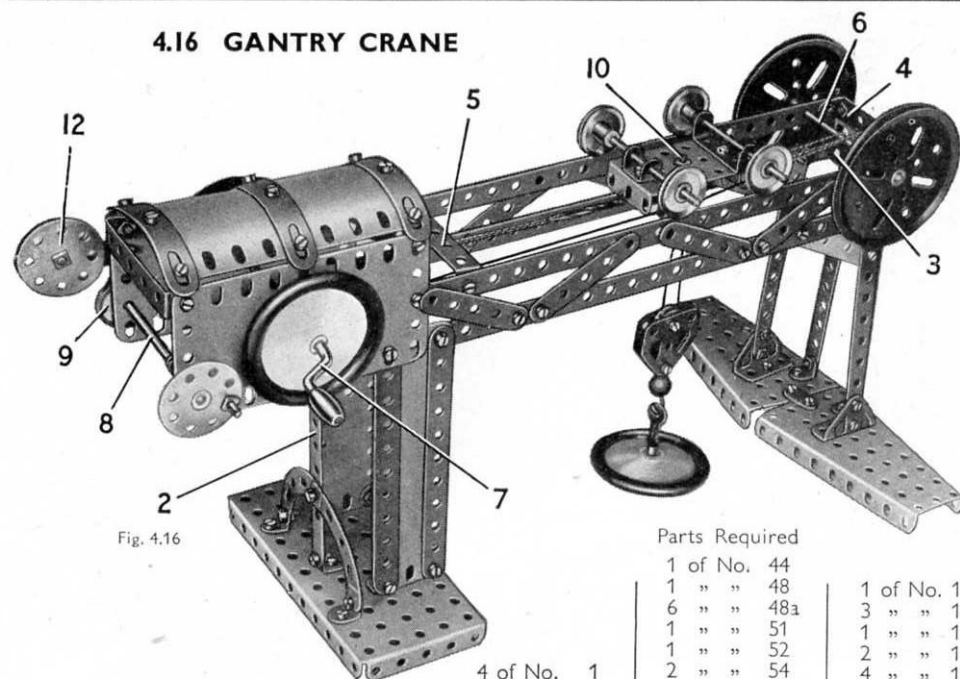


Fig. 4.16

Parts Required

1 of No. 44	1 of No. 186
1 " " 48	3 " " 187
6 " " 48a	1 " " 188
1 " " 51	2 " " 189
1 " " 52	4 " " 190
2 " " 54	2 " " 200
1 " " 57c	1 " " 212
2 " " 90a	3 " " 215
4 " " 111c	2 " " 221
2 " " 126	
2 " " 126a	

4 of No. 1
8 " " 2
2 " " 3
9 " " 5
1 " " 10
1 " " 11
7 " " 12
4 " " 12c
4 " " 16
1 " " 18a
1 " " 18b
2 " " 19b
1 " " 19g
1 " " 22
1 " " 23
1 " " 24
2 " " 24a
2 " " 35
85 " " 37a
80 " " 37b
1 " " 40

The left-hand tower consists of two columns, each made from a $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate and two $5\frac{1}{2}"$ Strips. They are joined at their lower ends by a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip, and at their upper ends are bolted to a similar part (1). The assembly is attached to the Flanged Plate by two Angle Brackets. A $5\frac{1}{2}"$ Strip (2) is fixed to Double Angle Strip (1), and is connected to the base by an Angle Bracket.

The right-hand tower consists of three $5\frac{1}{2}"$ Strips and a built-up $5\frac{1}{2}"$ Strip made from two $3\frac{1}{2}"$ Strips. The upper ends of the inner Strips are bolted to a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (3), which is connected to a similar part (4) by a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate.

Each side of the gantry is formed by two $12\frac{1}{2}"$ Strips. These are bolted to the towers and to the Double Angle Strips (1) (3) and (4), and to two $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates that form the cabin sides. The $12\frac{1}{2}"$ Strips are fitted with $2\frac{1}{2}"$ Strips as shown, and a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (5) is fixed in position.

The cabin sides are connected by a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip, and the roof is attached to Obtuse Angle Brackets.

The wheels of the travelling bogie are fixed on $3\frac{1}{2}"$ Rods, one of which is mounted in a Double Bracket and the other in a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip. A length of Cord is tied to the bogie at one end, and is taken over a Rod (6). The Cord is then wound a few turns round Crank Handle (7) and tied to a $2\frac{1}{2}"$ Driving Band attached to the other end of the bogie.

The hoisting Cord is tied to Rod (8) fitted with a 1" Pulley (9) and a Bush Wheel. A $\frac{3}{8}"$ Bolt in the Bush Wheel acts as a handle. The Cord is passed over a 1" Rod held by Spring Clips in a Stepped Bent Strip fixed underneath the bogie by a Bolt (10). The Cord passes round a $\frac{1}{2}"$ Pulley in the pulley block, is taken over the 1" Rod and finally is tied to the Double Angle Strip (4). The $\frac{1}{2}"$ Pulley is held on a $\frac{3}{8}"$ Bolt between two Flat Trunnions, to which a small Loaded Hook is also attached by a $\frac{3}{8}"$ Bolt.

A brake on Rod (8) is provided by Cord passed round Pulley (9) and tied to $2\frac{1}{2}"$ Strip (11). This Strip is pivoted on a Bolt lock-nutted to the cabin, and is weighted by Wheel Discs (12).

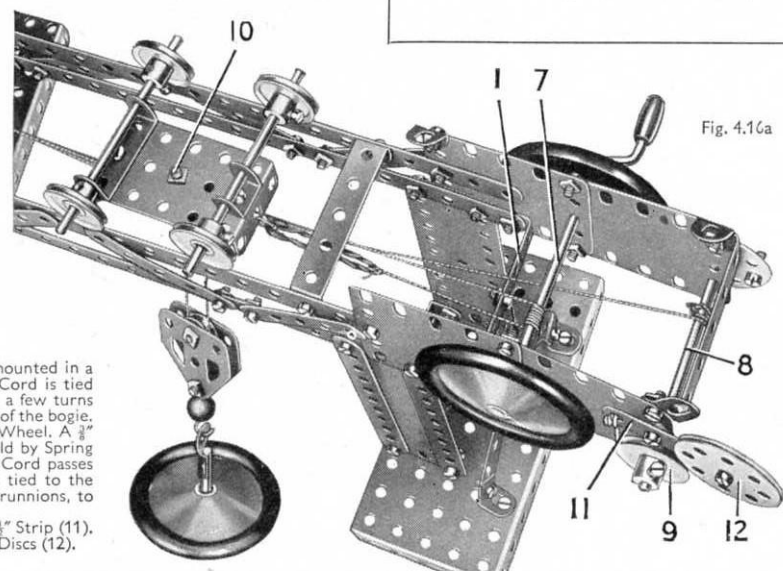


Fig. 4.16a

4.17 DREDGER

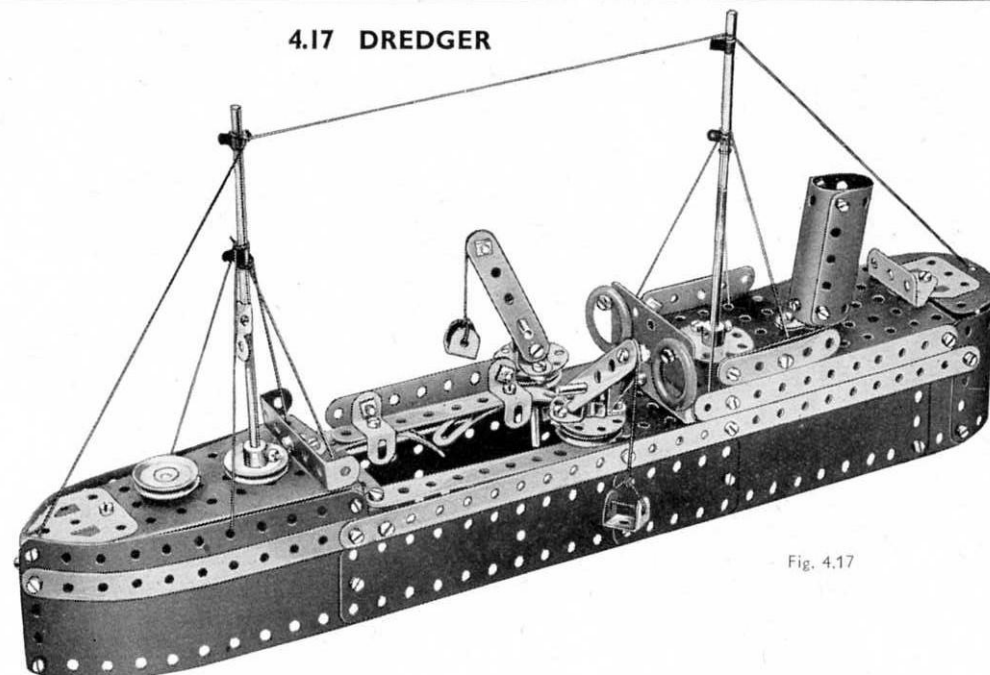


Fig. 4.17

A $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip is bolted to the front flange of the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate, and a Semi-Circular Plate is held between the flange and the Double Angle Strip by the same Bolt. The deck cranes each consist of a 1" Pulley fastened to a 2" Rod, above which is placed a Wheel Disc fitted with Angle Brackets. Bolted securely to these are the $2\frac{1}{2}"$ Strips forming the jib. The complete units are held in place by Spring Clips. The rear Formed Slotted Strip of the hopper bridge is fastened to the front of the $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate by an Obtuse Angle Bracket.

The foremast of the dredger is made by joining together two $3\frac{1}{2}"$ Rods by a Rod and Strip Connector. It is fixed to the Flanged Sector Plate forming the bow of the boat by two 1" Pulleys, one of which is held underneath the Flanged Sector Plate. The aft mast consists of two $3\frac{1}{2}"$ Rods joined by a Rod Connector, and it is held in a Bush Wheel bolted to the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate.

Parts Required

2 of No. 1	2 of No. 24a	2 of No. 126a
6 " " 2	8 " " 35	2 " " 155
2 " " 3	76 " " 37a	2 " " 188
9 " " 5	70 " " 37b	2 " " 189
4 " " 10	4 " " 38	2 " " 190
2 " " 11	1 " " 40	2 " " 191
8 " " 12	3 " " 48a	2 " " 192
2 " " 12c	1 " " 51	2 " " 199
4 " " 16	1 " " 52	2 " " 200
2 " " 17	1 " " 54	1 " " 212
2 " " 18a	5 " " 111c	1 " " 213
4 " " 22	2 " " 125	2 " " 214
1 " " 24	1 " " 126	2 " " 215

4.18 DRILLING MACHINE

The base of the machine is a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate (1), extended at each side by a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate. The base is edged by $5\frac{1}{2}"$ and $2\frac{1}{2}"$ Strips, and $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips as shown.

The upright column consists of two $12\frac{1}{2}"$ Strips at each side attached to Trunnions bolted to the base. The Strips on each side are connected at the top by two $5\frac{1}{2}"$ Strips (2), and these are joined to the opposite side by a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (3) and a $2\frac{1}{2}"$ Strip (4) attached to Angle Brackets. The top of the column is filled in by a $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate and a Wheel Disc (5). A $2\frac{1}{2}" \times 1\frac{1}{2}"$ Triangular Flexible Plate (6) on each side is bolted between the $5\frac{1}{2}"$ and the $12\frac{1}{2}"$ Strips.

The drill head is made by bolting a $3\frac{1}{2}"$ Strip (7) to the lower of the Strips (2) on each side, and connecting it to the main column by a $2\frac{1}{2}"$ Strip and a Flexible Plate. A $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate is used on one side, and a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate (8) on the other.

The drill spindle consists of two Rods joined by a Rod Connector, and two 1" Pulleys (9) are fixed on the spindle as shown. The spindle is passed through the Double Angle Strip (3) and the Wheel Disc (5), and through a $2\frac{1}{2}"$ Strip (10) and a Wheel Disc attached to the lower ends of Strips (7) by Angle Brackets.

The drill can be lowered down to the work table by operating a lever (11). This is a $5\frac{1}{2}"$ Strip *lock-nutted* to the column, and a 2" Rod held in the Strip and in a $\frac{1}{2}"$ Reversed Angle Bracket (12) engages between the 1" Pulleys (9). A Driving Band (13) arranged as shown normally holds the drill clear of the table.

The drill is rotated by turning a Crank Handle mounted in $2\frac{1}{2}"$ Strips (14) bolted to the $12\frac{1}{2}"$ Strips. A 3" Pulley on the Crank Handle is connected by a Cord belt to one of the Pulleys (9). The Cord belt passes over two 1" Pulleys (15), free to turn on a Rod supported in Trunnions bolted to the Strips (2). The drill head is enclosed by two 'U'-section Curved Plates attached to Obtuse Angle Brackets bolted to the Strips (7).

The work table consists of a Flanged Sector Plate bolted to the column, and fitted at each side with a $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate. The front of the table is a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate fixed to Angle Brackets. A 3" Pulley (16) is held on a $\frac{1}{2}"$ Bolt passed through the Flanged Sector Plate.

A $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate (17) is attached to the column by Double Brackets.

Parts Required

4 of No.	1	1 of No.	40
8 " "	2	1 " "	48
2 " "	3	4 " "	48a
9 " "	5	1 " "	52
2 " "	11	1 " "	54
8 " "	12	5 " "	111c
2 " "	12c	1 " "	125
1 " "	15b	2 " "	126
1 " "	16	2 " "	126a
2 " "	17	1 " "	186
2 " "	19b	2 " "	187
1 " "	19g	1 " "	188
4 " "	22	2 " "	189
1 " "	23	2 " "	190
2 " "	24a	2 " "	191
5 " "	35	2 " "	192
87 " "	37a	2 " "	199
81 " "	37b	1 " "	213
3 " "	38	4 " "	221

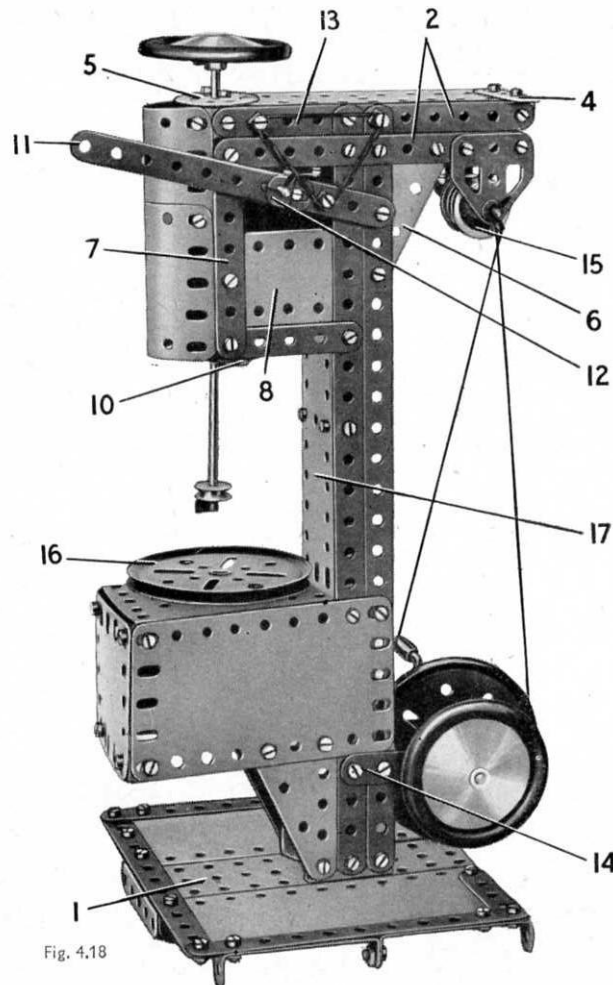


Fig. 4.18

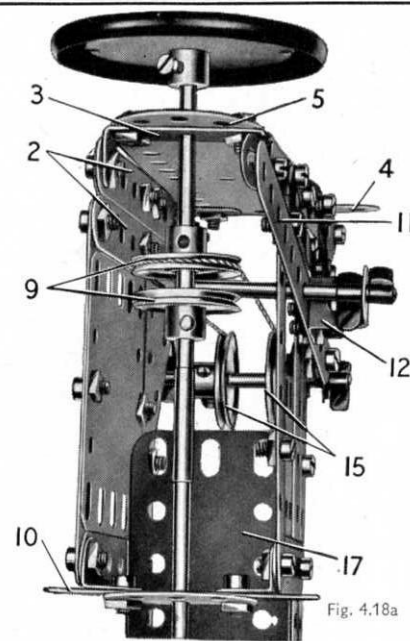


Fig. 4.18a

4.19 QUAYSIDE UNLOADER

Parts Required

4 of No.	1	1 of No.	24	2 of No.	126
8 " "	2	8 " "	35	4 " "	155
2 " "	3	77 " "	37a	1 " "	176
9 " "	5	75 " "	37b	1 " "	186
2 " "	10	9 " "	38	2 " "	187
8 " "	12	1 " "	40	2 " "	188
4 " "	12c	6 " "	48a	2 " "	189
1 " "	15b	1 " "	51	1 " "	190
3 " "	16	1 " "	52	2 " "	192
1 " "	18b	2 " "	54	2 " "	200
1 " "	19g	1 " "	57c	2 " "	214
5 " "	22	2 " "	90a	3 " "	215
1 " "	23	6 " "	111c	4 " "	221

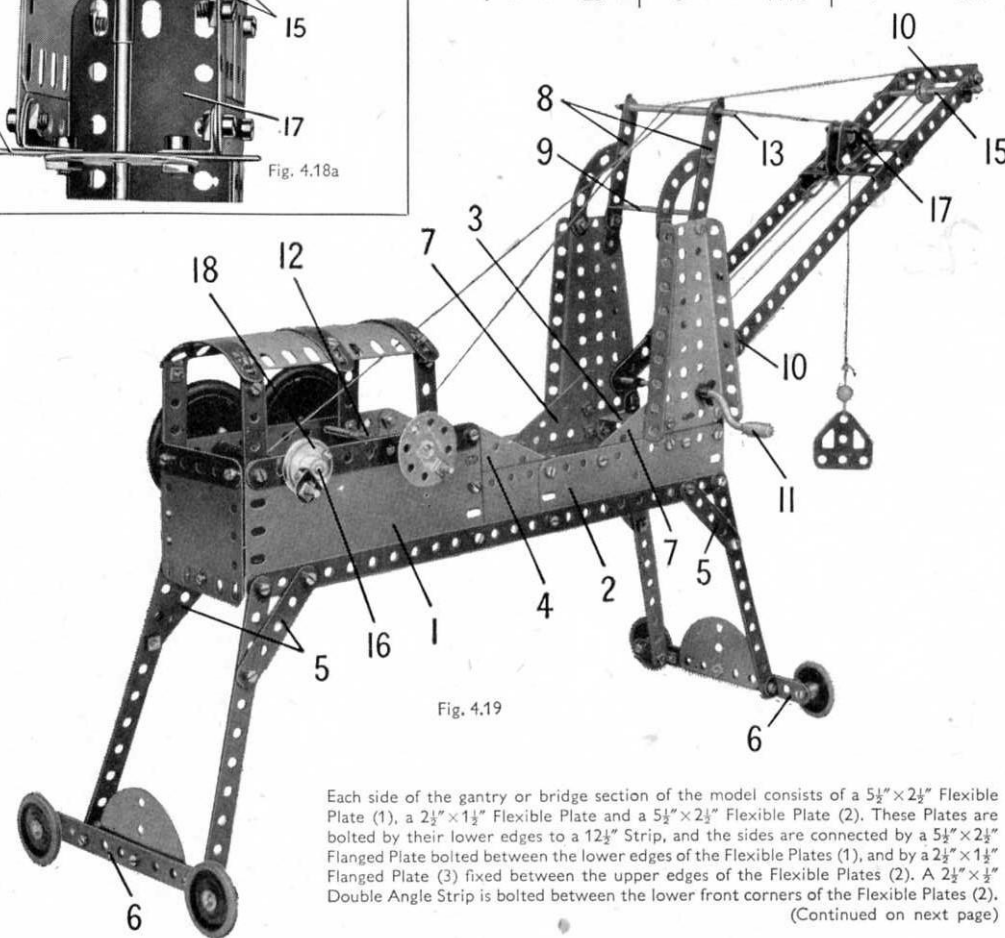


Fig. 4.19

Each side of the gantry or bridge section of the model consists of a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (1), a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate and a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (2). These Plates are bolted by their lower edges to a $12\frac{1}{2}"$ Strip, and the sides are connected by a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate bolted between the lower edges of the Flexible Plates (1), and by a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate (3) fixed between the upper edges of the Flexible Plates (2). A $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip is bolted between the lower front corners of the Flexible Plates (2).

(Continued on next page)

MODEL 4.19 QUAYSIDE UNLOADER — Continued

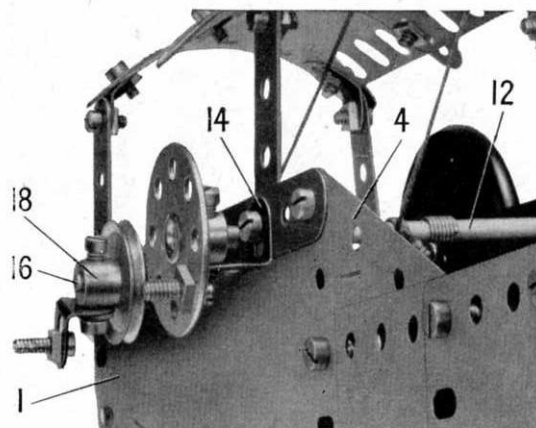


Fig. 4.19a

The top edges of the Flexible Plates (1) are strengthened by $5\frac{1}{2}$ " Strips, and $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Triangular Plates (4) are bolted in position as shown.

Each leg of the gantry is a $5\frac{1}{2}$ " Strip braced to the gantry by a $2\frac{1}{2}$ " Strip (5). The legs are connected at their lower ends by Angle Brackets to $5\frac{1}{2}$ " Strips (6), and 1" Pulleys are held by their set-screws on $\frac{3}{8}$ " Bolts passed through these Strips.

The roof of the operating cabin consists of two $1\frac{1}{8}$ " radius Curved Plates edged as shown by three Formed Slotted Strips. The roof is attached by Obtuse Angle Brackets to four $2\frac{1}{2}$ " Strips bolted to the Flexible Plates (1). The back of the cabin is a $2\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plate bolted to the $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate and connected to the sides by Angle Brackets.

A Flanged Sector Plate is attached to each side of the gantry by a Fishplate and a $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Triangular Flexible Plate (7). The Flanged Sector Plates are extended upward by $3\frac{1}{2}$ " Strips (8), which are braced by $2\frac{1}{2}$ " Stepped Curved Strips, and a $2\frac{1}{2}$ " x $3\frac{1}{2}$ " Double Angle Strip (9) is bolted between the Flanged Sector Plates.

The jib of the model consists of two $12\frac{1}{2}$ " Strips joined together by two $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Double Angle Strips (10). The jib pivots on a Crank Handle (11) supported in the Flanged Sector Plates, and it can be luffed, or raised and lowered, by operating a Bush Wheel fixed on a 4" Rod (12). A length of Cord is tied to a Cord Anchoring Spring on the Rod, is led over a Rod (13) and is fastened to the front of the jib. The Rod (12) is free to slide about $\frac{1}{4}$ " in its bearings, so that when the Bush Wheel is pushed in its set-screw catches on an Angle Bracket (14) bolted to the side of the cabin.

The crab or travelling carriage that carries the load-hoisting Cord is made by bolting two $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Double Angle Strips to two Trunnions. The crab can be moved up or down the jib by turning the Crank Handle (11). A length of Cord is tied to the rear of the crab and is wound two or three times round the Crank Handle. The Cord is then taken round a $\frac{1}{2}$ " Pulley on a Rod (15) and is fastened to the front of the crab.

The hoisting Cord is tied to a Rod (16), is led over Rod (13) and a 1" Rod (17), and is fitted with a small Loaded Hook. A handle on Rod (16) is provided by an Angle Bracket fixed to a 1" Pulley (18) (Fig. 4.19a). Two Washers are slipped over a Bolt, which is then passed through the Angle Bracket and is screwed into the boss of the Pulley. A $\frac{3}{8}$ " Bolt is held by a nut in the Angle Bracket.

4.20 RACING CAR

The chassis is made by bolting two $12\frac{1}{2}$ " Strips to $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Double Angle Strips (1) and (2). Each $12\frac{1}{2}$ " Strip is extended at its rear end by a $5\frac{1}{2}$ " Strip (3) that overlaps the $12\frac{1}{2}$ " Strip by five holes, and the ends of the $5\frac{1}{2}$ " Strips are bolted together to form the pointed tail. A $5\frac{1}{2}$ " Strip (4) is fixed to the chassis at each side, and these Strips are connected by a $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Double Angle Strip (5).

The sides of the bonnet are formed by $5\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plates (6) and $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plates (7). The Plates (7) are curved and bolted together as shown, and their front edges are strengthened by Formed Slotted Strips. A $1\frac{1}{2}$ " x $1\frac{1}{2}$ " Double Angle Strip is fixed to the Plates (6) by a Bolt (8) on each side, and three $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Double Angle Strips representing the radiator are bolted to the $1\frac{1}{2}$ " x $1\frac{1}{2}$ " Double Angle Strip. The rounded top of the radiator is formed by a Wheel Disc.

The sides of the driver's cockpit are $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plates, and the tail is plated by a $1\frac{1}{8}$ " radius Curved Plate (9) on each side. The Curved Plates are connected at the top by a 'U'-section Curved Plate (10), and a second 'U'-section Curved Plate (11) is attached to the first by a Fishplate. Two $2\frac{1}{2}$ " Strips (12) are bolted to the Curved Plate (11), and they are connected to the Strips (3) by a Fishplate.

The rear wheels are each fixed on a $3\frac{1}{2}$ " Rod passed through a $\frac{1}{2}$ " Reversed Angle Bracket (13) and a Fishplate bolted to the Strip (3). The inner ends of the Rods are supported in Fishplates bolted to a Double Bracket that is fixed to the centre of Double Angle Strip (5). The front axle is a 4" and a 2" Rod joined by a Rod Connector.

The steering wheel is fixed on a 1" Rod held by a 1" Pulley in a Wheel Disc (14). The Wheel Disc and a $2\frac{1}{2}$ " Stepped Curved Strip (15) are attached to the bonnet by an Angle Bracket. The rear end of the exhaust pipe is supported as shown by two Obtuse Angle Brackets bolted together.

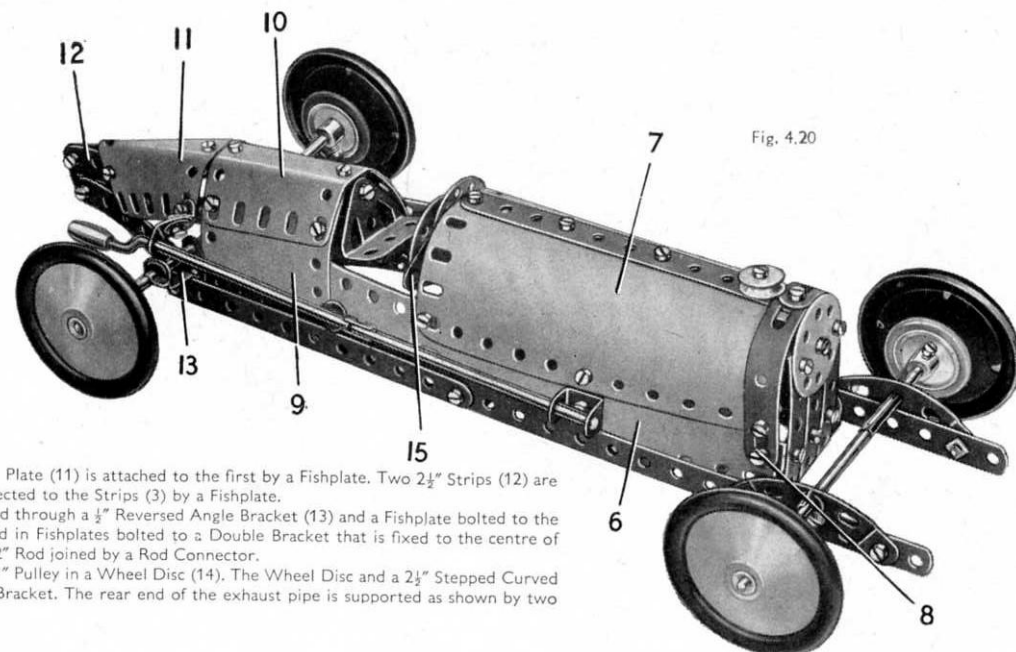


Fig. 4.20

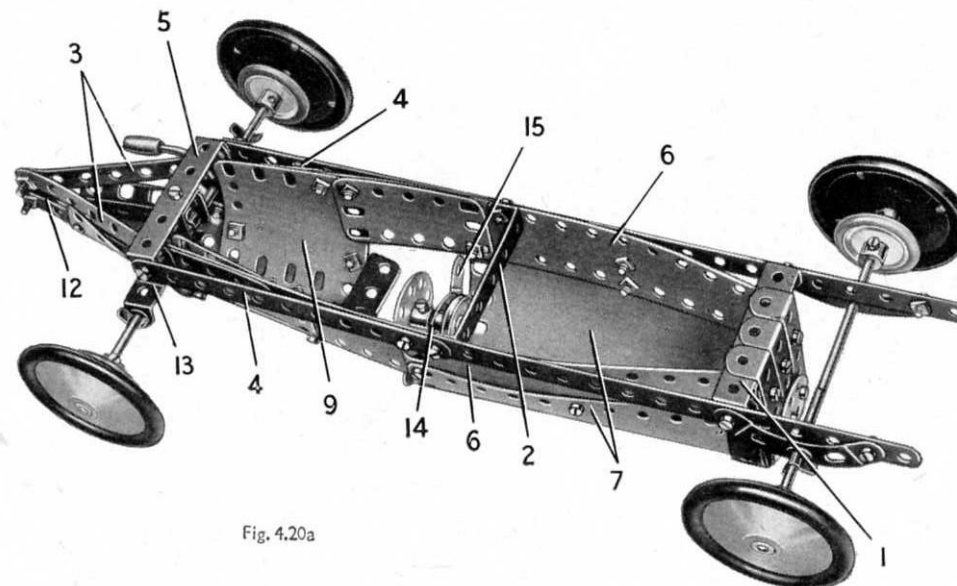


Fig. 4.20a

Parts Required

2 of No. 1	48 of No. 37b
5 " " 2	1 " " 48
3 " " 5	6 " " 48a
5 " " 10	3 " " 90a
2 " " 11	5 " " 111c
2 " " 12	2 " " 125
2 " " 12c	1 " " 126
2 " " 15b	4 " " 155
2 " " 16	4 " " 187
1 " " 17	2 " " 188
1 " " 18b	2 " " 189
1 " " 19g	2 " " 192
5 " " 22	2 " " 199
1 " " 23	2 " " 200
1 " " 24	1 " " 212
2 " " 24a	1 " " 213
6 " " 35	2 " " 215
53 " " 37a	

4.21 TRANSPORT LORRY

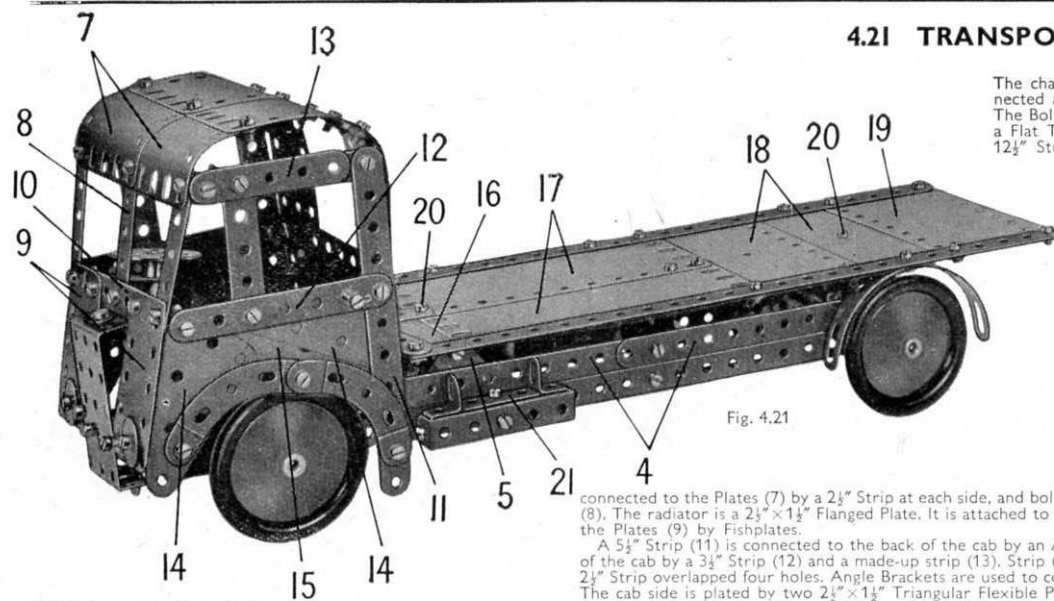


Fig. 4.21

A $\frac{1}{2}$ " Pulley on the Motor driving shaft is connected by a Driving Band to a 1" Pulley on the rear axle of the model. The $\frac{1}{2}$ " Pulley is supplied with the No. 1 Clockwork Motor. The petrol tank consists of a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip and a $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip (21) bolted together and to the chassis by a Double Bracket. A $\frac{1}{2}$ " Reversed Angle Bracket is fixed to each lug of the $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip.

connected to the Plates (7) by a $2\frac{1}{2}$ " Strip at each side, and bolted to a further $2\frac{1}{2}$ " Strip (10) that is fixed to Strip (8). The radiator is a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate. It is attached to Strip (8) by an Angle Bracket, and is connected to the Plates (9) by Fishplates.

A $5\frac{1}{2}$ " Strip (11) is connected to the back of the cab by an Angle Bracket, and this Strip is linked to the front of the cab by a $3\frac{1}{2}$ " Strip (12) and a made-up strip (13). Strip (13) consists of a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip and a $2\frac{1}{2}$ " Strip overlapped four holes. Angle Brackets are used to connect Strips (12) and (13) to the front of the cab. The cab side is plated by two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Triangular Flexible Plates (14), a Semi-Circular Plate (15) and two $2\frac{1}{2}$ " Stepped Curved Strips. The steering wheel is a Bush Wheel on a 2" Rod that is supported in a Stepped Bent Strip bolted to the front of the cab.

The load platform consists of two $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates (16), two $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates (17), the separated halves of a Hinged Flat Plate (18) and a $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate (19). These Plates are edged at each side by a $1\frac{1}{2}$ " Strip, and at the front by two $2\frac{1}{2}$ " Strips. A No. 1 Clockwork Motor is bolted to the underside of the platform as shown in Fig. 4.21a. The complete platform is fixed to $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips by the Bolts (22). The Double Angle Strips are bolted between the pointed ends of the Flat Trunnions (2) and the Trunnions (5).

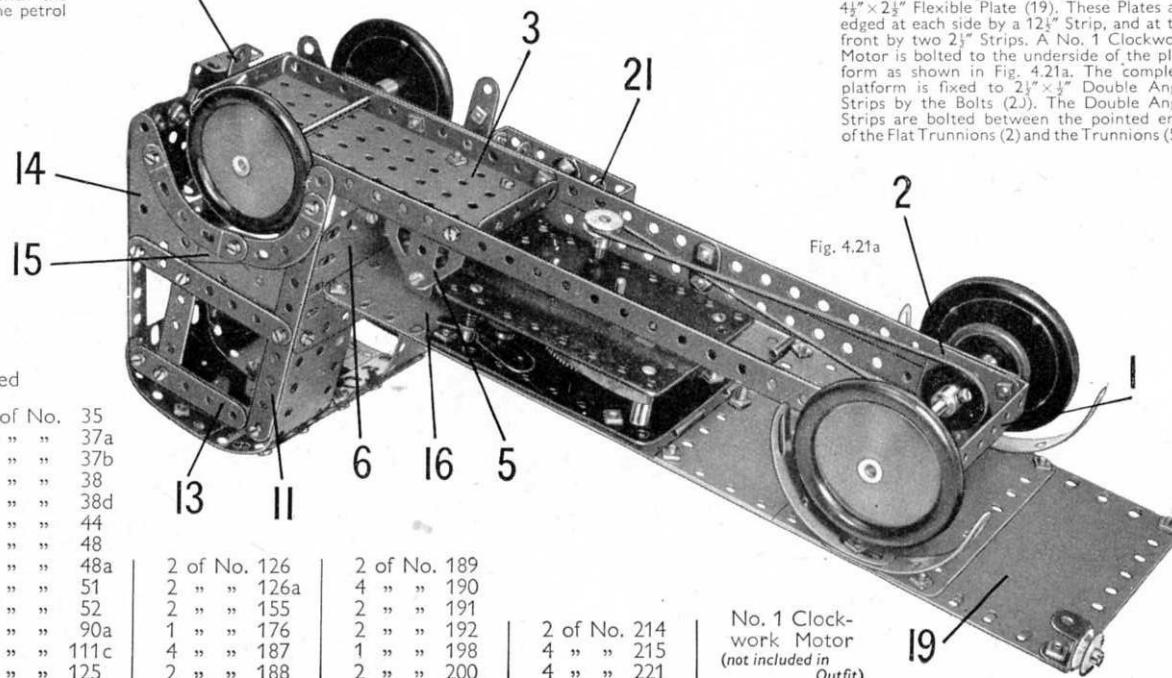


Fig. 4.21a

Parts Required

4 of No. 1	3 of No. 35	2 of No. 126	2 of No. 189
5 " " 2	83 " " 37a	2 " " 126a	4 " " 190
2 " " 3	77 " " 37b	2 " " 155	2 " " 191
9 " " 5	7 " " 38	1 " " 176	2 " " 192
4 " " 10	2 " " 38d	1 " " 187	1 " " 198
2 " " 11	1 " " 44	4 " " 188	2 " " 200
8 " " 12	1 " " 48		
1 " " 12c	6 " " 48a		
2 " " 15b	1 " " 51		
1 " " 17	1 " " 52		
3 " " 22	4 " " 90a		
1 " " 23	6 " " 111c		
1 " " 24	2 " " 125		

No. 1 Clockwork Motor
(not included in Outfit)

4.22 PENNY-IN-THE-SLOT WEIGHING MACHINE

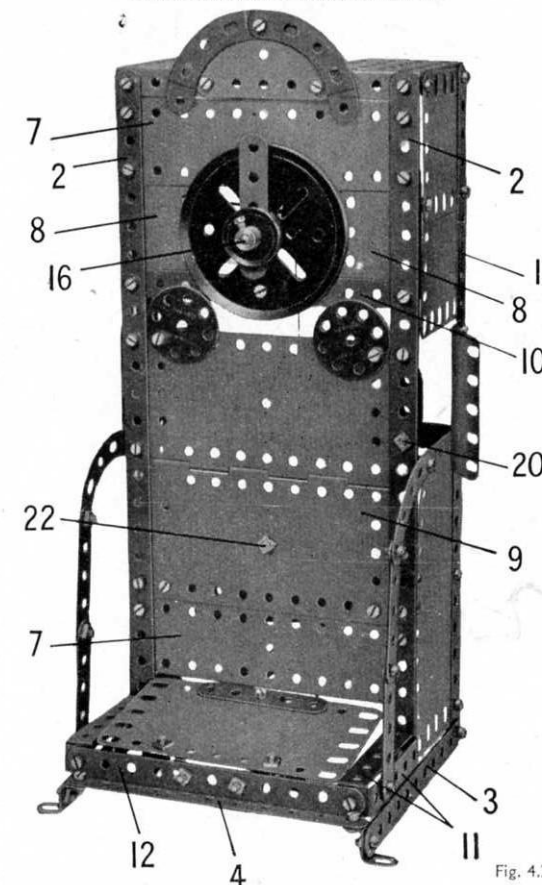


Fig. 4.22

The corners of the column or stand are four $12\frac{1}{2}$ " Strips (1) and (2). They are bolted at the top to a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate, and at their lower ends Strips (1) are fixed to $5\frac{1}{2}$ " Strips (3). The $12\frac{1}{2}$ " Strips (2) are attached to Angle Brackets bolted to Strips (3), and a $5\frac{1}{2}$ " Strip (4) also is connected to them by $\frac{1}{2}$ " Reversed Angle Brackets.

The sides of the column are each filled in by a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate, two $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates and a $1\frac{1}{2}$ " radius Curved Plate. The Curved Plate on one side is straightened, but the one on the other side is left curved to provide access to the coin slot. Strips (1) and (2) are braced by $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips (5), and these are connected by a $5\frac{1}{2}$ " Strip (6).

The front of the column is completed by two $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates (7), two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates (8), and a Hinged Flat Plate (9) attached to Fishplates. A $5\frac{1}{2}$ " Strip (10) is bolted across the front, and the dial, which is a 3" Pulley, is attached to this Strip and to one of the Plates (7) by $\frac{1}{2}$ " Bolts.

Two $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips (11) are bolted to the column on each side, and are connected by a $5\frac{1}{2}$ " Strip (12) that supports a $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip (13). The weighing platform is a $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate bolted to a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate (14), which is pivoted on a Rod passed through the lugs of Double Angle Strip (13). The platform is connected to the weighing mechanism by a $5\frac{1}{2}$ " Strip (15) fixed to each side of the Flanged Plate. The free ends of Strips (15) are held together by a $\frac{1}{2}$ " Bolt.

(Continued on next page)

MODEL 4.22 PENNY-IN-THE-SLOT WEIGHING MACHINE — Continued

The dial pointer is a $2\frac{1}{2}$ " Strip clamped between Pulleys on a 4" Rod (16). This Rod is supported in the boss of the 3" Pulley, and in a $3\frac{1}{2}$ " Strip (17). A 1" Pulley (18) is fixed on Rod (16), and elastic is stretched between the set screw of the Pulley and a Bolt (19). A length of Cord tied to a Cord Anchoring Spring on Rod (16) is passed several times round the Rod, and is fastened to the $\frac{3}{8}$ " Bolt in the Strips (15).

The coin slot consists of two Flat Trunnions connected together by a $\frac{3}{8}$ " Bolt but spaced apart by a Nut and a Washer. The $\frac{3}{8}$ " Bolt is then fitted with a second nut, and the assembly is clamped to the column by a further nut (20).

When a penny is placed in the slot it depresses a release lever that frees a locking catch on the platform. The release lever is made from two $2\frac{1}{2}$ " Strips (21) bolted to an Angle Bracket that is lock-nutted to the column by a Bolt (22). Another Angle Bracket is fixed to one of the Strips (21), and this supports a $3\frac{1}{2}$ " Strip (23) that carries an Angle Bracket (24). Angle Bracket (24) is opened out slightly and it engages below one of the Strips (15). A $\frac{1}{2}$ " Pulley is fixed as a balance weight to one of the Strips (21).

The coin tray is a Flanged Sector Plate fitted with a $2\frac{1}{2}$ " Strip, and it is attached to the Strips (1) by Angle Brackets.

Parts Required

4 of No. 1	84 of No. 37a	1 of No. 54	2 of No. 188
8 " " 2	76 " " 37b	4 " " 90a	2 " " 189
2 " " 3	4 " " 38	6 " " 111c	4 " " 190
9 " " 5	1 " " 40	2 " " 125	1 " " 191
4 " " 10	1 " " 48	1 " " 126	2 " " 192
5 " " 12	6 " " 48a	2 " " 126a	1 " " 198
1 " " 15b	1 " " 51	1 " " 176	2 " " 200
1 " " 16	1 " " 52	1 " " 186	1 " " 214
1 " " 19b			
4 " " 22			
1 " " 23			
2 " " 24a			
2 " " 35			

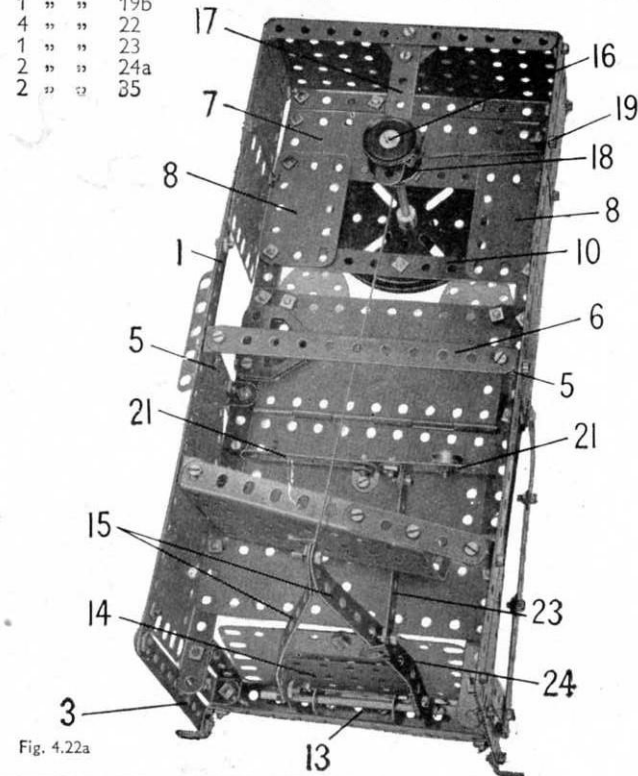
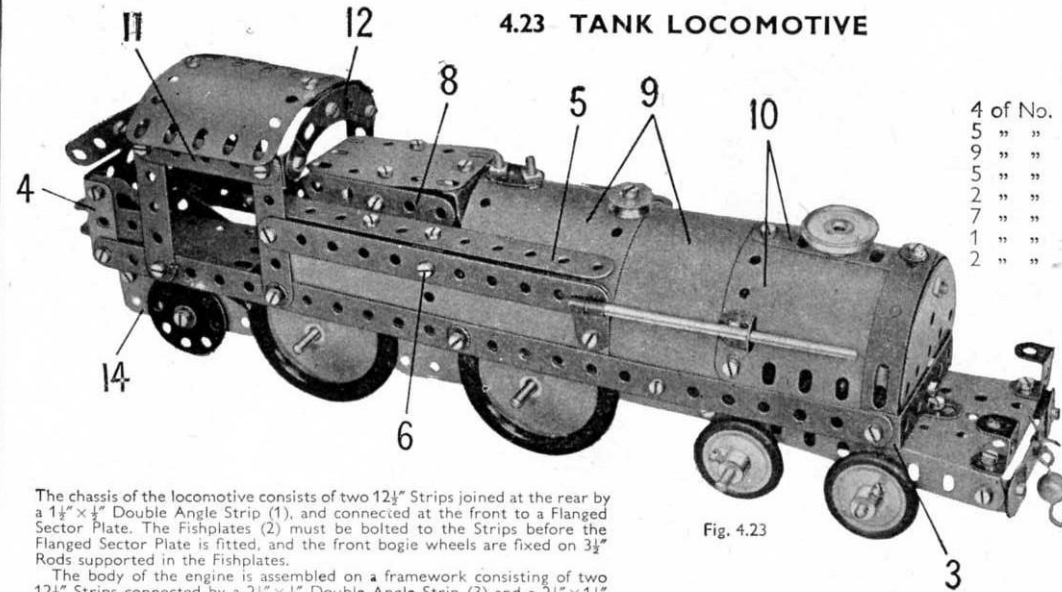


Fig. 4.22a

4.23 TANK LOCOMOTIVE



Parts Required

4 of No. 1	4 of No. 16
5 " " 2	5 " " 22
9 " " 5	1 " " 23
5 " " 10	2 " " 24a
2 " " 11	4 " " 35
7 " " 12	78 " " 37a
1 " " 12c	72 " " 37b
2 " " 15b	9 " " 38
	2 " " 38d
	1 " " 44
	1 " " 48
	5 " " 48a
	1 " " 51
	1 " " 54
	1 " " 57c
	3 " " 90a
	6 " " 111c
	2 " " 125
	2 " " 126
	2 " " 126a
	4 " " 155
	4 " " 187
	2 " " 188
	2 " " 189
	4 " " 190
	2 " " 192
	2 " " 212a
	1 " " 214
	2 " " 215
	4 " " 221

The chassis of the locomotive consists of two $12\frac{1}{2}$ " Strips joined at the rear by a $1\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip (1), and connected at the front to a Flanged Sector Plate. The Fishplates (2) must be bolted to the Strips before the Flanged Sector Plate is fitted, and the front bogie wheels are fixed on $\frac{1}{2}$ " Rods supported in the Fishplates.

The body of the engine is assembled on a framework consisting of two $12\frac{1}{2}$ " Strips connected by a $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip (3) and a $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flanged Plate (4). The sides of the water tanks are $5\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plates bolted to the $12\frac{1}{2}$ " Strips, and the tops are $5\frac{1}{2}$ " Strips (5) attached to a $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip held by a Bolt (6) on each side. A similar Double Angle Strip (7) is bolted also between the sides of the tanks. The firebox is made by attaching a $2\frac{1}{2}$ " Strip (8) on each side to a $\frac{1}{2}$ " Reversed Angle Bracket bolted to the Strip (5). The firebox top is a $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plate fixed to the Reversed Angle Brackets, and the front is a Trunnion bolted to the Flexible Plate.

The boiler consists of two $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plates (9), curved and bolted to the $12\frac{1}{2}$ " Strips, and two $1\frac{1}{2}$ " radius Curved Plates (10) edged by Formed Slotted Strips. The front of the boiler is a Semi-Circular Plate attached to the Plates (10) by an Angle Bracket. A handrail on each side is a 4" Rod held in an Angle Bracket and a Right-Angle Rod and Strip Connector.

The cab roof is supported by two $2\frac{1}{2}$ " Strips on each side connected by a $2\frac{1}{2}$ " Strip (11). These Strips are joined across by a $2\frac{1}{2}$ " Stepped Curved Strip (12), and the roof is attached to the Curved Strip by an Angle Bracket. The roof is made from two $2\frac{1}{2}$ " x $2\frac{1}{2}$ " Flexible Plates curved to shape.

The completed body is attached to the chassis by an Angle Bracket bolted to the Double Angle Strip (1), and by a $5\frac{1}{2}$ " Strip fixed to the Flanged Sector Plate and to a $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip (13).

Two $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Triangular Flexible Plates are fixed to the chassis at the centre, and two similar Plates (14) are bolted in position at the rear. The latter Plates are braced by $2\frac{1}{2}$ " Stepped Curved Strips, which are bolted to the $12\frac{1}{2}$ " Strips of the chassis and are connected to the Triangular Flexible Plates by $\frac{3}{8}$ " Bolts. A Wheel Disc is free to turn on each Bolt, which then is held in the Curved Strip and the Plate by two nuts.

A $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip bolted to the front of the Flanged Sector Plate is fitted with two $\frac{3}{8}$ " Washers to represent buffers. The safety valves are formed by $\frac{3}{8}$ " Bolts. One of these is fixed in a Fishplate by a nut, and the Fishplate is then attached to the boiler by the second $\frac{3}{8}$ " Bolt.

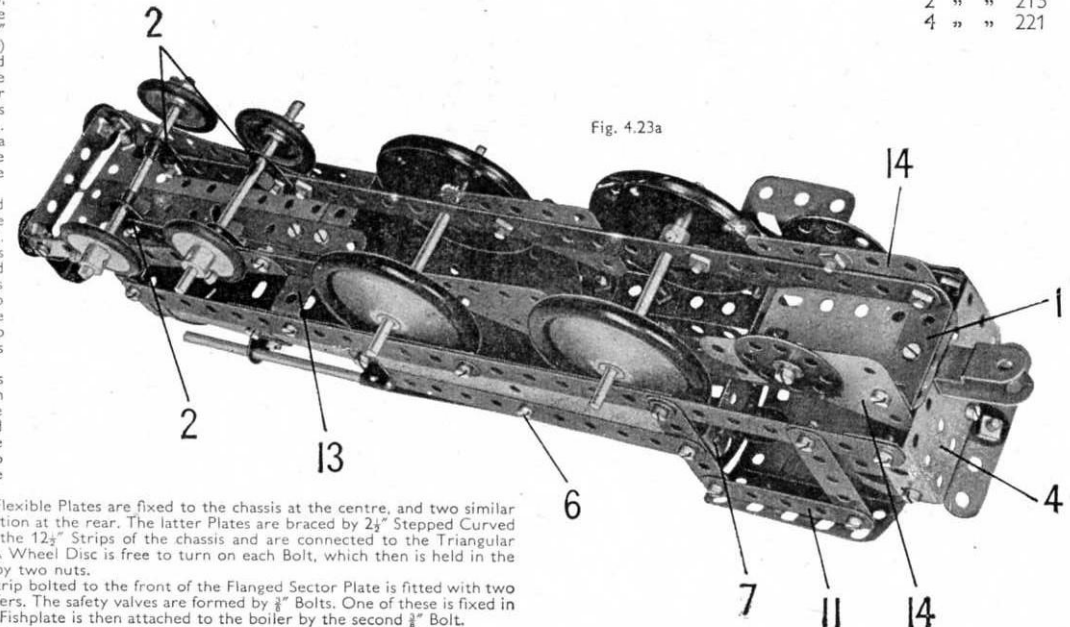


Fig. 4.23a

4.24 GIANT EXCAVATOR

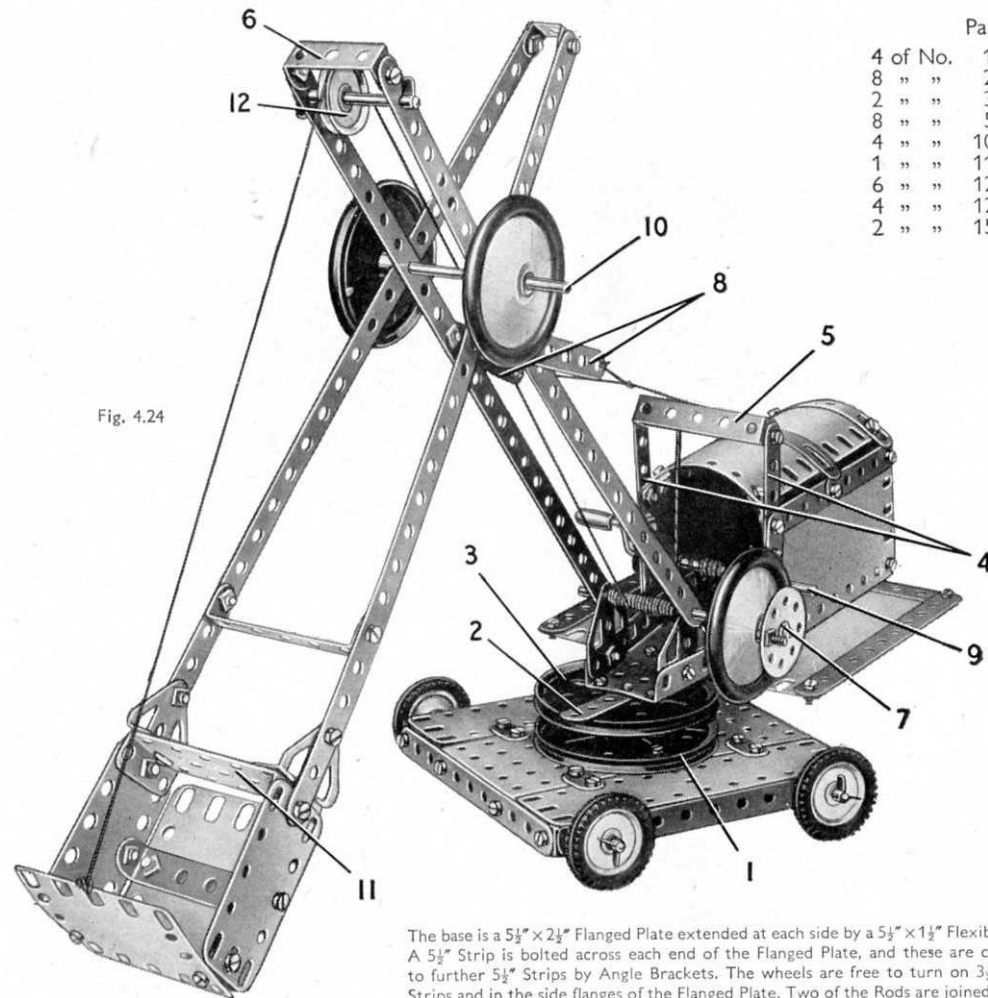


Fig. 4.24

Parts Required

4 of No.	1	4 of No.	16
8 " "	2	1 " "	17
2 " "	3	1 " "	18a
8 " "	5	2 " "	19b
4 " "	10	1 " "	19g
1 " "	11	5 " "	22
6 " "	12	1 " "	24
4 " "	12c	8 " "	35
2 " "	15b	80 " "	37a
		75 " "	37b
		8 " "	38
		1 " "	40
		1 " "	48
		6 " "	48a
		1 " "	51
		1 " "	52
		1 " "	54
		1 " "	90a
		5 " "	111c
		2 " "	126
		2 " "	126a
		4 " "	142c
		3 " "	187
		2 " "	188
		2 " "	189
		3 " "	190
		2 " "	191
		2 " "	192
		2 " "	200
		1 " "	212
		1 " "	213
		2 " "	215

The base is a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate extended at each side by a $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate attached to Fishplates. A $5\frac{1}{2}"$ Strip is bolted across each end of the Flanged Plate, and these are connected at their outer ends to further $5\frac{1}{2}"$ Strips by Angle Brackets. The wheels are free to turn on $3\frac{1}{2}"$ Rods supported in the $5\frac{1}{2}"$ Strips and in the side flanges of the Flanged Plate. Two of the Rods are joined by a Rod Connector, and the other two are pushed into a Rod and Strip Connector. A $3"$ Pulley (1) is fixed to the Flanged Plate.

A Flanged Sector Plate and a $5\frac{1}{2}"$ Strip (2) are bolted to a $3"$ Pulley (3), and a $1\frac{1}{2}"$ Rod gripped in the boss of this Pulley is passed through Pulley (1) and is held by a Spring Clip. The floor of the cab is extended on each side by a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate bolted to the Flanged Sector Plate. The Flexible Plates are edged by $5\frac{1}{2}"$ Strips.

The sides of the cab are $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates bolted to the Flanged Sector Plates and edged as shown by $2\frac{1}{2}"$ Strips. The back is a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate attached to $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips. The roof consists of two $1\frac{1}{2}"$ radius Curved Plates strengthened by Formed Slotted Strips, and it is connected to the sides by Obtuse Angle Brackets. Two $3\frac{1}{2}"$ Strips (4) are bolted to the front of the cab, and are connected at their upper ends by a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (5).

The jib is made by bolting two $12\frac{1}{2}"$ Strips to a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (6), and it is pivoted on a $4"$ Rod (7) supported in Flat Trunnions fixed to the Flanged Sector Plate. This Rod carries a Road Wheel and a Bush Wheel fitted with a $\frac{3}{8}"$ Bolt to act as a winding handle. Cord is tied to two $2\frac{1}{2}"$ Strips (8) lock-nutted to the jib, is taken over Double Angle Strip (5) and is tied to a Crank Handle (9) mounted in the front of the cab.

The bucket arm consists of two $12\frac{1}{2}"$ Strips connected by a Double Bracket and a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip. It is pivoted on a $4"$ Rod (10) passed through the jib and held in place by Road Wheels. The sides and back of the bucket are $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates and a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate, and the bottom is also a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate. These Plates are connected together by $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips, and the top, a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate (11), is bolted in position.

A length of Cord tied to the front of the bucket is taken over a $1"$ Pulley (12) at the top of the jib, and is tied to Rod (7).

4.25 MOTOR-CYCLE AND SIDECAR

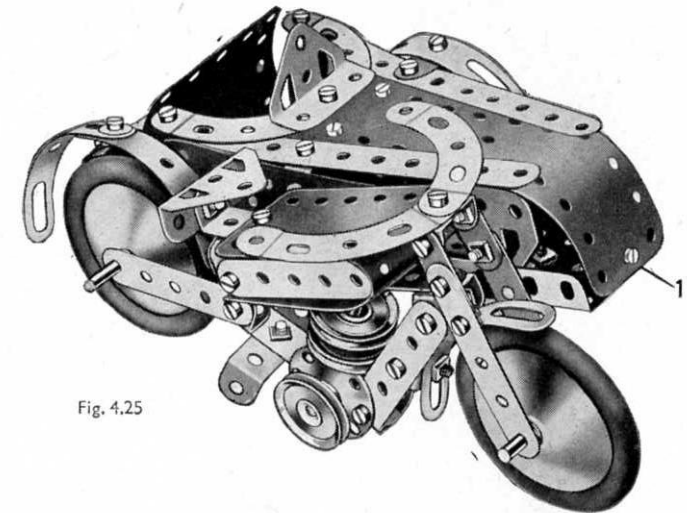


Fig. 4.25

The $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate that forms the front of the sidecar is bolted at (1) to a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip, which is fastened by Bolt (2) (Fig. 4.25b) to the Flanged Sector Plate forming the bottom of the sidecar. The Bolts (3) pass through the Flexible Plates and also through a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip.

The engine cylinder consists of two $1"$ Pulleys mounted on a $2"$ Rod, one end of which is supported in the Strip (4) (Fig. 4.25a) that forms the top of the frame. The other end of the Rod is held between the two Bolts that fasten the Wheel Discs to the frame.

The petrol tank is represented by a $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate bent to 'U'-shape and attached to a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip by Angle Brackets. A $2\frac{1}{2}"$ Strip is attached to the Double Angle Strip and the unit is then bolted to the Strip (4) (Fig. 4.25a). The saddle, which is a Trunnion, is also attached to this Strip by a $\frac{1}{2}"$ Reversed Angle Bracket.

The Strip (4) carries a Double Bracket at its front end, and to this are bolted two $2\frac{1}{2}"$ Strips. To these Strips are attached two Wheel Discs, and these are joined by a double bracket built up from two Angle Brackets (see Fig. 4.25b).

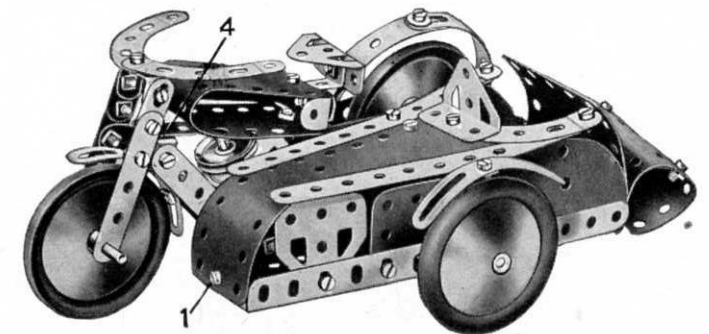


Fig. 4.25a

(Continued on next page)

MODEL 4.25 MOTOR-CYCLE AND SIDECAR — Continued

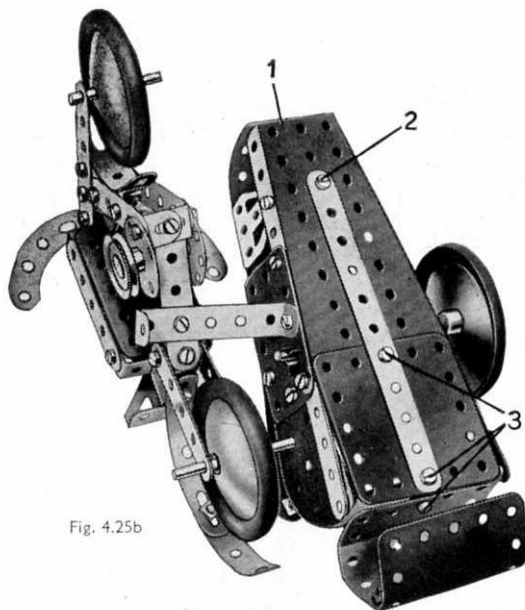


Fig. 4.25b

Parts Required

5 of No. 2	1 of No. 48
1 " " 3	3 " " 48a
8 " " 5	1 " " 54
5 " " 10	4 " " 90a
2 " " 11	1 " " 111c
8 " " 12	1 " " 125
1 " " 12c	2 " " 126
1 " " 16	2 " " 126a
2 " " 17	3 " " 187
1 " " 18a	2 " " 188
3 " " 22	2 " " 189
2 " " 24a	1 " " 190
1 " " 35	2 " " 199
51 " " 37a	1 " " 200
51 " " 37b	2 " " 214
2 " " 38	4 " " 215

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4.26 MOTOR TRICYCLE DELIVERY VAN

Parts Required	
8 of No. 2	2 of No. 35
2 " " 3	78 " " 37a
8 " " 5	75 " " 37b
2 " " 10	6 " " 38
2 " " 11	1 " " 38d
8 " " 12	1 " " 40
4 " " 12c	1 " " 48
1 " " 15b	6 " " 48a
2 " " 18a	1 " " 51
1 " " 18b	1 " " 52
1 " " 19b	4 " " 90a
4 " " 22	3 " " 111c
1 " " 23	2 " " 125
1 " " 24	2 " " 126
2 " " 24a	1 " " 126a
1 No. 1 Clockwork Motor (not included in Outfit)	
1 of No. 176	2 " " 187
2 " " 188	2 " " 189
3 " " 190	2 " " 191
2 " " 192	1 " " 198
2 " " 200	2 " " 214
4 " " 221	

The side seen in Fig. 4.26 consists of a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (1), a $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate (2) and a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (3). The other side consists of a $5\frac{1}{2}" \times 2\frac{1}{2}"$ and a $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate placed edge to edge, and a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate at the lower front corner.

The back is attached to one side by a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip and to the other by a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (4). The Flexible Plate is partly bent back in Fig. 4.26b. The roof is formed by a Hinged Plate (5) and a $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (6) attached to the sides by Angle Brackets and $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips (22). These Plates are connected at one side by a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip and at the other by a Fishplate, which are held by Bolts (7). At the centre the Plates are joined by passing Bolts (23) through a Wheel Disc under the roof. The floor of the body is a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate (8) fixed to the lower edge of the Flexible Plate at the rear, and is connected by a $2\frac{1}{2}"$ Strip on each side to an Angle Bracket held by a Bolt (9).

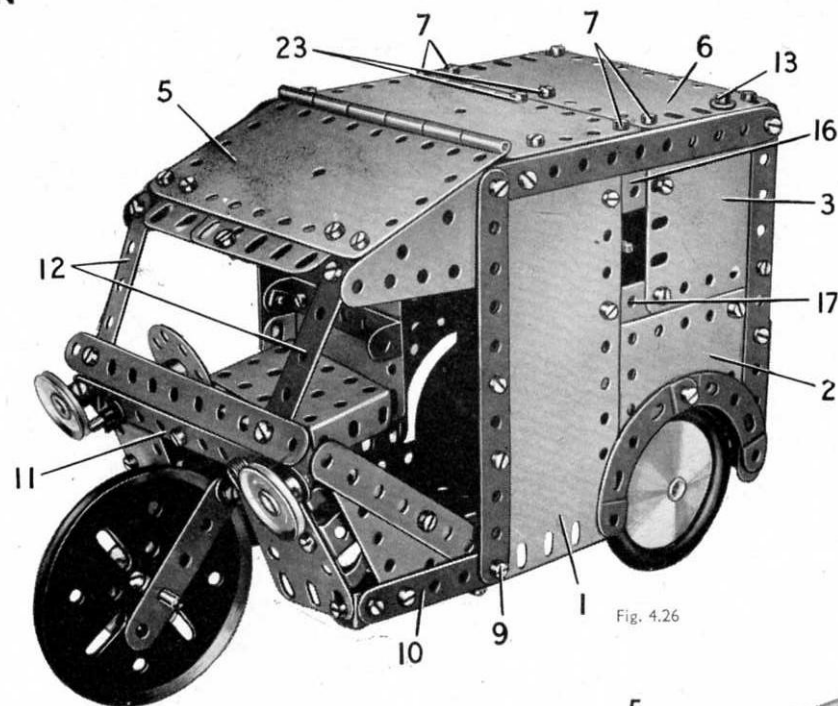


Fig. 4.26

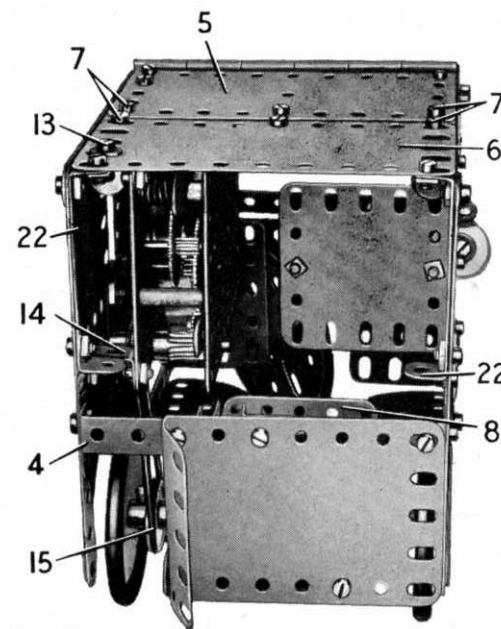


Fig. 4.26b

A $2\frac{1}{2}"$ Strip (10) is bolted to each side. These are joined by Angle Brackets to $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates connected by a $5\frac{1}{2}"$ Strip (11). Strip (11) is joined to a similar Strip by Obtuse Angle Brackets, and $2\frac{1}{2}"$ Strips (12) are connected by Obtuse Angle Brackets to the roof. The Hinged Plate is extended forward by two $1\frac{1}{8}"$ radius Curved Plates.

A No. 1 Clockwork Motor is attached to an Angle Bracket held by a Bolt (13), and to a Double Bracket (14). The inner sideplate of the Motor is bolted to the lug of a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip fixed to the roof by one of the Bolts (23). A $\frac{1}{2}"$ Pulley on the rear axle, which is mounted in the Flanged Plate (8) (the $\frac{1}{2}"$ Pulley is supplied with the No. 1 Clockwork Motor). The hole in the side giving access for winding the Motor is partly filled by a $2\frac{1}{2}"$ Strip (16) and a Flat Trunnion (17).

The front wheel is fixed on a $1\frac{1}{2}"$ Rod passed through two $2\frac{1}{2}"$ Strips connected by a Double Bracket (18). Two Wheel Discs and a $\frac{1}{2}"$ loose Pulley are placed on the axle at the opposite side to the boss of the 3" Pulley. A $\frac{3}{4}"$ Bolt is fixed in Double Bracket (18) by a nut. The Bolt is then passed through Angle Bracket (19) fixed to Strip (11), and a Fishplate is gripped on the Bolt between two nuts. A $\frac{3}{4}"$ Washer (20) is attached to the Fishplate.

The steering wheel is held on a $1\frac{1}{2}"$ Rod mounted in Strip (11) and in a $\frac{1}{2}"$ Reversed Angle Bracket. Cord is passed several times round the Rod, and one end is taken round a 1" Rod supported in a $\frac{1}{2}"$ Reversed Angle Bracket (21). The ends of the Cord are gripped between the Washer (20) and the Fishplate.

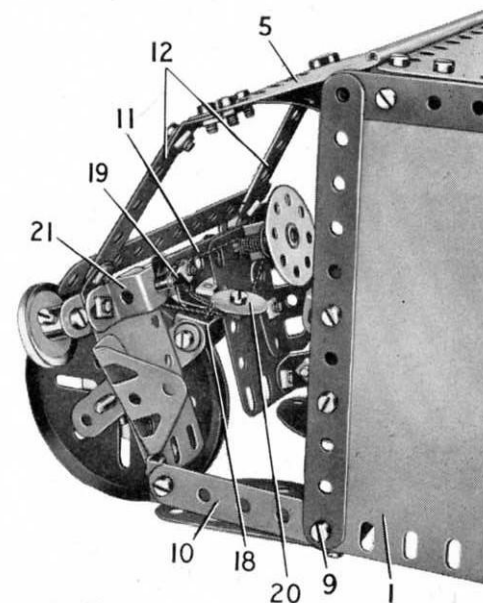


Fig. 4.26a

4.27 HAND TROLLEY CAR

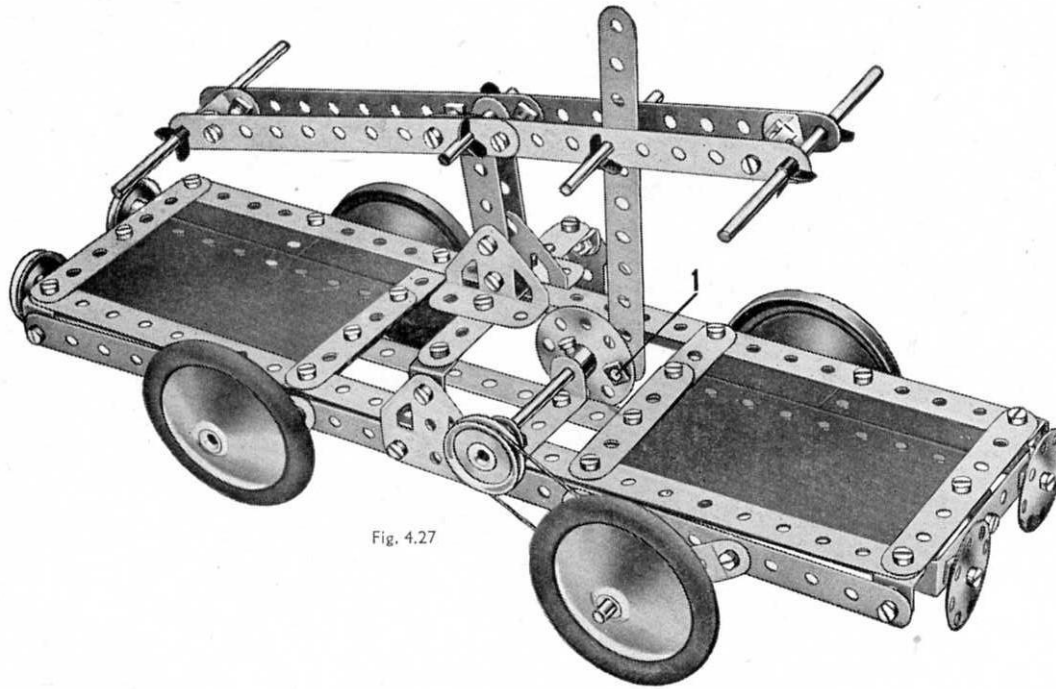


Fig. 4.27

The operating beam is built up from two compound strips, each consisting of two $5\frac{1}{2}$ " Strips overlapped three holes. The strips are connected at each end by a Double Bracket, and the beam pivots about its centre hole on a $1\frac{1}{2}$ " Rod mounted in two $2\frac{1}{2}$ " Strips. These Strips are fixed to Trunnions which are bolted to a transverse $3\frac{1}{2}$ " Strip. The $3\frac{1}{2}$ " Strip is attached by Angle Brackets to Flat Trunnions bolted to the chassis.

The side members of the chassis are $12\frac{1}{2}$ " Strips, and each of the platforms is connected to them by Angle Brackets.

The Bolt (1) is lock-nutted to the Bush Wheel and the drive is transmitted by a Cord belt to a 1" Pulley on the axle carrying the front Road Wheels. This axle is a compound rod consisting of a $3\frac{1}{2}$ " Rod and a 2" Rod joined by a Rod Connector. The other axle is a 4" Rod. Both axles are mounted in $2\frac{1}{2}$ " Stepped Curved Strips bolted to the $12\frac{1}{2}$ " Strips of the chassis.

The buffers at one end are Wheel Discs. They are spaced by nuts on $\frac{3}{8}$ " Bolts, from a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip, which is attached to the chassis by an Angle Bracket. At the other end the buffers are 1" Pulleys, each of which is held by its set screw on a $\frac{3}{8}$ " Bolt passed through a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip.

Parts Required

4 of No. 1	1 of No. 15b	1 of No. 24	2 of No. 38	2 of No. 126
6 " " 2	3 " " 16	2 " " 24a	1 " " 48	2 " " 126a
2 " " 3	2 " " 17	8 " " 35	2 " " 48a	4 " " 187
8 " " 5	2 " " 18a	61 " " 37a	4 " " 90a	4 " " 190
2 " " 11	4 " " 22	54 " " 37b	4 " " 111c	2 " " 191
8 " " 12				1 " " 213

4.28 MECHANICAL DIGGER

The base is made by joining together at their narrow ends two Flanged Sector Plates, by means of $2\frac{1}{2}$ " Strips fixed to the flanges of the Plates. The Flanged Sector Plates are arranged so that a gap of $\frac{1}{2}$ " is left in the centre, and a 3" Pulley (1) is bolted to them with its boss projecting through the gap. A $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " and a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate are bolted to each side, and a 2" Rod is fixed in the boss of Pulley (1). The wheels are fixed on 4" Rods.

The cab is assembled on a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flanged Plate (2). Each side consists of one half of a Hinged Flat Plate and two $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates edged by $5\frac{1}{2}$ " and $2\frac{1}{2}$ " Strips. The $5\frac{1}{2}$ " Strips (3) are bent as shown, and a Rod (4) is supported in their top holes. The sides are connected by Angle Brackets to a $3\frac{1}{2}$ " Strip bolted across the Flanged Plate (2) at its rear end, and they are connected also to the Flanged Plate by two built-up brackets (5). Each of these brackets consists of an Angle Bracket and a Fishplate bolted together. The rear of the cab is formed by two $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates curved and bolted between the sides.

The jib consists of two $12\frac{1}{2}$ " Strips joined at their top ends by a Double Bracket, and connected by a $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip. It pivots on a built-up rod made from two $1\frac{1}{2}$ " Rods joined by a Rod Connector, and this is supported in Trunnions bolted to the Flanged Plate (2). The jib can be raised or lowered by turning a Rod (6), supported in one side of the cab and in a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip (7) bolted to the Flanged Plate (2). The Rod is supported also by a $\frac{1}{2}$ " Reversed Angle Bracket (8), bolted to a Double Bracket fixed to the side of the cab. The Rod (6) carries a Bush Wheel fitted with a $\frac{3}{8}$ " Bolt, and a length of Cord tied to the Rod is taken over a $\frac{1}{2}$ " Pulley on Rod (4) and is tied to the top of the jib.

The shovel arm is made from two $12\frac{1}{2}$ " Strips joined at their upper ends by a Stepped Bent Strip, and connected by a $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip (9). The shovel arm pivots on a Rod (10) held in the jib by Road Wheels, and the arm can be operated by turning a Crank Handle (11), bolted to a Double Bracket fixed to the side of the cab. The Rod (6) carries a Bush Wheel fitted with a $\frac{3}{8}$ " Bolt, and a length of Cord tied to the Crank Handle is fastened to the top of the shovel arm.

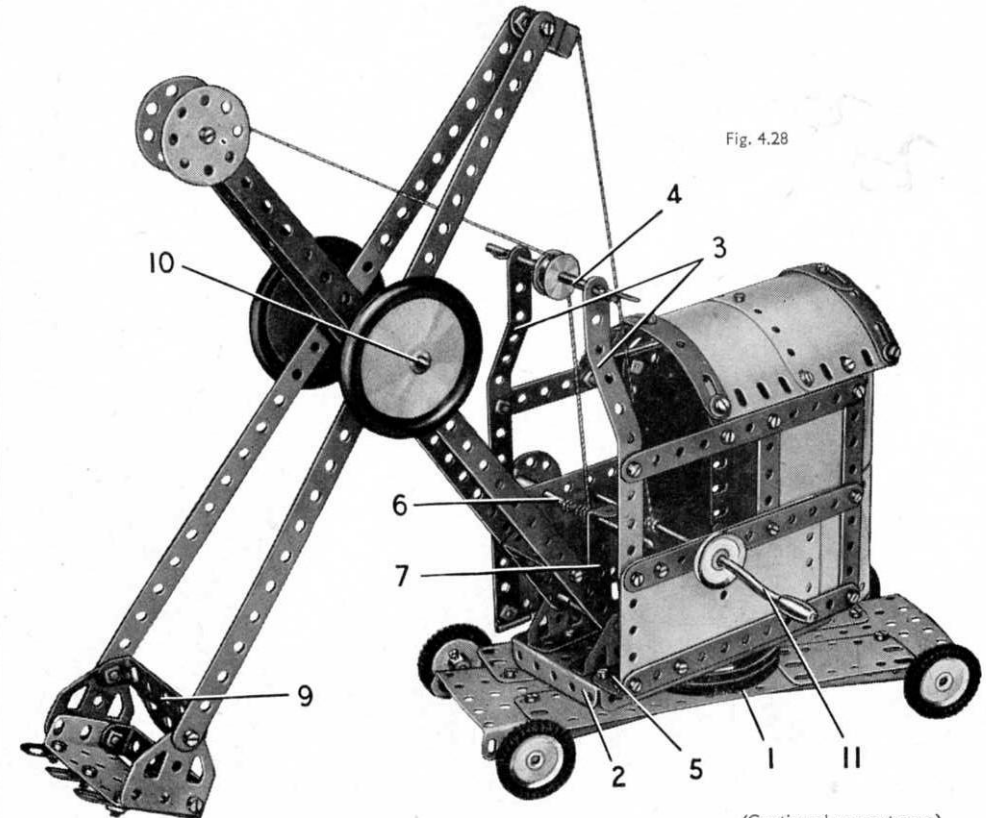


Fig. 4.28

(Continued on next page)

MODEL 4.28 MECHANICAL DIGGER — Continued

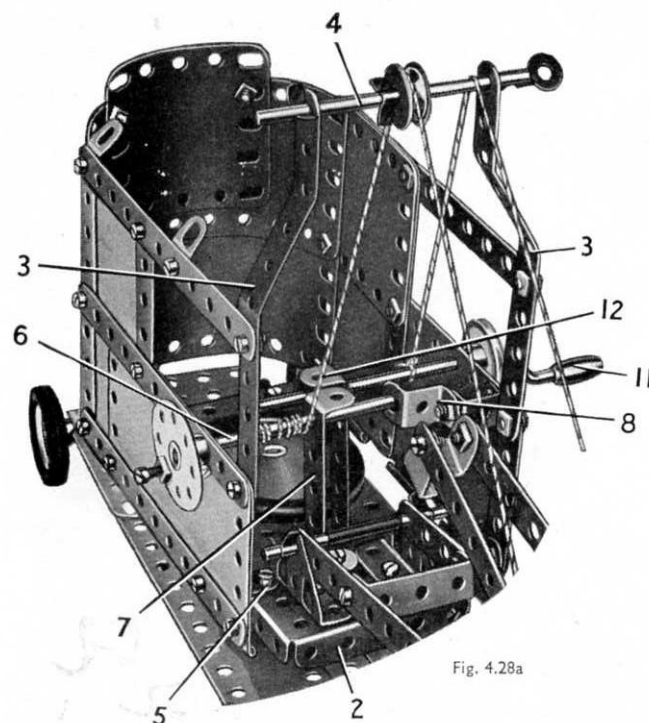


Fig. 4.28a

The bottom of the shovel is a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate, and the sides are Flat Trunnions. The back is partly filled in by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip and a $2\frac{1}{2}''$ Stepped Curved Strip bolted to the Double Angle Strip (9).

A 3" Pulley with its boss uppermost is placed over the 2" Rod held in the Pulley (1), and the Rod is then passed through the Flanged Plate (2). A Road Wheel is fixed on the Rod to hold the cab and the base together.

The roof of the cab consists of two $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plates curved and edged by Formed Slotted Strips, and it is attached to the cab sides by Obtuse Angle Brackets.

Parts Required		
4 of No. 1	1 of No. 24	1 of No. 125
8 " " 2	2 " " 24a	2 " " 126
2 " " 3	8 " " 35	2 " " 126a
9 " " 5	78 " " 37a	4 " " 142c
5 " " 10	72 " " 37b	1 " " 176
2 " " 11	4 " " 38	3 " " 187
4 " " 12	2 " " 38d	2 " " 188
4 " " 12c	1 " " 40	2 " " 189
2 " " 15b	1 " " 44	4 " " 190
3 " " 16	1 " " 48	2 " " 191
1 " " 17	4 " " 48a	2 " " 192
2 " " 18a	1 " " 51	1 " " 198
1 " " 18b	1 " " 52	1 " " 200
2 " " 19b	2 " " 54	2 " " 212
1 " " 19g	1 " " 90a	1 " " 213
5 " " 22	3 " " 111c	4 " " 215
1 " " 23		

Parts Required

4 of No. 1	1 of No. 48
7 " " 2	1 " " 48a
2 " " 3	2 " " 90a
9 " " 5	3 " " 111c
5 " " 10	1 " " 125
2 " " 11	2 " " 126
8 " " 12	2 " " 126a
2 " " 12c	2 " " 142c
1 " " 17	1 " " 176
2 " " 18a	2 " " 188
2 " " 22	2 " " 189
1 " " 23	2 " " 190
1 " " 24	2 " " 191
2 " " 24a	2 " " 192
1 " " 35	1 " " 198
83 " " 37a	2 " " 199
78 " " 37b	2 " " 212a
5 " " 38	2 " " 214
2 " " 38d	2 " " 215
1 " " 40	4 " " 221

4.29 MONOPLANE

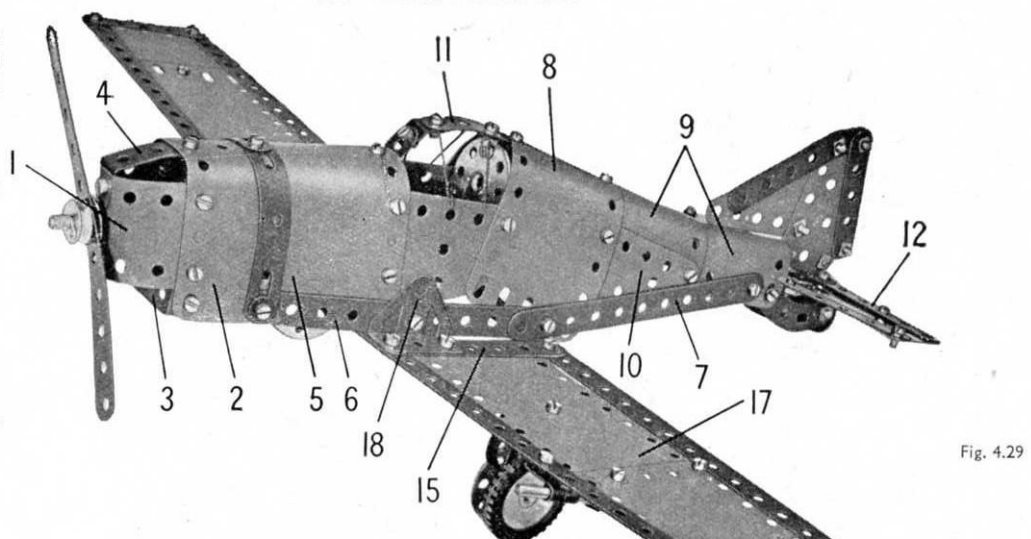


Fig. 4.29

The nose of the fuselage is made by bending a $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate (1) to 'U'-shape and bolting to it a second $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate (2), also curved to 'U'-shape. A $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip (3) is bolted between the lower ends of the Plate (2), and a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip (4) is fixed between Plates (1) and (2) as shown. The Flexible Plate (2) is bolted to a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate (5), and the join between the Plates is covered by two Formed Slotted Strips.

A $5\frac{1}{2}''$ Strip (6) is bolted to the Flexible Plates (2) and (5) on each side, and it is extended towards the tail by a second $5\frac{1}{2}''$ Strip (7). The

tail section is plated by a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate (8), two 'U'-section Curved Plates (9), and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plate (10) on each side. These Plates are bent to the required shape and are bolted in position at the angles shown. A Semi-Circular Plate at each side is bolted between the Plates (5) and (8), and the back of the cockpit is a Bush Wheel attached to Plate (8) by an Angle Bracket. A $5\frac{1}{2}''$ Strip (11) is bolted to Plate (8) and is connected to Plate (5) by two Obtuse Angle Brackets arranged as shown.

The tail plane is formed by two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plates bolted to a $5\frac{1}{2}''$ Strip (12) and edged by $2\frac{1}{2}''$ Strips (13). The assembly is fitted with a $2\frac{1}{2}''$ Strip (14) bolted in the centre hole of Strip (12), and fixed to a Double Bracket attached between the rear ends of one of the 'U'-section Curved Plates (9). The bolts holding the Double Bracket in place secure also $2\frac{1}{2}''$ Stepped Curved Strips, and the tail wheel is a $\frac{3}{4}''$ Washer mounted on a $\frac{3}{4}''$ Bolt passed through the Curved Strips and fitted with a nut. The tail fin consists of two $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plates bolted together as shown. These Plates are edged by $2\frac{1}{2}''$ Strips attached to the Plates by Fishplates, and the fin is connected to the tail plane by an Angle Bracket.

The main spars of the wings are formed by four $12\frac{1}{2}''$ Strips arranged in pairs. The pair forming the front edge are overlapped three holes, and the rear pair are overlapped four holes. The main spars are connected close to the fuselage by $3\frac{1}{2}''$ Strips (15), and at their outer ends by $2\frac{1}{2}''$ Strips. Each wing is plated by one half of a Hinged Flat Plate (17), a $4\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate and a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate. The wings are attached to the fuselage by two Trunnions (18).

The landing wheels are 1" Pulleys fixed by their set screws to $\frac{3}{8}''$ Bolts passed through the centre holes of Wheel Discs. Each Wheel Disc is bolted tightly to a Flat Trunnion, which is fixed by an Angle Bracket to one of the Plates (17) of the wing.

The propeller shaft is a 2" Rod passed through the centre hole of the Flexible Plate (1), and through a $\frac{1}{2}''$ Reversed Angle Bracket (19) bolted to the Plate. The propeller is a $5\frac{1}{2}''$ Strip pivoted between a $\frac{3}{4}''$ Washer and a $\frac{3}{4}''$ Pulley. A Cord Anchoring Spring and a Spring Clip are used to keep the 2" Rod in place.

The wing guns are $1\frac{1}{2}''$ Rods, and each is attached to the wing by a Right-Angle Rod and Strip Connector and an Angle Bracket.

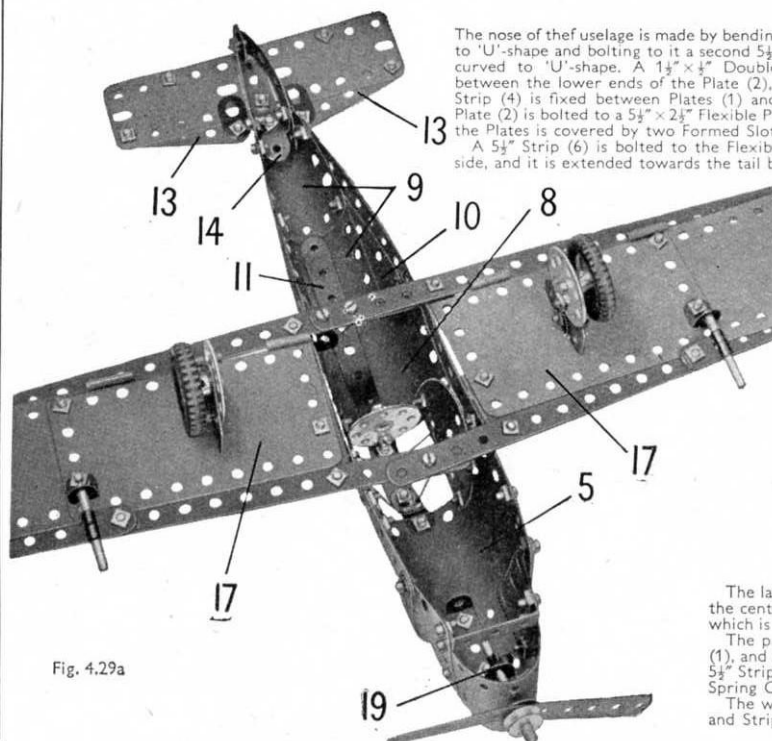


Fig. 4.29a

4.30 AUTOMATIC SHIP COALER

This fine model represents a type of high-speed coaler used for the automatic coaling of large ships. The coal is raised by a grab, which is then unloaded into a hopper truck. The truck travels along the elevated rails, and discharges its contents into a chute leading direct into the ship's coal bunkers.

With this model it is possible to carry out most of the essential movements of a real coaling plant. By means of an ingenious system of Cords, the hopper truck is automatically unloaded as it reaches the limit of its travel.

The tower is built from two $12\frac{1}{2}$ " Strips and two built-up strips, each made from two $5\frac{1}{2}$ " Strips. These are bolted to plates (2) fixed to the base of the model. Two $5\frac{1}{2}$ " Strips (1) lengthened by $2\frac{1}{2}$ " Strips are bolted across the ends of the Flanged Plate to give stability. The plates (2) are obtained by removing the pin from a Hinged Flat Plate and using each half separately. The top of the tower is formed from two $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates (3) attached to Obtuse Angle Brackets.

The rails on which the truck travels are $12\frac{1}{2}$ " Strips. They are connected at one end by two Formed Slotted Strips, and at the other end they are joined by a $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plate curved as shown. This structure is then bolted exactly in the position shown to $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips in the tower, but is spaced from them by one nut placed on the shank of each Bolt.

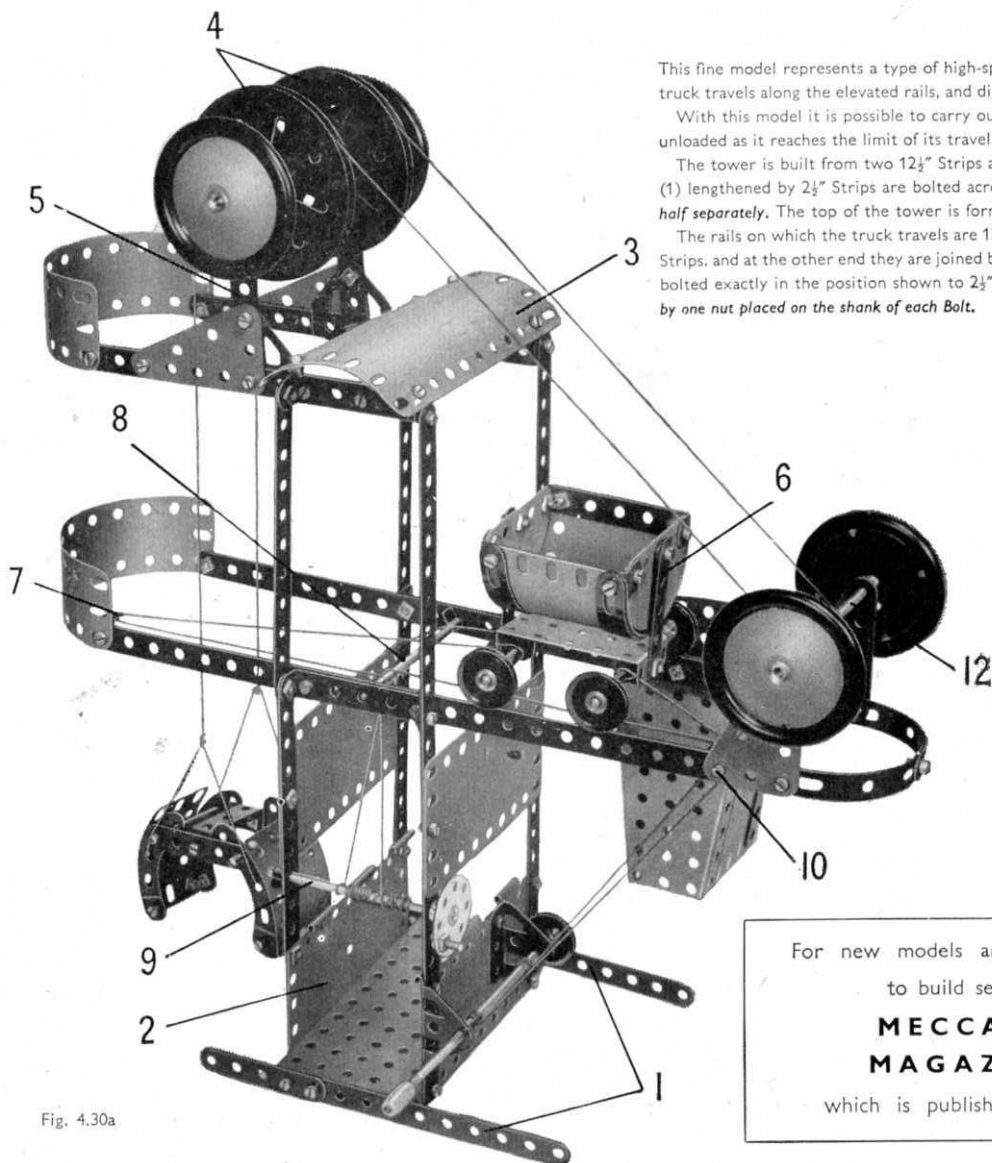


Fig. 4.30a

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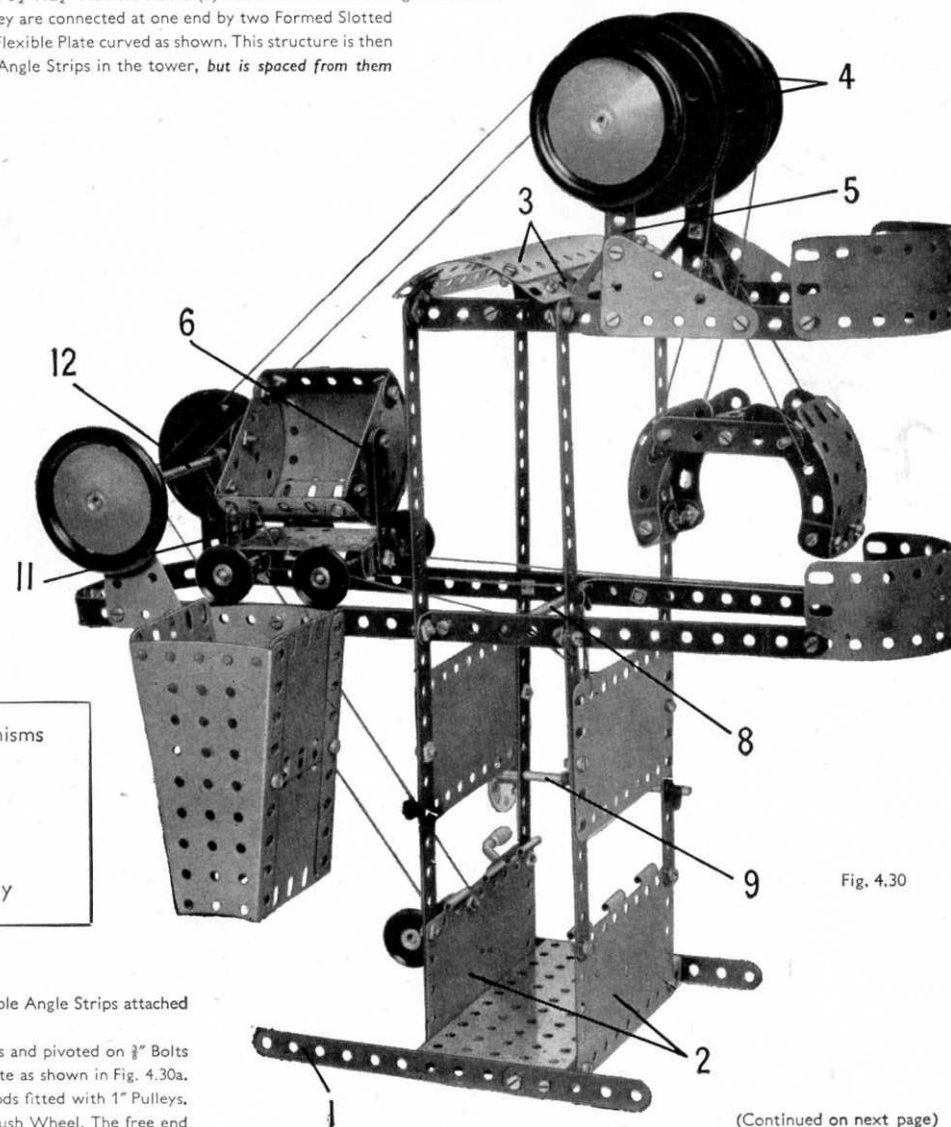


Fig. 4.30

The Rod carrying the 3" Pulleys (4) is passed through the ends of $3\frac{1}{2}$ " Strips (5). These Strips are bolted to $5\frac{1}{2}$ " Strips fixed to $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips attached to the top of the tower. The Strips (5) are braced by $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Triangular Flexible Plates.

The truck is made from two $1\frac{1}{8}$ " radius Curved Plates and two Semi-Circular Plates, joined together by $2\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strips and pivoted on $\frac{3}{8}$ " Bolts to $2\frac{1}{2}$ " Strips (6) (Fig. 4.30a). One side of the hopper is weighted by two Formed Slotted Strips bolted to the edges of the Curved Plate as shown in Fig. 4.30a. The truck base is a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate, and a Double Bracket is bolted to the centre of each flange to provide bearings for $3\frac{1}{2}$ " Rods fitted with 1" Pulleys. Cord is tied to one axle, and is passed through the Angle Bracket (7), over Rod (8), and then wound round Rod (9), which carries a Bush Wheel. The free end

(Continued on next page)

MODEL 4.30 AUTOMATIC SHIP COALER — Continued

of the Cord is passed again over the Rod (8), threaded through an Angle Bracket held by a Bolt (10), and then attached to the other axle of the truck.

A piece of Cord (11) is attached to the opposite side of the truck to the Formed Slotted Strips, and then is passed through the Flanged Plate and tied to the side of the tower, as shown in Fig. 4.30b. The Cord is adjusted so that the body of the truck is tipped sideways when it reaches the chute.

The Cords that operate the grab are passed over the 3" Pulleys (4), then over a Rod (12), and finally are wound round a Crank Handle supported in Trunnions bolted to one of the plates (2). Rod (12) is passed through 2½" Strips bolted to the truck rails and braced by 2½"×1½" Triangular Flexible Plates.

The unloading chute is made from Flanged Sector Plates and 2½"×2½" Flexible Plates joined together. It is attached to the truck rail on one side, but is spaced from the rail by a nut on the Bolt.

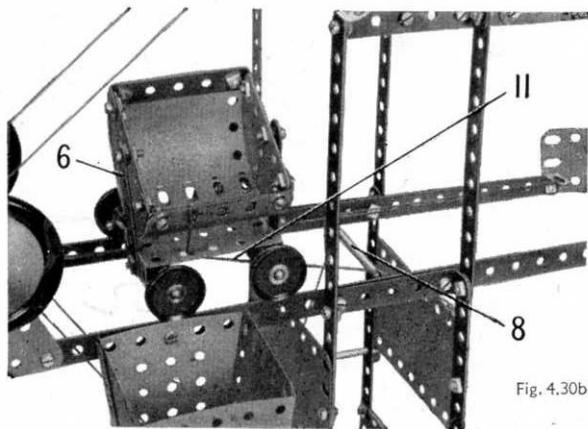


Fig. 4.30b

Parts Required		
4 of No. 1	8 of No. 35	4 of No. 187
8 " " 2	87 " " 37a	2 " " 188
2 " " 3	79 " " 37b	2 " " 189
8 " " 5	7 " " 38	4 " " 190
2 " " 11	1 " " 40	2 " " 191
6 " " 12	1 " " 48	2 " " 192
4 " " 12c	6 " " 48a	1 " " 198
2 " " 15b	1 " " 51	2 " " 200
4 " " 16	1 " " 52	1 " " 212
2 " " 17	2 " " 54	1 " " 213
2 " " 19b	4 " " 90a	2 " " 214
1 " " 19g	3 " " 111c	4 " " 215
5 " " 22	2 " " 126	2 " " 221
1 " " 24	2 " " 126a	

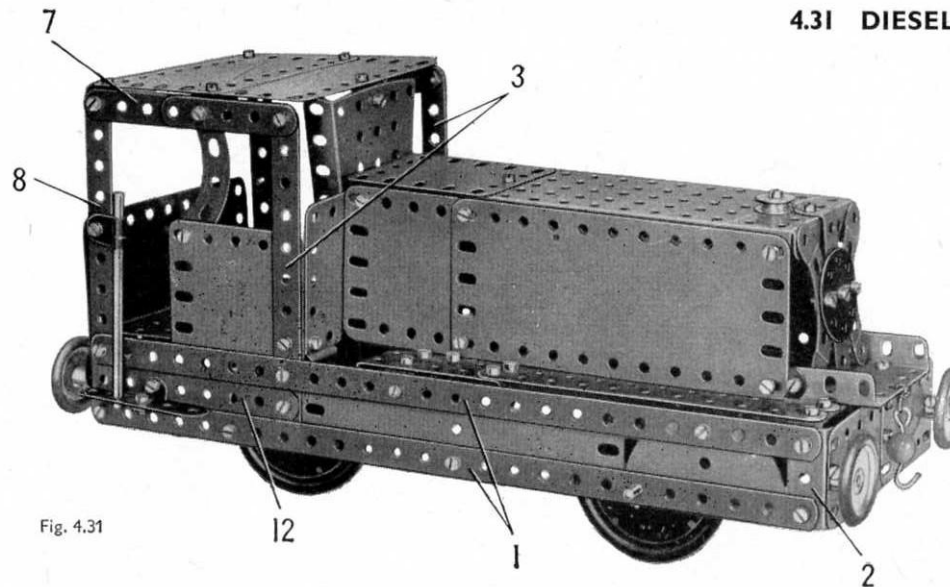


Fig. 4.31

4.31 DIESEL SHUNTING LOCOMOTIVE

Parts Required

4 of No. 1	1 of No. 51
8 " " 2	1 " " 52
2 " " 3	2 " " 54
9 " " 5	1 " " 57c
4 " " 10	4 " " 90a
2 " " 11	6 " " 111c
8 " " 12	2 " " 125
3 " " 12c	2 " " 126
1 " " 15b	4 " " 155
3 " " 16	4 " " 187
1 " " 17	2 " " 188
4 " " 22	2 " " 189
1 " " 23	4 " " 190
1 " " 24a	2 " " 191
87 " " 37a	2 " " 192
81 " " 37b	1 " " 198
4 " " 38	1 " " 200
1 " " 40	2 " " 212a
1 " " 48	1 " " 213
6 " " 48a	2 " " 214

The main frame at each side of the locomotive consists of 12½" Strips (1), bolted to a 5½"×1½" Flexible Plate, a Semi-Circular Plate and a Trunnion (2). The back of the cab is formed by half a Hinged Flat Plate attached to the frames by Angle Brackets. The other half of the Hinged Flat Plate is used for the front of the cab, and is fixed to the 5½" Strips (3) by Angle Brackets.

The main frames are connected at the front by a 2½"×½" Double Angle Strip (4) (Fig. 4.31a), a 1½"×½" Double Angle Strip (5) and a 2½"×1½" Flanged Plate (6). Two 2½"×1½" Flexible Plates bolted together are attached to the Trunnions (2) by ½" Bolts. The buffers are represented by 1" Pulleys fixed on the shanks of these Bolts.

The sides of the cab are formed by 2½"×2½" Flexible Plates attached to the Strips (3) and the main frames.

The roof is made by overlapping two 4½"×2½" Flexible Plates two holes. It is fixed by Angle Brackets to built-up strips (7), each made from two 2½" Strips overlapped two holes. The strips (7) are bolted to the Strips (3) and to 5½" Strips (8) on each side.

The running plates above the wheels consist of 5½" Strips bolted to the Double Angle Strips (4) and (5). The 5½" Strips are extended on one side by two 2½" Strips, and on the other by a 2½" Strip and a 2½"×½" Double Angle Strip. These Strips are supported by the Double Angle Strips (9).

Each side of the engine housing consists of a 5½"×2½" and a 2½"×2½" Flexible Plate. These are attached to the Flanged Plate (6) by Fishplates, to the front of the cab by a 2½"×½" Double Angle Strip, and to the running plates by Angle Brackets (10). The top is filled in by a 5½"×2½" Flanged Plate and a straightened 1½" radius Curved Plate. The radiator consists of a 2½"×½" Double Angle Strip bolted to the 5½"×2½" Flanged Plate. A Wheel Disc is fixed to the centre of the Double Angle Strip, and supports a 2½" Stepped Curved Strip on each side.

The leading axle consists of a 3½" and a 2" Rod joined by a Rod Connector and is supported in the main frames. The rear axle is a 4" Rod free to turn in two ½" Reversed Angle Brackets (11).

A handrail consisting of a 3½" Rod is attached to each side of the cab. The top of the Rod is held in a Right-Angle Rod and Strip Connector, and the lower end is supported in a 2½" Strip attached to a 3½" Strip (12) by an Angle Bracket.

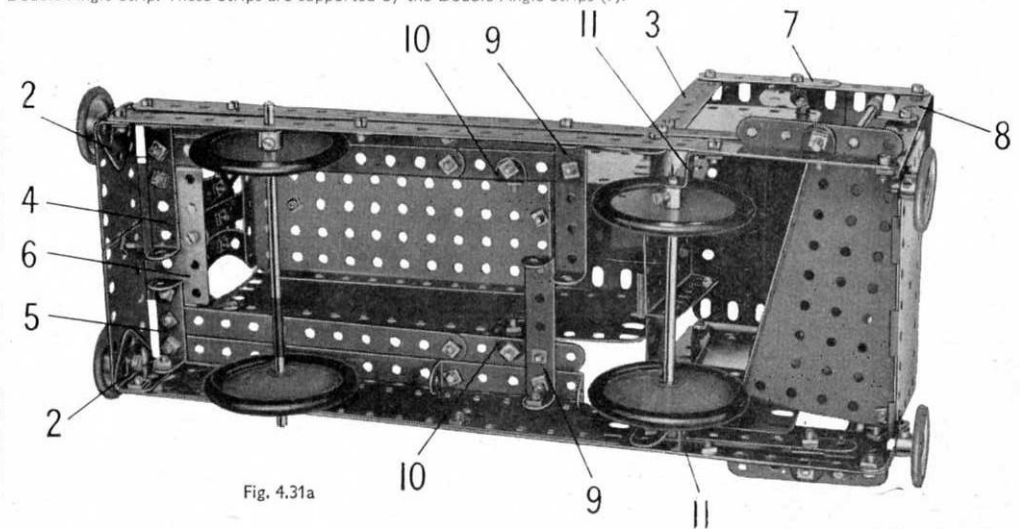


Fig. 4.31a

4.32 STEAM TRACTION ENGINE

The base of the model is a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate, and the sides are $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates edged as shown by $5\frac{1}{2}"$ and $2\frac{1}{2}"$ Strips. The sides are connected by $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips (1) and (2), and a similar Double Angle Strip held by a Bolt (3) on each side.

The boiler is attached to $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates (4) bolted to the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates. It consists of two $1\frac{1}{2}"$ radius Curved Plates (5), two curved $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates (6) and a Curved $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (7). Two $\frac{1}{2}"$ Reversed Angle Brackets (8) are fixed to the lower edge of Plate (7). The chimney is a 'U'-section Curved Plate rolled into a circle, and it is attached to the boiler by an Angle Bracket. The Road Wheel at the front of the boiler is held on a $1\frac{1}{2}"$ Rod by a Spring Clip. The Rod is fixed by further Spring Clips in a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip bolted to the Plates (6) inside the boiler.

The rear wheels are fixed on a 4" Rod mounted in holes in the $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates, and a belt of Cord passed round one wheel drives a 1" Pulley (9). Pulley (9) is fixed on a 2" Rod supported in a Stepped Bent Strip bolted to Double Angle Strip (2), and the Rod is fitted also with a 1" Pulley (10) and a Bush Wheel. A belt of Cord from Pulley (10) drives a 1" Pulley (11) on a $3\frac{1}{2}"$ Rod. This Rod is supported in Fishplates bolted to Trunnions, which are fixed to the Double Angle Strip held by the Bolts (3).

The cylinder is a 'U'-section Curved Plate attached to the boiler by Obtuse Angle Brackets. The piston rod is a 4" Rod passed through an Angle Bracket bolted to the cylinder, and the Rod is fitted with a Rod and Strip Connector. The latter is *lock-nutted* to a Fishplate (12), which is bolted tightly to the Bush Wheel but is spaced from it by three Washers and a nut on the $\frac{3}{8}"$ Bolt used to fix the parts together.

The steering column is a $3\frac{1}{2}"$ and a 2" Rod joined by a Rod Connector. It is supported in an Obtuse Angle Bracket bolted to the Double Angle Strip (1), and Cord wrapped two or three times round the lower end of the rod is tied at each end to a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (13). This Double Angle Strip is *lock-nutted* to the Reversed Angle Brackets (8). A Cord Anchoring Spring and a $\frac{3}{8}"$ Washer prevent the Cord from slipping off the steering column.

The roof is supported by two $3\frac{1}{2}"$ Strips (14) and a $2\frac{1}{2}"$ Strip (15). It consists of a $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate, two $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates, half of a Hinged Flat Plate (16) and a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (17).

A simple crane made from $5\frac{1}{2}"$ Strips is assembled as shown and fixed at the front of the boiler. The Cord supporting the small Loaded Hook is tied to the boiler.

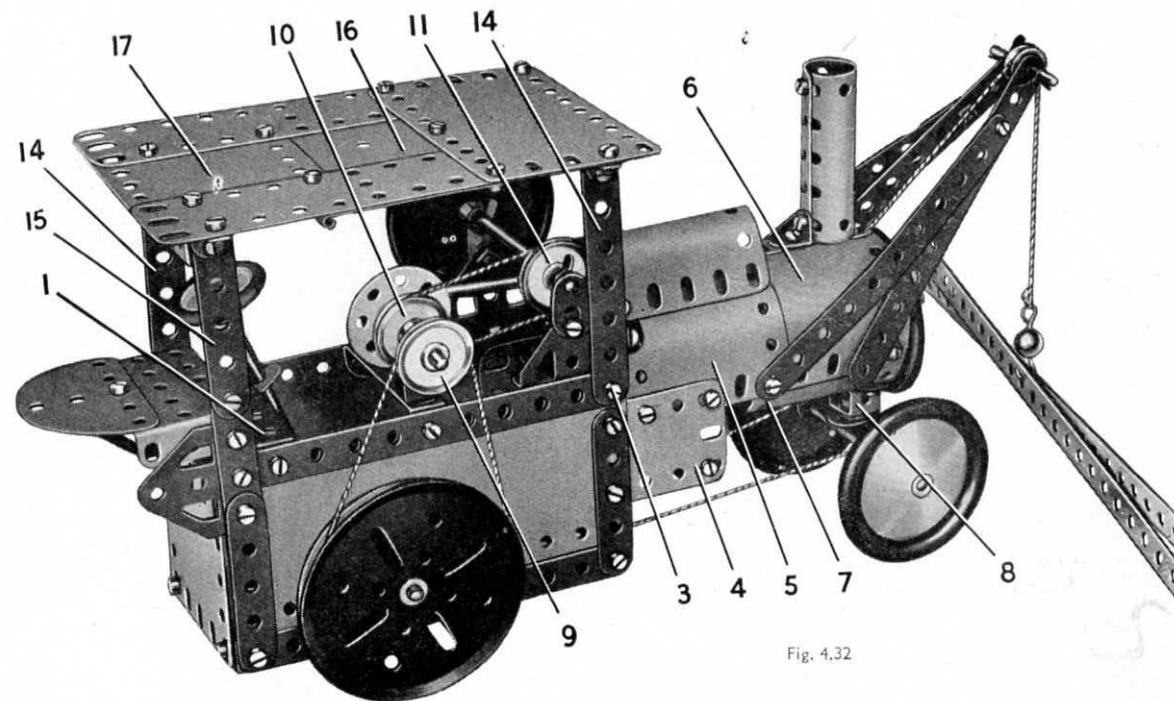


Fig. 4.32

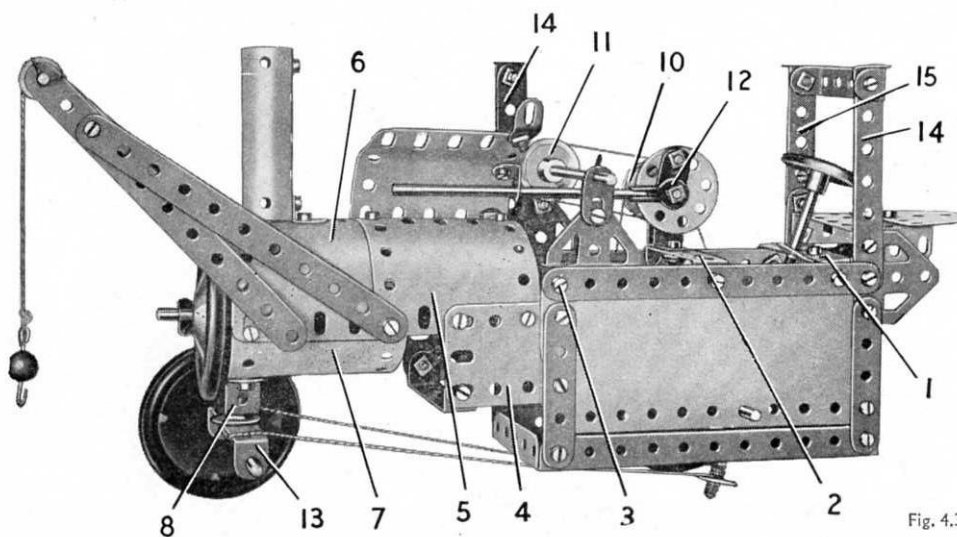


Fig. 4.32a

Parts Required

8 of No. 2	2 of No. 18a	2 of No. 38d	2 of No. 125	2 of No. 191
2 " " 3	2 " " 19b	1 " " 40	2 " " 126	2 " " 192
9 " " 5	4 " " 22	1 " " 44	2 " " 126a	1 " " 198
4 " " 10	1 " " 23	1 " " 48	1 " " 155	2 " " 199
7 " " 12	1 " " 24	5 " " 48a	1 " " 176	2 " " 200
4 " " 12c	7 " " 35	1 " " 51	4 " " 187	1 " " 212
2 " " 15b	76 " " 37a	1 " " 52	2 " " 188	1 " " 213
3 " " 16	69 " " 37b	1 " " 57c	2 " " 189	1 " " 214
2 " " 17	8 " " 38	3 " " 111c	4 " " 190	

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Experts are waiting to help you

4.33 HORIZONTAL STEAM ENGINE AND BOILER

The front side of the engine bed or base is filled in by the *separated halves of a Hinged Flat Plate* and a $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate. One end is formed by two $5\frac{1}{2}"$ Strips (1) and (2) connected to the front by an Angle Bracket and a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip, and bolted to two $2\frac{1}{2}"$ Strips at the corners. This end is filled in by a $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate. The other end consists of a $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plate (3), and a $5\frac{1}{2}"$ Strip fixed to an Angle Bracket attached to the front by a Bolt (4). The $5\frac{1}{2}"$ Strip is connected to the Flanged Plate by two $2\frac{1}{2}"$ Strips. The rear side is formed by two $12\frac{1}{2}"$ Strips. One of these is bolted to the Flanged Plate (3) and to a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip fixed to the Strip (1). The other $12\frac{1}{2}"$ Strip is connected to the ends of the base by a $1\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip and an Angle Bracket. A built-up strip (5), consisting of two $5\frac{1}{2}"$ Strips overlapped two holes, is attached to an Angle Bracket bolted to the Flanged Plate (3) and to a lug of the Double Angle Strip fixed to the Strip (1).

The sides of the boiler are $5\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plates, and they are fastened to a $12\frac{1}{2}"$ Strip at the rear of the base and to the strip (5). Its rounded top consists of two curved $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates. One end is a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flanged Plate (6), with a Semi-Circular Plate attached to it by a Fishplate. The other end is a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate bolted to a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip, and a Semi-Circular Plate is again fixed to a Fishplate. The chimney is made from two $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plates rolled into a circle and fixed to a $2\frac{1}{2}"$ Strip bolted to the boiler.

The crankshaft is in two pieces. One of these consists of a 2" Rod mounted in a $3\frac{1}{2}"$ Strip and in a Flat Trunnion (7), and in a built-up reversed angle bracket. The reversed angle bracket is made from two Angle Brackets bolted together, and it is fixed to the Flat Trunnion. The 2" Rod carries a Road Wheel, a 1" Pulley and a 3" Pulley (8). The other section of the crankshaft is made from a $3\frac{1}{2}"$ and a 2" Rod joined by a Rod Connector, and it is supported in a $3\frac{1}{2}"$ Strip (9), and in a Flat Trunnion (10) bolted to the strip (5). The Rods are fitted with three 1" Pulleys and a 3" Pulley (11).

The cylinder is made from two $1\frac{1}{8}"$ radius Curved Plates bolted to two 'U'-section Curved Plates and fixed to the Flanged Plate (3). It is filled in at one end by two $2\frac{1}{2}"$ Stepped Curved Strips (12), attached to the Flanged Plate by an Angle Bracket.

Each of the Pulleys (8) and (11) is fitted with a $\frac{1}{2}"$ Reversed Angle Bracket (13). A $\frac{3}{8}"$ Bolt is passed

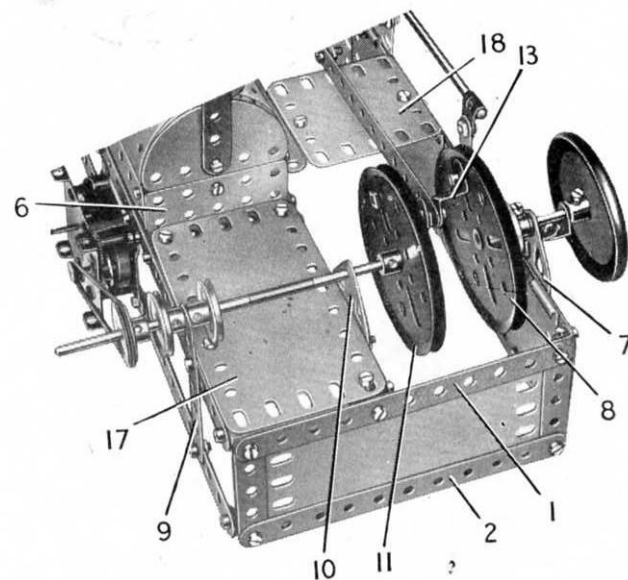


Fig. 4.33a

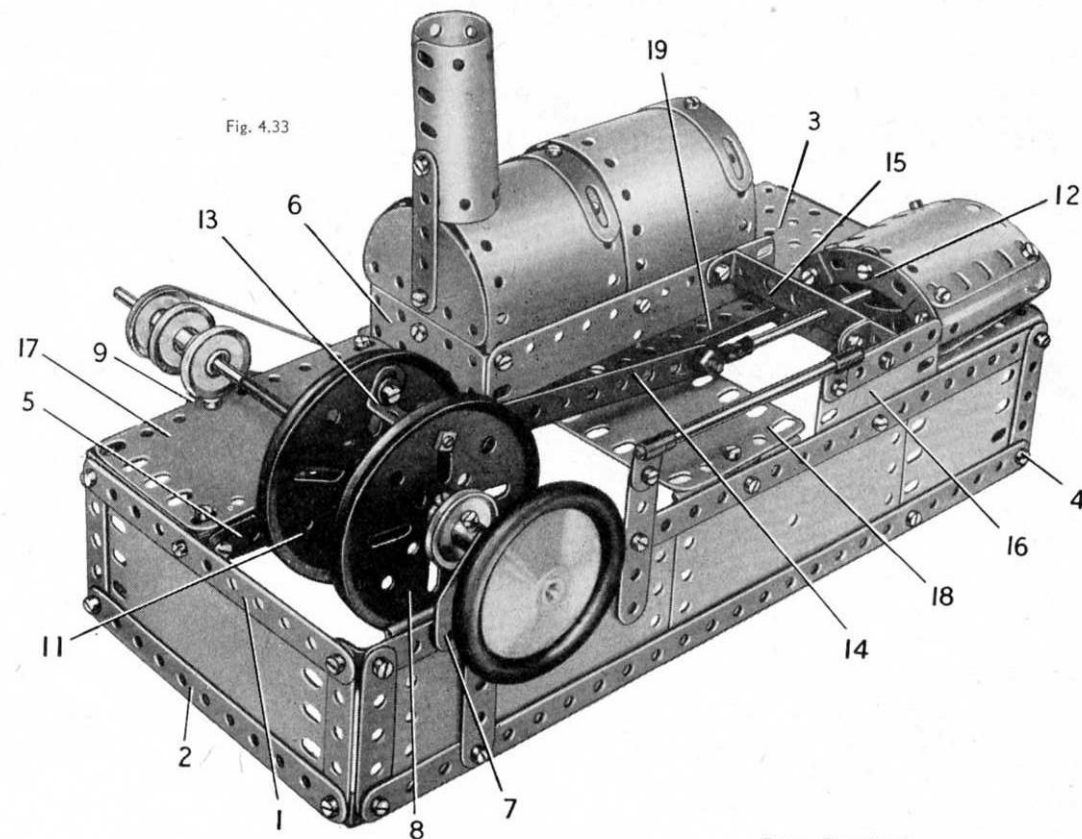


Fig. 4.33

through one of the Reversed Angle Brackets, and then a Washer, a $5\frac{1}{2}"$ Strip (14), and a second Washer are passed over the Bolt, which is finally fixed tightly by two nuts in the other Reversed Angle Bracket.

A Rod and Strip Connector is *lock-nutted* to Strip (14), and is fitted to a 4" Rod. This Rod is supported in a Fishplate bolted to one of the Curved Strips (12), and in a $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strip (15) extended at one end by a Double Bracket. The Double Angle Strip is fixed to the side of the boiler, and the Double Bracket is bolted to a $2\frac{1}{2}" \times 1\frac{1}{2}"$ Flexible Plate (16).

A $4\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (17) is attached to the base by two $2\frac{1}{2}" \times \frac{1}{2}"$ Double Angle Strips placed between the $12\frac{1}{2}"$ Strip and the strip (5), and by a Double Bracket connected to the Strip (1). A $2\frac{1}{2}" \times 2\frac{1}{2}"$ Flexible Plate (18) is connected to the front side of the base by an Angle Bracket, and to the strip (5) by a Trunnion. A $5\frac{1}{2}"$ Strip (19) is also fixed to the Trunnion.

A Magic Clockwork Motor is bolted to the lower $12\frac{1}{2}"$ Strip at the rear of the base, and is connected to the upper Strip by a Fishplate. The Motor drives one of the 1" Pulleys on the crankshaft.

Parts Required

4 of No. 1	81 of No. 37b	4 of No. 190
8 " " 2	8 " " 38	2 " " 191
2 " " 3	1 " " 48	2 " " 192
9 " " 5	6 " " 48a	1 " " 198
4 " " 10	1 " " 51	2 " " 199
2 " " 11	1 " " 52	2 " " 200
8 " " 12	2 " " 90a	1 " " 212
2 " " 15b	4 " " 111c	2 " " 212a
1 " " 16	2 " " 125	1 " " 213
2 " " 17	1 " " 126	2 " " 214
2 " " 19b	2 " " 126a	2 " " 215
4 " " 22	1 " " 187	1 Magic Motor
1 " " 23	2 " " 188	(not included in
86 " " 37a	2 " " 189	Outfit)

4.34 AUTOMATIC SLAG DUMPER

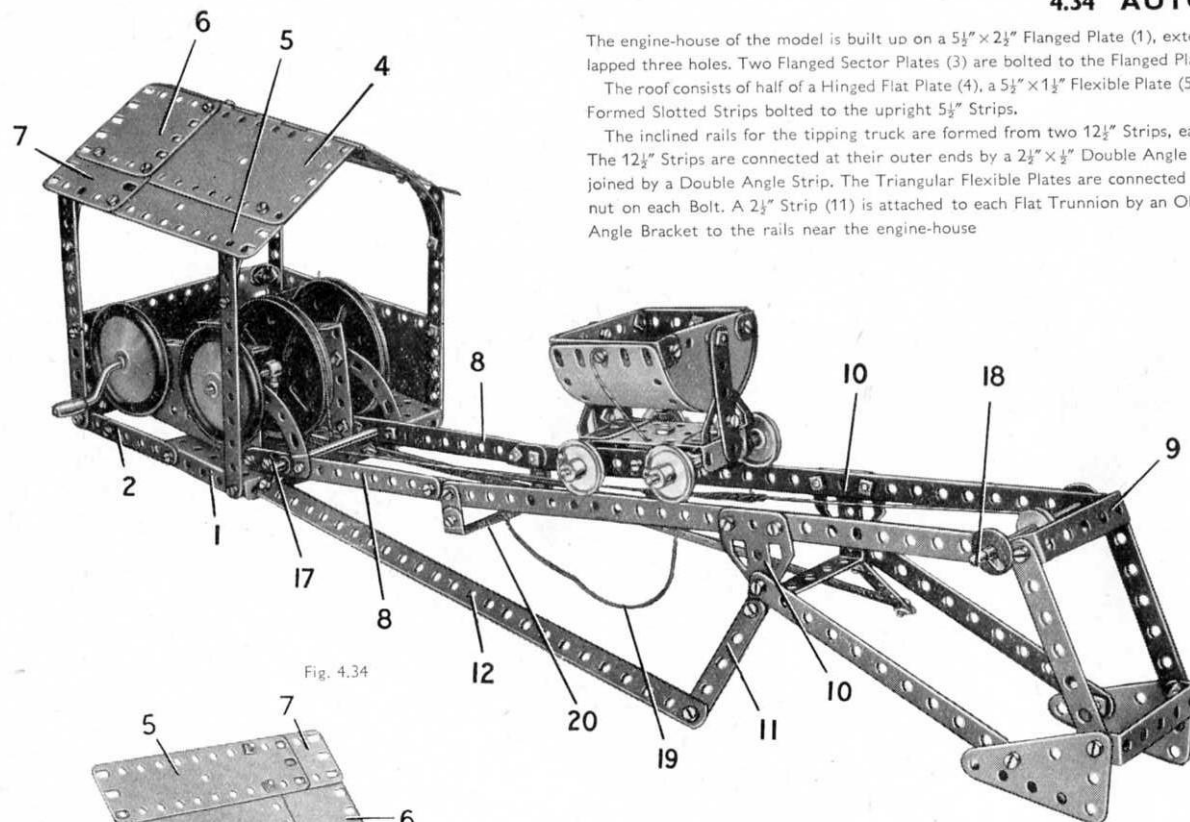


Fig. 4.34

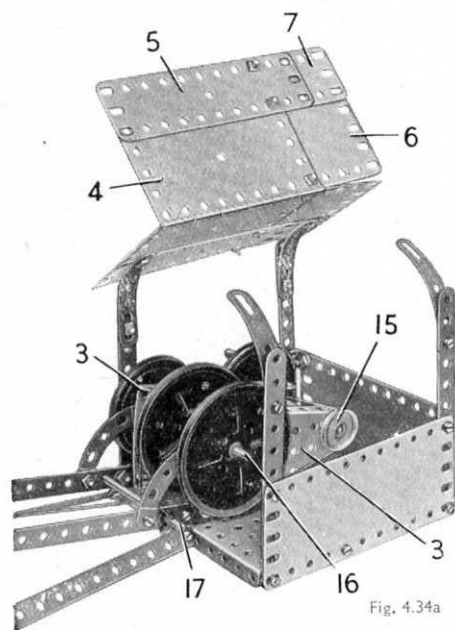


Fig. 4.34a

Parts Required

4 of No. 1	8 of No. 35	2 of No. 111c
8 " " 2	85 " " 37a	2 " " 126
2 " " 3	78 " " 37b	2 " " 126a
8 " " 5	8 " " 38	1 " " 186
4 " " 10	2 " " 38d	2 " " 187
4 " " 12	1 " " 40	2 " " 188
4 " " 12c	1 " " 44	2 " " 189
1 " " 15b	1 " " 48	2 " " 190
4 " " 16	6 " " 48a	2 " " 192
2 " " 19b	1 " " 51	1 " " 198
1 " " 19g	1 " " 52	2 " " 200
5 " " 22	2 " " 54	2 " " 214
1 " " 23	2 " " 90a	4 " " 215
		2 " " 221

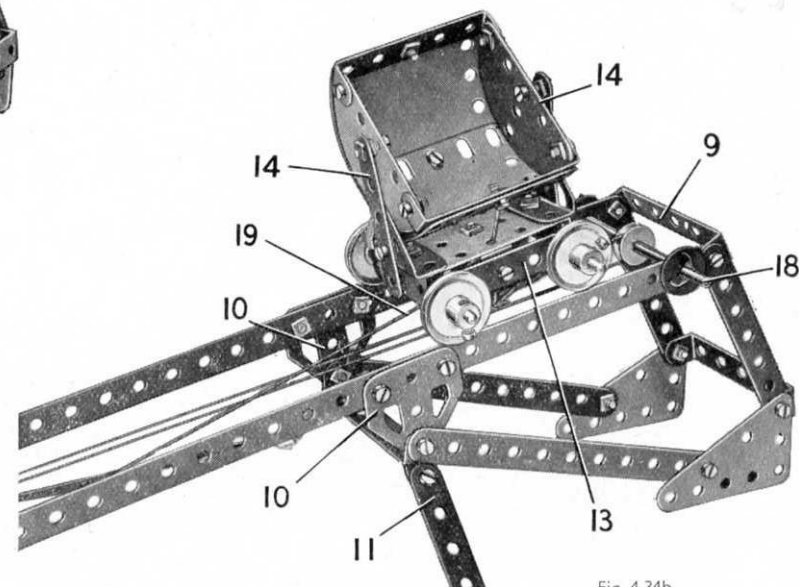


Fig. 4.34b

The engine-house of the model is built up on a $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plate (1), extended at one end by a built-up strip, which is seen at (2). This strip is formed from two $2\frac{1}{2}''$ Strips overlapped three holes. Two Flanged Sector Plates (3) are bolted to the Flanged Plate to provide bearings for the winding mechanism.

The roof consists of half of a Hinged Flat Plate (4), a $5\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate (5), a $2\frac{1}{2}'' \times 2\frac{1}{2}''$ Flexible Plate (6) and a $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flexible Plate (7) on each side. The roof is attached to Formed Slotted Strips bolted to the upright $5\frac{1}{2}''$ Strips.

The inclined rails for the tipping truck are formed from two $12\frac{1}{2}''$ Strips, each extended by a $5\frac{1}{2}''$ Strip (8) connected by a Fishplate and bolted to one of the Flanged Sector Plates. The $12\frac{1}{2}''$ Strips are connected at their outer ends by a $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip (9), and two $3\frac{1}{2}''$ Strips held by the same bolts are fixed to $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Triangular Flexible Plates also joined by a Double Angle Strip. The Triangular Flexible Plates are connected by $5\frac{1}{2}''$ Strips to Flat Trunnions (10), which are bolted to the $12\frac{1}{2}''$ Strips but are spaced from them by a nut on each Bolt. A $2\frac{1}{2}''$ Strip (11) is attached to each Flat Trunnion by an Obtuse Angle Bracket, and a $12\frac{1}{2}''$ Strip (12) is fixed to the $2\frac{1}{2}''$ Strip. Strip (12) is connected by an Obtuse Angle Bracket to the rails near the engine-house.

A $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate is used for the base of the tipping truck. A $2\frac{1}{2}''$ Strip (13) is secured to each side of this by a $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip (Fig. 4.34b). The $2\frac{1}{2}''$ Strips provide bearings for two $3\frac{1}{2}''$ Rods that carry $1''$ Pulleys. The ends of the truck hopper are Semi-Circular Plates joined by two $2\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips. The two $1\frac{1}{16}''$ radius Curved Plates that form the bottom and sides of the hopper are bolted to the Double Angle Strips.

The hopper is pivoted on lock-nutted $\frac{3}{8}''$ Bolts attached to $2\frac{1}{2}''$ Strips (14), which are fixed to Trunnions bolted to the $2\frac{1}{2}'' \times 1\frac{1}{2}''$ Flanged Plate.

Movement of the truck is controlled by a Crank Handle fitted with a $1''$ Pulley (15) (Fig. 4.34a). This Pulley is connected by a belt of Cord to a $3''$ Pulley fixed on a $4''$ Rod (16). A length of Cord fastened to a Stepped Bent Strip bolted underneath the truck is passed round a second $3''$ Pulley on Rod (16), under a Rod (17) and then is taken round a $\frac{1}{2}''$ Pulley on a Rod (18) and fastened to a $2\frac{1}{2}''$ Driving Band. The Driving Band is secured to the Stepped Bent Strip.

The hopper is tilted, so as to discharge its contents, by a Cord (19) (Fig. 4.34b). This Cord is tied to a Double Angle Strip (20) (Fig. 4.34) and passes through a hole in the base of the truck. It is then fastened to the side of the hopper. The length of this Cord must be adjusted so that the hopper is tipped when the truck reaches the limit of its travel along the rails.

4.35 SALOON CAR

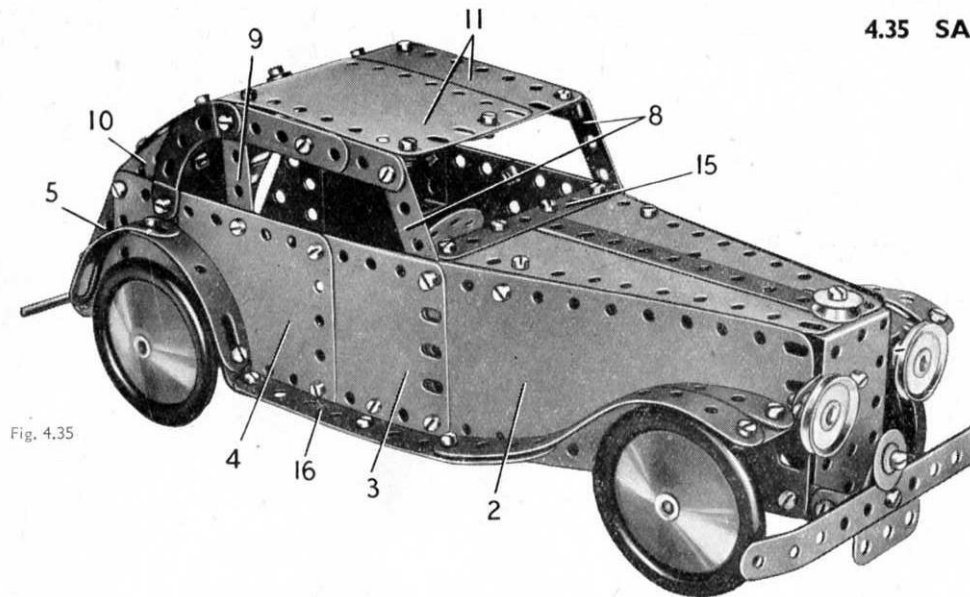


Fig. 4.35

Parts Required				
2 of No. 1	1 of No. 16	85 of No. 37a	2 of No. 125	1 of No. 198
8 " " 2	1 " " 17	81 " " 37b	2 " " 126	2 " " 212a
2 " " 3	2 " " 18a	7 " " 38	1 " " 126a	1 " " 213
9 " " 5	1 " " 18b	1 " " 38d	2 " " 155	2 " " 214
4 " " 10	5 " " 22	1 " " 48	4 " " 187	4 " " 215
1 " " 11	1 " " 23	5 " " 48a	2 " " 188	4 " " 221
8 " " 12	1 " " 24	1 " " 51	2 " " 189	No. 1 Clockwork Motor (not included in Outfit)
3 " " 12c	1 " " 24a	4 " " 90a	4 " " 190	
2 " " 15b	2 " " 35	6 " " 111c	2 " " 191	
			2 " " 192	

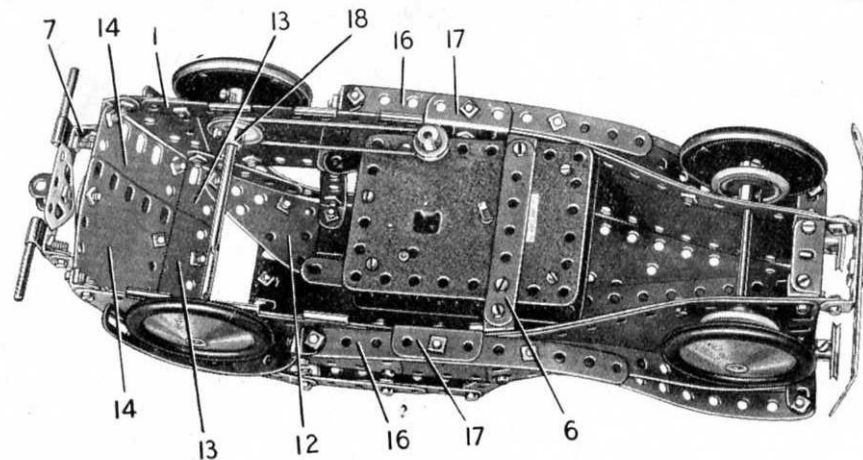


Fig. 4.35b

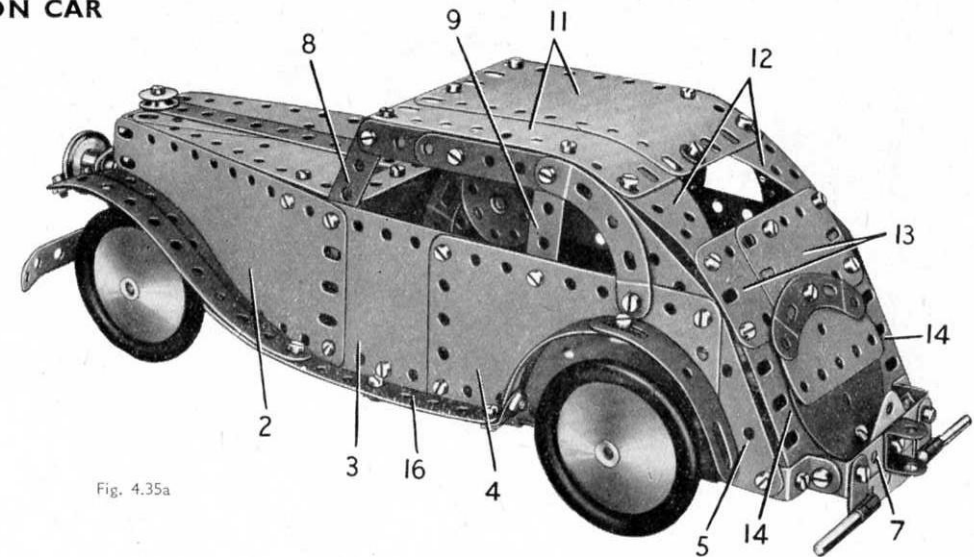


Fig. 4.35a

Each side of the car is assembled on a $12\frac{1}{2}$ " Strip (1) bent to the shape shown in Fig. 4.35b. The Plates used for the sides consist of a $5\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate (2), a $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plate (3), half of a Hinged Flat Plate (4) and a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Triangular Flexible Plate (5). The centre pin is withdrawn from the Hinged Flat Plate so that the halves can be used to form the plates (4).

The completed sides are connected by Angle Brackets to a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate that forms the radiator, and by a $3\frac{1}{2}$ " Strip (6) attached to the lower lugs of $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Double Angle Strips bolted in an upright position to the sides. The upper lugs of the Double Angle Strips serve as supports for the top of the bonnet. At the rear each side is fitted with a $\frac{1}{2}$ " Reversed Angle Bracket, and these are bolted to a $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Double Angle Strip (7).

The windscreen and window frames consist of two $2\frac{1}{2}$ " Strips (8), two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Double Angle Strips (9), two $2\frac{1}{2}$ " Stepped Curved Strips and two $2\frac{1}{2}$ " Strips (10). Two $2\frac{1}{2}$ " Strips overlapped three holes are bolted between the Strips (8) and the Double Angle Strips (9) on each side.

The roof and rear of the body are made from two $4\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates (11), two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Triangular Flexible Plates (12), two $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates (13) and two $2\frac{1}{2}$ " \times $2\frac{1}{2}$ " Flexible Plates (14). These Plates are arranged as shown in Fig. 4.35a, and they are attached to Angle Brackets bolted to the Strips (8), to the lugs of the Double Angle Strips (9), and to the Reversed Angle Brackets bolted to the Triangular Flexible Plates (5). The spare wheel cover is represented by two Semi-Circular Plates and a $2\frac{1}{2}$ " Stepped Curved Strip.

The top of the bonnet consists of two $5\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flexible Plates and a $5\frac{1}{2}$ " Strip. These parts are bolted to a $3\frac{1}{2}$ " Strip (15) that is fixed to the upper lugs of the vertical Double Angle Strips previously mentioned. The front ends of the Flexible Plates and the $5\frac{1}{2}$ " Strip are attached by a $\frac{1}{2}$ " Bolt to the $2\frac{1}{2}$ " \times $1\frac{1}{2}$ " Flanged Plate, and a $\frac{1}{2}$ " loose Pulley on the Bolt represents the radiator cap. An Angle Bracket on each side connects the top of the bonnet to the sides.

The headlamps are 1" Pulleys fixed on $\frac{1}{2}$ " Bolts passed through a $2\frac{1}{2}$ " Strip that is bolted to the radiator. The steering wheel is a Bush Wheel fixed on a 2" Rod passed through the centre hole of a Wheel Disc. The Wheel Disc and a $2\frac{1}{2}$ " Stepped Curved Strip are bolted to an Obtuse Angle Bracket attached to the top of the bonnet.

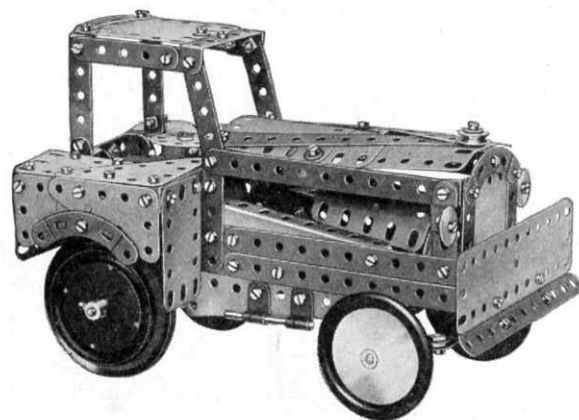
The rear mudguards on each side are made from two Formed Slotted Strips attached to an Angle Bracket, and they are connected by Obtuse Angle Brackets to $5\frac{1}{2}$ " Strips (16) that form the steps or running boards. Each of the Strips (16) is connected to the side of the body by a Trunnion (17), and is lengthened by two $5\frac{1}{2}$ " Strips bent as shown to form a front mudguard. The free ends of the two $5\frac{1}{2}$ " Strips are joined together by a Fishplate.

The front bumper is a $5\frac{1}{2}$ " Strip, and together with a Flat Trunnion, it is fixed to a $1\frac{1}{2}$ " \times $\frac{1}{2}$ " Double Angle Strip bolted between the ends of the Strips (1). The rear bumper is in two sections, each made from a $1\frac{1}{2}$ " Rod pushed into a Right-Angle Rod and Strip Connector. The latter parts are bolted to the Double Angle Strip (7), and a Flat Trunnion also fixed to the Double Angle Strip represents the number plate.

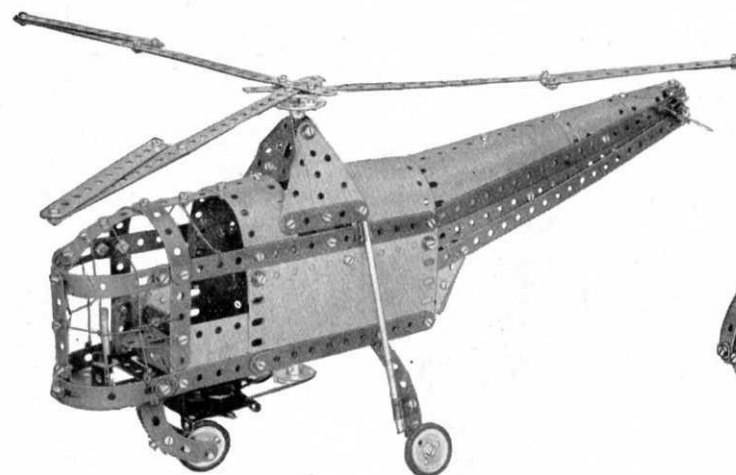
The front axle is a 4" Rod supported in the body as shown. The rear axle is made from a 4" and a 1" Rod joined by a Rod Connector, and it carries a 1" Pulley (18).

If a No. 1 Clockwork Motor is available it can be used to drive the model. The Motor should be bolted to the Strip (6). A $\frac{1}{2}$ " fixed Pulley on the Motor shaft should be connected by a Driving Band to Pulley (18). The $\frac{1}{2}$ " fixed Pulley is supplied with the No. 1 Clockwork Motor.

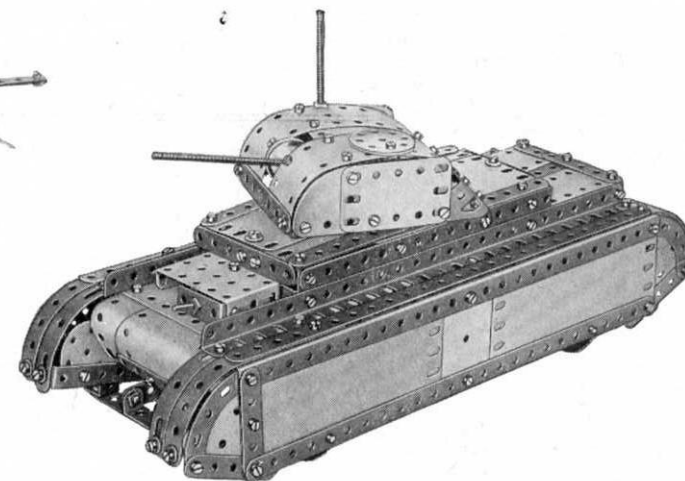
BUILD BIGGER AND BETTER MODELS



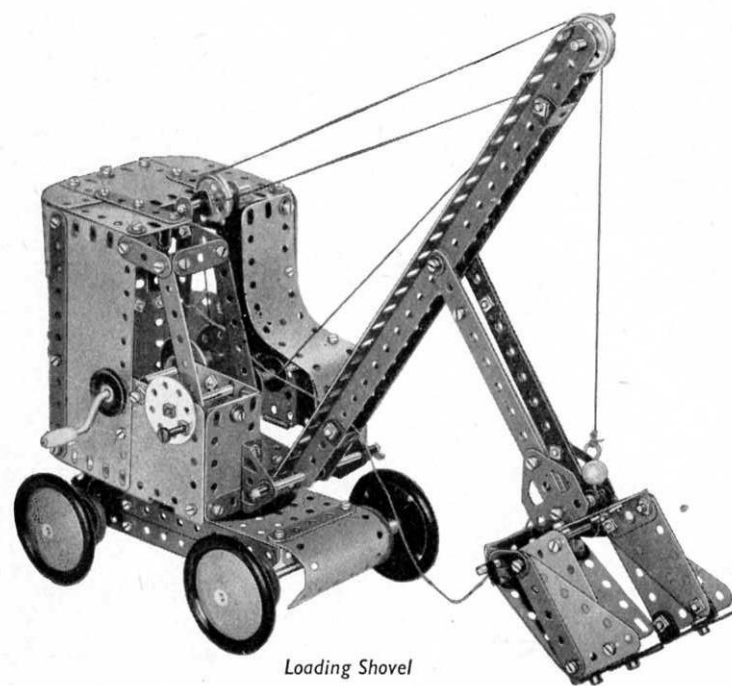
Shunting Tractor



Helicopter



Military Tank

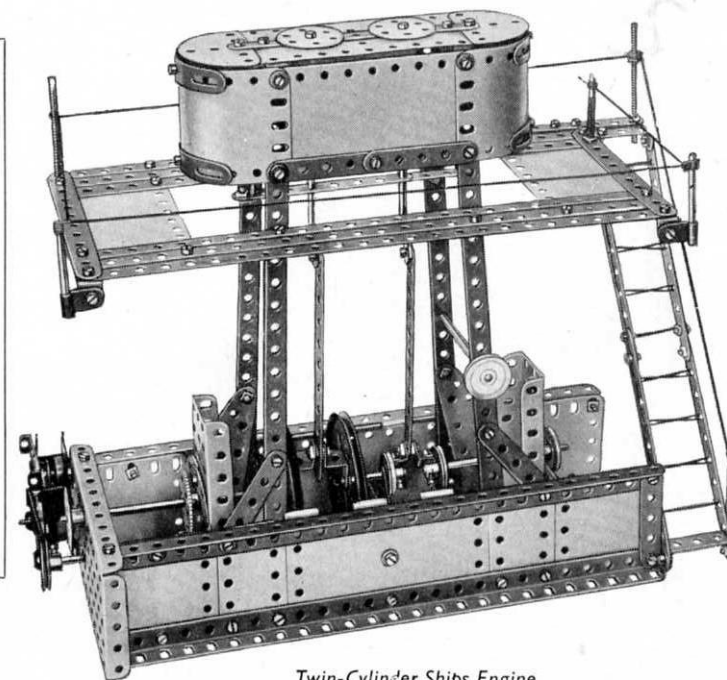


Loading Shovel

HOW TO CONTINUE

When you have built all the models shown in this Book of Instructions, you will be keen to build others bigger and more elaborate. Your next step, therefore, is to purchase a Meccano No. 4A Accessory Outfit containing all the parts required to convert your No. 4 into a No. 5 Outfit. You will then be able to build the full range of No. 5 Outfit models, a selection of which is illustrated on this page.

If you prefer to do so, you can build up and develop your No. 4 Outfit quite easily by adding various parts to it from time to time. The model-building possibilities of the Meccano System are unlimited, and the more Meccano parts you have, the bigger and better the models you will be able to build.



Twin-Cylinder Ships Engine

MECCANO PARTS



PERFORATED STRIPS

No.	12 $\frac{1}{2}$ "	No.	2a. 4 $\frac{1}{2}$ "	No.	6. 2"
1a.	9 $\frac{1}{2}$ "	3a.	3 $\frac{1}{2}$ "	24a.	Wheel Disc, 1 $\frac{1}{2}$ " diam., without boss, eight holes
1b.	7 $\frac{1}{2}$ "	4.	3"	24b.	Bush Wheel 1 $\frac{1}{2}$ " diam., six holes
2.	5 $\frac{1}{2}$ "	5.	2 $\frac{1}{2}$ "	24c.	Wheel Disc, 1 $\frac{1}{2}$ " diam., without boss, six holes

ANGLE GIRDERS

7.	24 $\frac{1}{2}$ "	8b.	7 $\frac{1}{2}$ "	9c.	3"
7a.	18 $\frac{1}{2}$ "	9.	5 $\frac{1}{2}$ "	9d.	2 $\frac{1}{2}$ "
8.	12 $\frac{1}{2}$ "	9a.	4 $\frac{1}{2}$ "	9e.	2 $\frac{1}{2}$ "
8a.	9 $\frac{1}{2}$ "	9b.	3 $\frac{1}{2}$ "	9f.	1 $\frac{1}{2}$ "



10. Fishplate | 11. Double Bracket

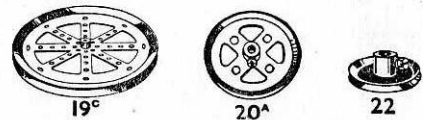
ANGLE BRACKETS

12.	1 $\frac{1}{2}$ " x 1"	12b.	1" x 1"
12a.	1 $\frac{1}{2}$ " x 1"	12c.	Obtuse, 1 $\frac{1}{2}$ " x 1"



AXLE RODS

13.	11 $\frac{1}{2}$ "	15a.	4 $\frac{1}{2}$ "	16b.	3"
13a.	8"	15b.	4"	17.	2"
14.	6 $\frac{1}{2}$ "	16.	3 $\frac{1}{2}$ "	18a.	1 $\frac{1}{2}$ "
15.	5"	16a.	2 $\frac{1}{2}$ "	18b.	1"
19g.	Crank Handle, 3 $\frac{1}{2}$ " shaft, with grip				
19h.	Crank Handle, 5" shaft, with grip				
19s.	Crank Handle, 3 $\frac{1}{2}$ " shaft, without grip				

19a. Spoked Wheel, 3" diam.
20. Flanged Wheel, 1 $\frac{1}{2}$ " diam.
20b. Flanged Wheel, 1" diam.

PULLEYS

19b.	3" diam., with boss and screw
19c.	6" diam., with boss and screw
20a.	2" diam., with boss and screw
21.	1 $\frac{1}{2}$ " diam., with boss and screw
22.	1" diam., with boss and screw



PULLEYS

22a.	1" diam., without boss
23.	$\frac{1}{2}$ " diam., without boss
23a.	$\frac{1}{2}$ " diam., with boss and screw

24. Bush Wheel 1 $\frac{1}{2}$ " diam., eight holes
24a. Wheel Disc, 1 $\frac{1}{2}$ " diam., without boss, eight holes
24b. Bush Wheel 1 $\frac{1}{2}$ " diam., six holes
24c. Wheel Disc, 1 $\frac{1}{2}$ " diam., without boss, six holes

PINIONS

25.	$\frac{1}{2}$ " diam., $\frac{1}{2}$ " face, 25 teeth
25a.	$\frac{1}{2}$ " diam., $\frac{1}{2}$ " face, 25 teeth
25b.	$\frac{1}{2}$ " diam., $\frac{1}{2}$ " face, 25 teeth
26.	$\frac{1}{2}$ " diam., $\frac{1}{2}$ " face, 19 teeth
26a.	$\frac{1}{2}$ " diam., $\frac{1}{2}$ " face, 19 teeth
26b.	$\frac{1}{2}$ " diam., $\frac{1}{2}$ " face, 19 teeth
26c.	$\frac{1}{2}$ " diam., $\frac{1}{2}$ " face, 15 teeth



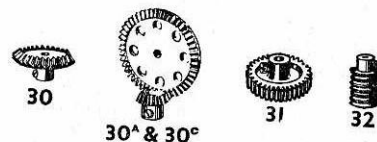
GEAR WHEELS

27.	1 $\frac{1}{2}$ " diam., 50 teeth
27a.	1 $\frac{1}{2}$ " diam., 57 teeth
27b.	3 $\frac{1}{2}$ " diam., 133 teeth
27c.	2 $\frac{1}{2}$ " diam., 95 teeth
27d.	1 $\frac{1}{2}$ " diam., 60 teeth



CONTRATE WHEELS

28.	1 $\frac{1}{2}$ " diam., 50 teeth
29.	$\frac{1}{2}$ " diam., 25 teeth



30" & 30"

30.	Bevel Gear, $\frac{7}{8}$ " diam., 26 teeth (for use in pairs)
30a.	Bevel Gear, $\frac{1}{2}$ " diam., 16 teeth
30b.	Bevel Gear, $\frac{1}{2}$ " diam., 48 teeth
31.	Gear Wheel, 1" diam., $\frac{1}{2}$ " face, 38 teeth
32.	Worm, $\frac{1}{2}$ " diam.
34.	Spanner



34b.	Box Spanner
35.	Spring Clip
36.	Screwdriver
36a.	Screwdriver (longer)
36c.	Drift (for levering bolt holes into line)
37.	Nut and Bolt, $\frac{1}{8}$ "
37a.	Nut
37b.	Bolt, $\frac{3}{8}$ "
38.	Washer
38d.	Washer, $\frac{3}{8}$ "
40.	Hank of Cord

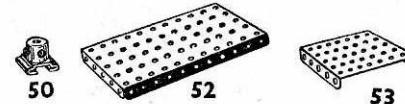
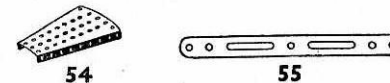
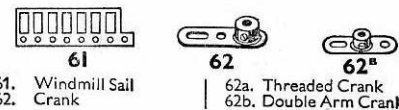
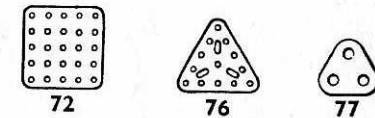


41. Propeller Blade | 43. Tension Spring, 2" long

44. Bent Strip, stepped
45. Double Bent Strip

DOUBLE ANGLE STRIPS

46.	2 $\frac{1}{2}$ " x 1"	48.	1 $\frac{1}{2}$ " x 1"	48c.	4 $\frac{1}{2}$ " x 1"
47.	2 $\frac{1}{2}$ " x 1"	48a.	2 $\frac{1}{2}$ " x 1"	48d.	5 $\frac{1}{2}$ " x 1"
47a.	3 $\frac{1}{2}$ " x 1"	48b.	3 $\frac{1}{2}$ " x 1"		

50. Slide Piece
51. Flanged Plate, 2 $\frac{1}{2}$ " x 1 $\frac{1}{2}$ "
52. Flanged Plate, 5 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ "
52a. Flat Plate, 5 $\frac{1}{2}$ " x 3 $\frac{1}{2}$ "
53. Flanged Plate, 3 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ "
53a. Flat Plate, 4 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ "54. Flanged Sector Plate, 4 $\frac{1}{2}$ " long
55. Perforated Strip, slotted, 5 $\frac{1}{2}$ " long
55a. Perforated Strip, slotted, 2" long57b. Hook, Loaded, large
57c. Hook, Loaded, small
58. Spring Cord, 40" length
58a. Coupling Screw for Spring Cord
58b. Hook for Spring Cord
59. Collar, with screw61. Windmill Sail Crank
62. Threaded Crank
62a. Threaded Crank
62b. Double Arm Crank63. Coupling Strip Coupling
63a. Threaded Coupling
63b. Strip Coupling
63c. Threaded Coupling
63d. Short Coupling64. Threaded Boss Centre Fork
65. Grub Screw, $\frac{3}{8}$ "
65a. Grub Screw, $\frac{3}{8}$ "
65b. Grub Screw, $\frac{3}{8}$ "
65c. Grub Screw, $\frac{3}{8}$ "72. Flat Plate, 5 $\frac{1}{2}$ " x 2 $\frac{1}{2}$ "
73. Flat Plate, 3" x 1 $\frac{1}{2}$ "
76. Triangular Plate, 2 $\frac{1}{2}$ "
77. Triangular Plate, 1"

SCREWED RODS

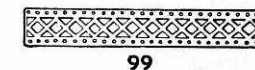
78.	11 $\frac{1}{2}$ "	80.	5"	80c.	3"
79.	8"	80a.	3 $\frac{1}{2}$ "	81.	2"
79a.	6"	80b.	4 $\frac{1}{2}$ "	82.	1"

CURVED STRIPS

89.	5 $\frac{1}{2}$ " (10" radius)
89a.	Stepped, 3" (1 $\frac{1}{2}$ " radius)
89b.	Stepped, 4" (4 $\frac{1}{2}$ " radius)
90.	2 $\frac{1}{2}$ " (2 $\frac{1}{2}$ " radius)
90a.	Stepped, 2 $\frac{1}{2}$ " (1 $\frac{1}{2}$ " radius)



94. Sprocket Chain, 40" length

95. 2" d'arm., 36 teeth
95a. 1 $\frac{1}{2}$ " diam., 28 teeth
95b. 3" diam., 56 teeth
96. 1" diam., 18 teeth
96a. $\frac{3}{4}$ " diam., 14 teeth

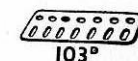
99

BRACED GIRDERS

97.	3 $\frac{1}{2}$ " long	99.	12 $\frac{1}{2}$ " long	100.	5 $\frac{1}{2}$ " long
97a.	3 $\frac{1}{2}$ " long	99a.	9 $\frac{1}{2}$ " long	100a.	4 $\frac{1}{2}$ " long
98.	2 $\frac{1}{2}$ " long	99b.	7 $\frac{1}{2}$ " long		



101. Heald for Loom | 102. Single Bent Strip

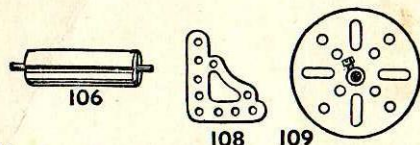


103

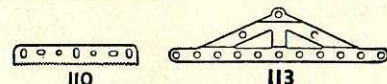
FLAT GIRDERS

103.	5 $\frac{1}{2}$ " long	103d.	3 $\frac{1}{2}$ " long	103h.	1 $\frac{1}{2}$ " long
103a.	9 $\frac{1}{2}$ " long	103e.	3" long	103k.	7 $\frac{1}{2}$ " long
103b.	12 $\frac{1}{2}$ " long	103f.	2 $\frac{1}{2}$ " long		
103c.	4 $\frac{1}{2}$ " long	103g.	2" long		

MECCANO PARTS



- No.
106. Wood Roller (complete with Rod and two Collars)
108. Corner Gusset
109. Face Plate, 2½" diam.



110. Rack Strip, 3½" long | 110a. Rack Strip, 6½" long

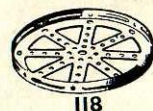
BOLTS

111. 3/8"
111a. 1/2"
111c. 3/8"
111d. 1 1/8"

113. Girder Frame



114. Hinge
115. Threaded Pin
116. Fork Piece, large
116a. Fork Piece, small



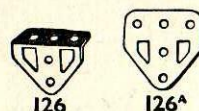
118. Hub Disc, 5½" diam.



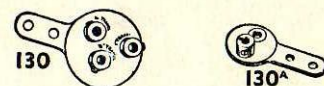
- 120b. Compression Spring, 1 1/8" long
122. Loaded Sack



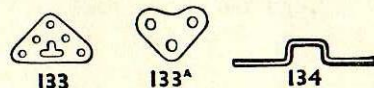
123. Cone Pulley, 1½", 1" and 3/8" diam.
124. Reversed Angle Bracket, 1"
125. Reversed Angle Bracket, 1/2"



126. Trunnion
126a. Flat Trunnion
128. Bell Crank, with boss



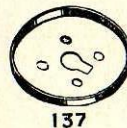
- No.
130. Eccentric, Triple Throw, ¼", ⅜" and ½"
130a. Eccentric, Single Throw, ¼"



133. Corner Bracket, 1½"
133a. Corner Bracket, 1½"
134. Crank Shaft, 1" stroke



136. Handrail Support | 136a. Handrail Coupling



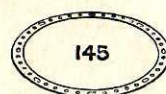
137. Wheel Flange | 138. Ship's Funnel, Raked



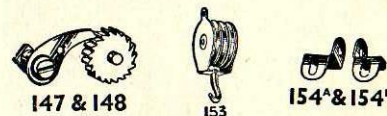
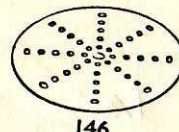
139. Flanged Bracket (right)
139a. Flanged Bracket (left)
140. Universal Coupling



- 142a. Motor Tyre (to fit 2" diam. rim)
142b. Motor Tyre (to fit 3" diam. rim)
142c. Motor Tyre (to fit 1" diam. rim)
142d. Motor Tyre (to fit 1 1/2" diam. rim)
143. Circular Girder, 5 1/2" diam.
144. Dog Clutch



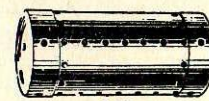
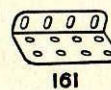
145. Circular Strip, 7½" diam. overall
146. Circular Plate, 6" diam. overall
146a. Circular Plate, 4" diam. overall



- No.
147. Pawl, with Pivot Bolt and nuts
147a. Pawl
147b. Pivot Bolt, with two nuts
147c. Pawl, without boss
148. Ratchet Wheel
151. Single Pulley Block
153. Triple Pulley Block
154a. Corner Angle Bracket, 1/2" (right-hand)
154b. Corner Angle Bracket, 1/2" (left-hand)
155. Rubber Ring (for 1" Pulley)



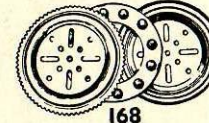
157. Fan, 2" diam.
160. Channel Bearing, 1 1/2" x 1" x 1/2"
161. Girder Bracket, 2" x 1" x 1/2"



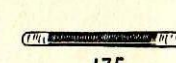
162. Boiler, complete, 5" long x 2 1/8" diam.
162a. Boiler Ends, 2 1/8" diam. x 3/8"
163. Sleeve Piece, 1 1/2" long x 1 1/8" diam.
164. Chimney Adaptor, 3/8" diam. x 1/2" high



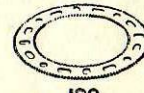
165. Swivel Bearing
166. End Bearing
167b. Flanged Ring, 9/16" diam.
168. Ball Thrust Bearing, 4" diam.
168a. Ball Thrust Race, flanged disc, 3 3/8" diam.
168b. Ball Thrust Race, toothed disc, 4" diam.
168c. Ball Cage, 3 3/8" diam., complete with balls
168d. Ball, 3/8" diam.



171. Socket Coupling
173a. Adaptor for Screwed Rod
175. Flexible Coupling Unit
176. Anchoring Spring for Cord



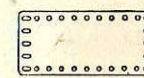
179. Rod Socket
180. Gear Ring, 3 1/2" diam. (133 ext. teeth, 95 int.)



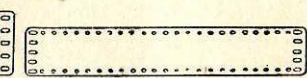
- No.
185. Steering Wheel, 1 1/8" diam.



- DRIVING BANDS**
186. 2 1/2" (light) | 186c. 10" (heavy)
186a. 6" (light) | 186d. 15" (heavy)
186b. 10" (light) | 186e. 20" (heavy)
187. Road Wheel, 2½" diam.
187a. Conical Disc, 1 1/2" diam.



192



197

FLEXIBLE PLATES

188. 2 1/2" x 1 1/2" | 190. 2 1/2" x 2 1/2" | 191. 4 1/2" x 2 1/2"
189. 5 1/2" x 1 1/2" | 190a. 3 1/2" x 2 1/2" | 192. 5 1/2" x 2 1/2"

STRIP PLATES

196. 9 1/2" x 2 1/2" | 197. 12 1/2" x 2 1/2"



198

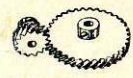


199



200

198. Hinged Flat Plate, 4 1/2" x 2 1/2"
199. Curved Plate, 'U'-section, 2 1/2" x 2 1/2" x 1/8" radius
200. Curved Plate, 2 1/2" x 2 1/2" x 1 1/8" radius



211a & 211b

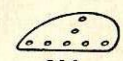


212



213

- 211a. Helical Gear, 1 1/2" } Can only be used
211b. Helical Gear, 1 1/2" } together
212. Rod and Strip Connector
212a. Rod and Strip Connector, right-angle
213. Rod Connector
213a. Three-way Rod Connector
213b. Three-way Rod Connector with boss



214



215



216

214. Semi-circular Plate, 2 1/2"
215. Formed Slotted Strip, 3"
216. Cylinder, 2 1/2" long, 1 1/4" diam.

TRIANGULAR FLEXIBLE PLATES

221. 2 1/2" x 1 1/2" | 223. 2 1/2" x 2 1/2" | 225. 3 1/2" x 2 1/2"
222. 2 1/2" x 2" | 224. 3 1/2" x 1 1/2" | 226. 3 1/2" x 2 1/2"
230. 4" Rod with Keyway
231. Key Bolt