

# Using the Meccano Gears Outfit "A"

## A Derrick Crane Built with Outfit No. 4

THE derrick crane that forms the subject of our model this month is built from the parts in Outfit No. 4 and a Gears Outfit "A."

The base of the crane consists of two Flanged Sector Plates joined by a 3" Pulley 1. A Rod is fixed in the Pulley and forms the pivot for the cab.

The cab base is a  $5\frac{1}{2} \times 2\frac{1}{2}$ " Flanged Plate. The sides are strengthened by  $5\frac{1}{2}$ " Strips 2 at the front and by compound 4" strips 3 at the rear. Two  $5\frac{1}{2}$ " Strips 4 and 5 are bolted to each side, and Strips 2 are extended by further  $5\frac{1}{2}$ " Strips 6 overlapped five holes. Strips 6 are connected at their upper ends by a  $1\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip, and extended by Flat Trunnions 7. Strips 5 are linked by a  $2\frac{1}{2} \times 1\frac{1}{2}$ " Flanged Plate and by two  $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strips.

A 3" Pulley 8 is bolted to Reversed Angle Brackets attached to the base of the cab, and the assembly is then passed over the Rod fixed in Pulley 1 and held in position by a  $\frac{3}{4}$ " Sprocket. A  $1\frac{1}{2}$ " Contrate 9 is fixed on the upper end of the Rod and it meshes with a  $\frac{1}{2}$ " Pinion on a Rod mounted in the sides of the cab.

A Magic Clockwork Motor is attached to Angle Brackets bolted to the rear of the cab, and drives a 1" Pulley on a Rod 10. The Rod carries a  $\frac{3}{4}$ " Pinion 11, a  $\frac{3}{4}$ " Contrate 12, and a  $\frac{1}{2}$ " Pinion 13, and is arranged to slide about  $\frac{1}{4}$ " in its bearings. The sliding movement is controlled by a  $3\frac{1}{2}$ " Strip 14, lock-nutted to a  $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strip bolted across the cab. A  $\frac{3}{4}$ " Bolt in the end hole of the  $3\frac{1}{2}$ " Strip engages between Contrate 12 and Pinion 13.

Pinion 11 can be moved into mesh with a 50-tooth Gear 15, and similarly Pinion 13 with a 57-tooth Gear 16. These Gears are fixed on  $1\frac{1}{2}$ " Rods mounted in the sides of the cab and in two  $2\frac{1}{2} \times \frac{1}{2}$ " Double Angle Strips 17 bolted together and to the cab base. These Rods form the winding shafts. Ratchet brakes are fitted to the shafts and consist of Angle Brackets 18 that engage the teeth of the Gears. The Angle Brackets are

fixed to compound strips 19 lock-nutted to the rear of the cab.

The jib consists of four  $12\frac{1}{2}$ " Strips overlapped three holes. They are joined at their lower ends by a Double Bracket, and at the jib head by a Stepped Bent Strip. The jib pivots on a 1" Rod passed through a Double Bracket at the front of the cab. Luffing is operated by a Cord from the Rod of Gear 16. The Cord passes over a 1" Pulley on Rod 20, round a similar Pulley on Rod 21 and again round a 1" Pulley on Rod 20. It is then taken over a 1" Pulley on Rod 21 and tied to one of the Flat Trunnions 7.

Cord tied to the Rod of Gear 15 is taken round a  $\frac{1}{2}$ " fixed Pulley on Rod 20, round a  $\frac{1}{2}$ " loose Pulley at the jib head, and is fitted with a small Loaded Hook.

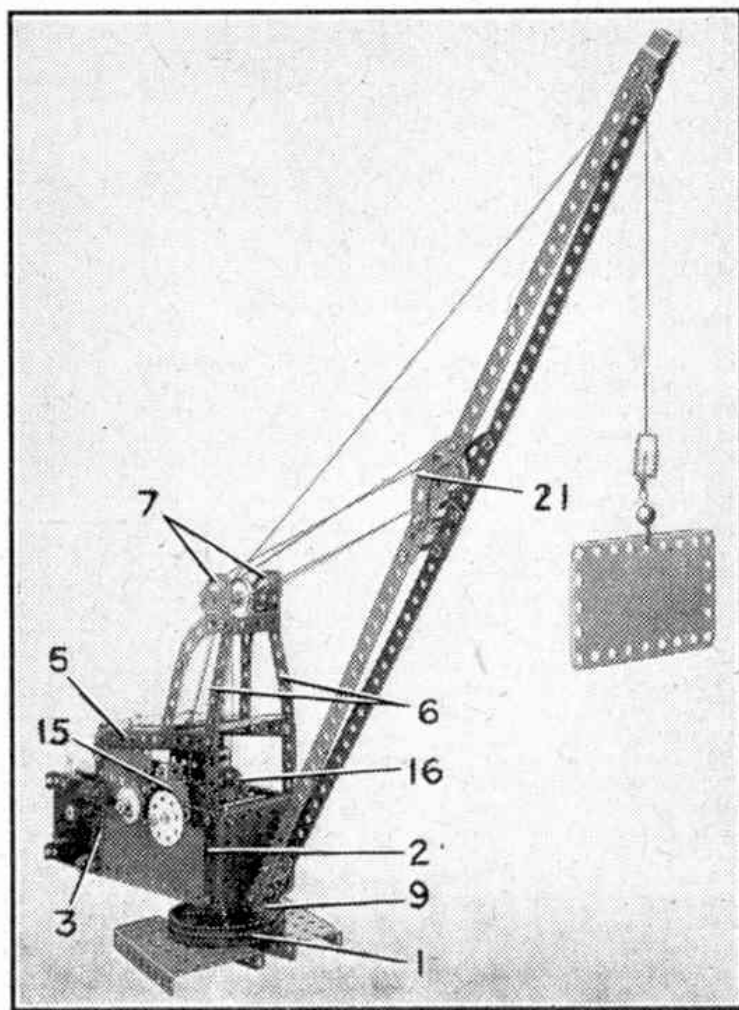


Fig. 1. A Magic Motor is used to drive this simple derrick crane, which is built from parts in an Outfit No. 4 and a Gears Outfit "A."

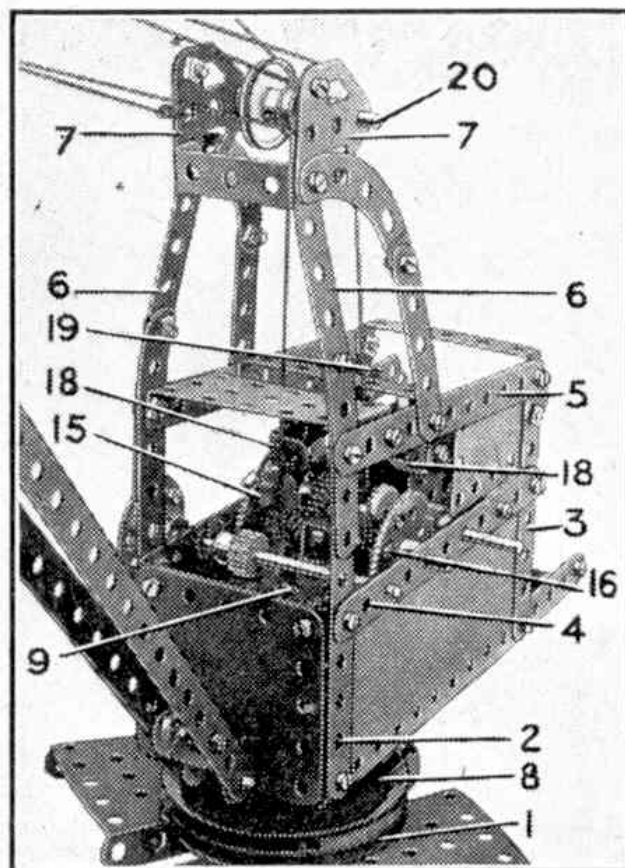


Fig. 2. The cab and operating mechanism of the derrick crane seen from the front.

The  $\frac{1}{2}$ " fixed Pulley is supplied with the *Magic Motor*. The  $\frac{1}{2}$ " loose Pulley is free to turn on a  $\frac{3}{8}$ " Bolt attached to the jib by two nuts.

A platform below the *Magic Motor* is formed by a  $2\frac{1}{2}$ "  $\times$   $2\frac{1}{2}$ " Flexible Plate edged by Strips.

Parts required to build model Derrick Crane: 4 of No. 1; 8 of No. 2; 2 of No. 3; 9 of No. 5; 2 of No. 10; 2 of No. 11; 5 of No. 12; 1 of No. 15b; 2 of No. 16; 2 of No. 17; 2 of No. 18a; 1 of No. 18b; 2 of No. 19b; 5 of No. 22; 1 of No. 23; 5 of No. 35; 64 of No. 37; 12 of No. 37a; 6 of No. 38; 1 of No. 44; 1 of No. 48; 6 of No. 48a; 1 of No. 51; 1 of No. 52; 2 of No. 54a; 1 of No. 57c; 4 of No. 90a; 1 of No. 96; 6 of No. 111c; 2 of No. 125; 2 of No. 126; 2 of No. 126a; 1 of No. 186a; 2 of No. 188; 4 of No. 190; 2 of No. 192; 1 *Magic Motor*; 1 Gears Outfit "A."

## Spring Model-Building Competition

### TRANSPORT—PAST AND PRESENT

There have been many rapid and surprising changes in methods of transport within the last 100 years. If it were possible for a boy of say 1851 to see a modern motor car or bus, a great ocean liner of to-day, driven by oil or electricity, or a giant streamlined locomotive, he would find it difficult to realise that these have grown out of the comparatively crude pioneer road vehicles, small ships and locomotives with which he was familiar. An equally startling comparison is a jet-engined fighter 'plane with the Wright biplane that was the forerunner of modern aviation. To us to-day it is equally interesting to look back over the years and to compare say a modern motor car with one of the clumsy, noisy

and lumbering vehicles that were known to our grandparents in their younger days.

It occurs to us that a good model-building competition can be based on this theme, and this month therefore we announce details of such a contest in which every model-builder may compete. In it fine prizes are offered for the most interesting and best-built Meccano models representing some method of transport, either in its obsolete or its present-day form. Models of obsolete ox-wagons, bullock carts, bicycles, aircraft or ships will be just as suitable as more elaborate structures featuring modern vehicles, ships or other present day modes of transport.

To enter this contest it is only necessary to send in either a photograph or a good drawing of a model. The actual model is not required. Also models need not be specially built for this contest. Any suitable model already constructed may be entered, provided that it has not previously been awarded a prize in any "*Meccano Magazine*" Competition.

Entries will be divided into two Sections. A, for readers of all ages living in the British Isles, and B, for readers of all ages living Overseas. Section A will close on 31st May, 1951, and Section B on 31st August, 1951.

The following prizes will be awarded in each Section: First, Cheque for £3/3/-; Second, Cheque for £2/2/-; Third, Cheque for £1/1/-. In addition there will be a number of Consolation Prizes of 10/- and 5/- each.

Entries should be addressed: "*Transport—Past and Present Competition, Meccano Ltd., Binns Road, Liverpool 13.*"

We are constantly receiving requests from model-builders for competition entry forms. It should be understood that entry forms are not required for this contest or any of the monthly "*M.M.*" competitions.

Photographs or drawings of prize-winning models become the property of Meccano Ltd., but unsuccessful entries will be returned if a stamped addressed envelope is enclosed for that purpose.

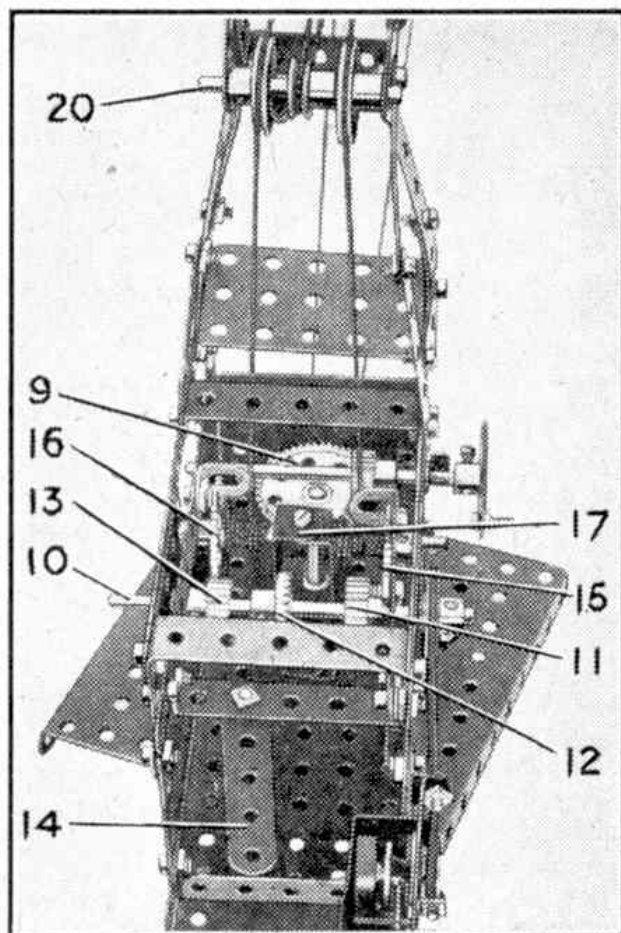


Fig. 3. A rear view of the derrick cab and mechanism.

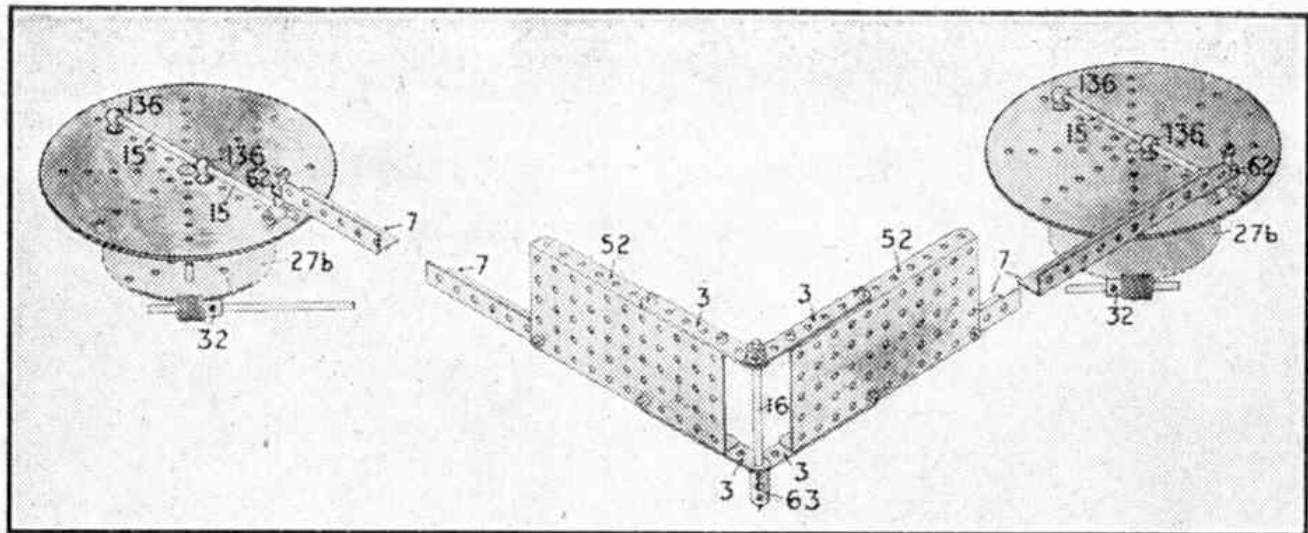


Fig. 1. The Meccano Ellipsograph designed by Commdr. H. F. Lane, R.N.

## Simple Elliptic Compasses

By Commdr. H. F. Lane, R.N. (Retd.)

AFTER the circle the regular curve that we see or need to draw most often is the oval, or ellipse. It is easy to draw a circle with the aid of a pair of compasses, but drawing an ellipse is another matter altogether. Draughtsmen have one way of doing this, using compasses. They often need an ellipse to represent a circle seen in isometric, or "picture" drawings, and they produce one by drawing an arc of small radius for each end of the ellipse and joining these by two arcs of larger radius. The result is only approximate, and a very ugly approximation too.

One simple solution to the problem is probably known by most boys. It is to fix two pins in the paper or card on which the oval is to be drawn, and to tie the ends of a piece of string of suitable length to them. The string is then stretched out by a pencil point and half the ellipse is drawn by sliding the pencil along with the string fully extended. The rest of the ellipse is then drawn by bringing the thread over to the other side of the pins, which lie on its larger, or major axis.

An ellipse drawn in this way is faulty unless the string is evenly stretched, and it is less easy to make sure of this than might be thought. The method too is really unsuitable for lining in a finished drawing in ink.

In this article an instrument is described that can be used for drawing an ellipse that is more satisfactory than one produced by either of the two methods already

mentioned. It is constructed from (comparatively few) standard parts. It draws a smooth and graceful curve, of very nearly mathematical accuracy provided the ellipses are small in relation to the lengths of the two links. With an instrument of the size described in this article, ellipses with a major axis of 3 or 4 inches can be drawn with sufficient accuracy for all practical purposes. Above this, the angularity of the links will introduce errors, unless the links themselves are lengthened by introducing additional girders.

The instrument consists essentially of a pair of links, one end of each of which is hinged on a vertical shaft, an extension of which carries the pencil or pen, and the other end is connected to one of two turntables which are caused to rotate together in the same direction and at the same speed.

The two links are identical, each consisting of a  $24\frac{1}{2}$ " Angle Girder 7, which at one end carries a Crank 62 by which it is connected to one of the turntables, and at the other end is overlapped seven holes and bolted to the lower flange of a vertical Flanged Plate 52. At the other end of the Plate, there is bolted to each flange a  $3\frac{1}{2}$ " Strip 3, through the outer end holes of which passes a  $3\frac{1}{2}$ " Axle Rod 16 that serves as a hinge-pin. On one Flanged Plate only, Washers are inserted between the flanges and the  $3\frac{1}{2}$ " Strips, top and bottom, to enable the Strips to pass outside the Strips

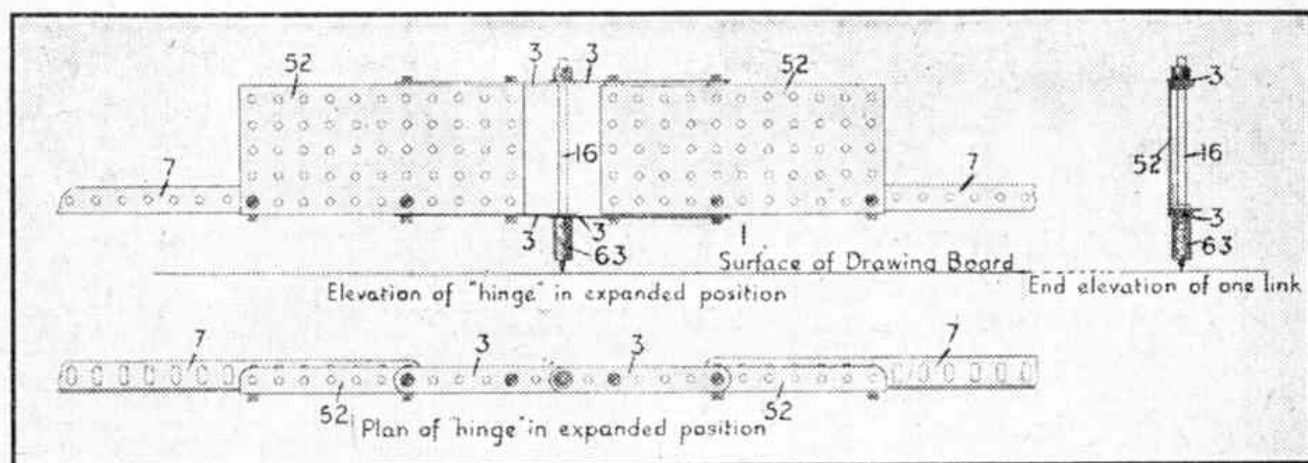


Fig. 2.

on the other Flanged Plate where they meet on the hinge.

The Axle Rod 16, after passing through the lower pair of Strips, is inserted halfway in a Coupling 63 and secured with a grub screw. The other half of the Coupling holds the pencil point, also secured with a grub screw. A refill lead for a propelling pencil is suitable. In order to fit the lead in the Coupling snugly, a short length of rubber bicycle valve tubing is slipped over it.

The two turntables are also identical. Each consists of a 6" Circular Plate, to the underside of which is bolted centrally a Bush Wheel. On the upper face of each are bolted two Handrail Supports 136, and fixed in them is a 5" Axle Rod 15. At its other end, each of these Rods carries a Coupling which can be secured at whatever distance from the centre is desired. Mounted vertically in this Coupling, and also serving to secure it on the Rod is a 1/2" Bolt which when passed through Crank 62 forms the pivot for the link connected to that particular turntable.

The Bush Wheel under the turntable already referred to is secured to a 2" Axle Rod 17. This Rod passes through two Bush Wheels sunk in the upper and lower surfaces of the drawing board to form a bearing. Two complete such bearings are required one for each turntable, and it is important that they

should be the correct distance apart. This distance is the whole length of either link, from pivot to hinge, multiplied by  $\sqrt{2}$ , i.e., 1.4142. In the instrument shown, the length of each link is  $27\frac{1}{2}$  inches, and the bearings must therefore be approximately 39 inches apart.

The axle of each turntable carries below the drawing board, a  $3\frac{1}{2}$ " Gear Wheel 27b, engaging with a Worm Wheel 32 mounted on a Rod that passes through suitable bearings secured to the underside of the drawing board and has at its other end a second Worm similarly connected to the other turntable. The Worm shaft can be driven by an Electric Motor but a more simple arrangement is to rotate one turntable by hand, the other being caused to follow by (Continued on page 190)

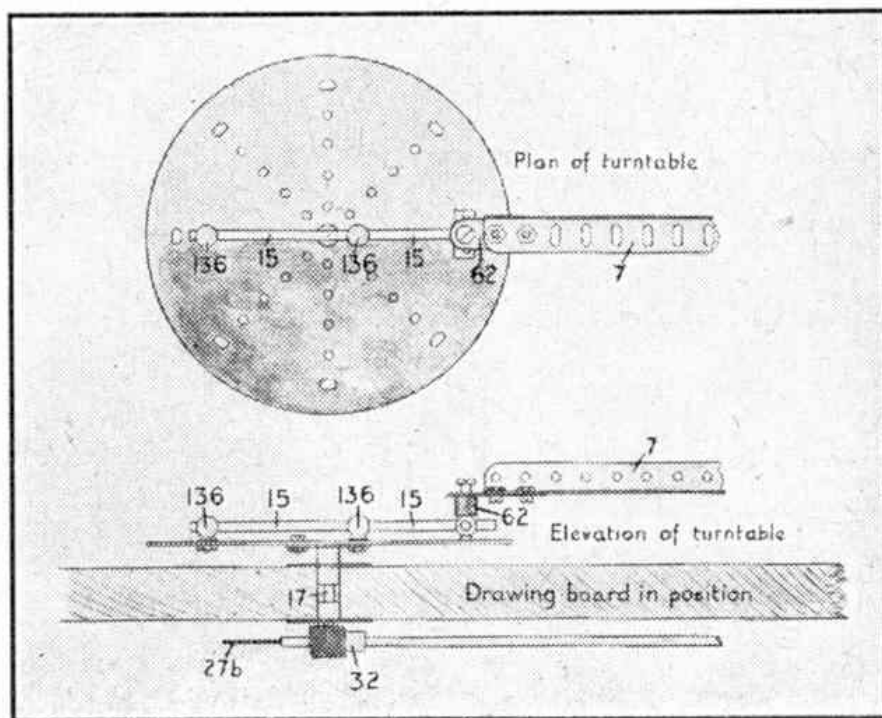


Fig. 3.

**Swansea and Mumbles Railway—(Cont. from p. 148)**

this was because all station platforms were on the same side of the line.

Such then was the typical Swansea and Mumbles train of the spacious days of steam, puffing its way along at the 4 m.p.h. to which speed was restricted in the Swansea streets. On the open stretches speed might go up to 20 m.p.h.

Although steam haulage lasted until 1929, electrification had been a possibility on several occasions. When it did come about it provided passengers with very large bogie double-deck tramcars, the upper decks being of course covered in. They are in fact the largest tramcars built for service in this country. Instead of the usual trolley pole for current collection from the overhead wire system, pantograph collectors are used. As in earlier stock both entrances are on the same side of each car, and two cars can be run coupled together and controlled as one unit. Air brakes are provided and the safety devices include the usual dead-man's handle type of control.

Until the electrification there was no system of signalling, but to-day colour-light signals control the passage of the cars in such a way that no more than one of them, or one train of them, can be in the same single line section at once.

**Development of the Rotorplane—(Cont. from p. 151)**

better still six, rotors in line, along a hull like that of a ship. Then, if one goes, the others can still keep the ship on an even keel. But, you object, rotors are so large in diameter that you will need an enormously long hull. The answer to that seems to be to build your rotors as biplanes or triplanes—running the same way on each shaft, but perhaps opposite ways on different shafts—and so cut the diameter of their circles by half or two-thirds.

Have any of you heard of or seen Jules Verne's "*Clipper of the Clouds*"? He had the right idea about 70 years ago. Although there were no motors in those days to drive his rotors, he imagined a mysterious power to do so.

Jules Verne also imagined submarines and other strange things that have now come to pass, though not just as he thought. Let us therefore think ahead about our rotorplanes, because, till we get them Air Transport will still be where railways were when there were no wayside stations, or where motor transport was when there were no roadside garages. We need landing grounds everywhere for our rotorplanes. But we need our rotorbuses and rotorcars first.

**The First British Standard Locomotive—**

(Continued from page 157)

being no tender footplate as such and the usual hinged drop plate between the engine and tender is dispensed with. All controls are grouped for easy access and operation.

Other footplate amenities include an upholstered seat with back rest for the driver and side windscreens outside the cab for both men. Locker accommodation on the tender front includes a food cupboard fitted with detachable stainless steel lining.

The tender is characterised by a set-in bunker on similar lines to the tenders of recent London Midland 2-6-0s. This arrangement provides a good view to the rear for tender-first running. A tender cab is not provided but the engine cab roof comes well back and the tender front has a sort of spectacle plate for protection of the men when travelling backward. The tender tank is welded and has large-radius corners to facilitate construction. The water sieves through which the feed passes to the injectors are arranged externally. The sieve portion is easily withdrawn for cleaning or renewal purposes, this arrangement avoiding many an unpleasant "tank job" on the shed.

The tender runs on six wheels that are of smaller

diameter than has been usual up to now in this country. This has simplified the tank construction for it avoids the recesses that often have to be provided in the tank when large-diameter wheels are used. Water pick-up apparatus is provided and access to the tender water-filling hole is gained by means of a ladder running up the rear of the tank.

**Simple Elliptic Compasses—(Continued from page 179)**

any suitable means. One suggested alternative is a pair of Sprocket Wheels, connected by an endless Sprocket Chain.

The lining up for ellipses is that the Axle Rods 15 must start parallel, and remain so while the curve is being drawn. The link pivot of one turntable is set out from the centre a distance equal to the semi-major axis of the required ellipse, that of the other to the semi-minor axis. If both are set out at the same distance, the resultant curve will be a circle.

In Figs. 1 and 3 it will be seen that one of the Handrail Supports is shown on the same side of the centre of the turntable as the Coupling holding the link pivot, so that the latter cannot be moved in to a very small radius. Should this be required both Handrail Supports should be mounted on the disc on the opposite side of the centre to the link pivot.

If one of the Axle Rods 15, instead of being parallel to the other, is set at varying angles in advance or in rear of it, a variety of interesting curves will result.

**"The Flying Kangaroo"—(Continued from page 172)**

in the world. Never before had passengers or crews travelled in such luxury; full meals could be served in flight and there was sleeping accommodation for 14 passengers. For two years, Q.E.A. plied between Singapore and Sydney with these magnificent boats, and then came the war.

The wartime achievements of the merchant airmen of Qantas are as glorious as any in the history of aviation, and would fill a book ten times the size of the "*M.M.*" For a time they carried the Empire service through to Karachi, until Japanese aggression made this impossible. They supplied Singapore and the Dutch Indies under the barrels of Japanese guns, until ordered away or until their flying boats were shot out of the sky. Then, when the Allies began the long, grim struggle that was destined to end in Tokyo Bay, Q.E.A. flew reinforcements and supplies to the battle areas of New Guinea, and flew out casualties. They restored communications with India by flying a 3,513-mile service between Perth and Ceylon with "*Catalinas*"—the longest non-stop regular service in airline history. And when the war was over they helped B.O.A.C. re-open the London-Sydney route with "*Lancastrians*" and "*Hythes*," bringing the extremities of the Empire within three days of each other.

To-day, Qantas Empire Airways operate over 33,000 route miles and employ a staff of 4,000. At the head, as always, is Hudson Fysh. Only K.L.M. can claim a longer history of service than Qantas; none can claim a finer one.

**New Meccano Model—(Continued from page 177)**

a 3" x 1½" Flat Plate.

A small hatchway 33 (Fig. 1 page 176) consists of two small Corner Brackets bolted to three Double Brackets. It is fixed in place by a 1½" Bolt 34. The foremast is an 11½" Rod mounted in a Double Bracket and carries at its lower end a small Fork Piece that pivots on a Bolt ¾" passed through the Double Bracket. The aft mast is an 8" Rod fitted at its lower end with a large Fork Piece that pivots on a ¾" Bolt passed through a Double Bracket. The port and starboard navigation lights are Collars held on ½" Bolts.

Details of the other small deck fittings, rigging and wireless aerial will be clear from the illustrations.