New Meccano Models

Governor—Electric Locomotive—Crane—Sifter—Tower—Truck Hoist

THE principle of centrifugal force has a wide application in engineering. It is utilised, for instance, in the well-known "ball" type governor that is fitted to most stationary steam engines to regulate the admission of steam to the cylinders. Centrifugal force is also made use of in more delicate machinery, the speedometers fitted to motor cars and other high speed machinery operating on this principle; while every Meccano boy who has examined the mechanism of a gramophone motor will know that a centrifugal governor is incorporated for controlling the speed of the record turntable.

The simple model centrifugal governor shown in Fig. 1 will be found a very handy little unit and it may be incorporated in many types of power-driven models where it is required to regulate the speed.

The base of the governor consists of a 3" diam. Pulley Wheel, and a 3½" Axle Rod 1 rotates in the boss of the Pulley. A 2½" Strip is secured to the Pulley by means of two bolts, washers being placed on the shanks of the bolts to provide the correct spacing. A ½" Reversed Angle Bracket is secured to the end of the 2½" Strip and a 3½" Axle Rod is mounted in a vertical position in the Bracket and Strip and held in place by means of two Spring Clips. This Rod carries a Bush Wheel at its upper end to which is secured a Flat Bracket and a Reversed Angle Bracket 4 which forms the adjustable 'stop.'

The central 3½" Axle Rod carries two 1" Pulley Wheels 2 having their setscrews removed, these Pulleys being connected together by the governor arms. Each governor arm consists of two Flat Brackets 3 pivoted by their round holes on a ⅜" Bolt, the shank of which is nipped by the set-screw of the 1" fast Pulley Wheel 5. The outer ends of the Flat Brackets are secured pivotally by a bolt and two nuts to ½" × ½" Angle Brackets which in turn are secured rigidly to further ½" × ½" Angle Brackets. These latter Brackets are held securely to the bosses of the Pulleys 2 by means of bolts. Nuts should be screwed on the bolts of the top Pulley to prevent fouling of the vertical Axle 1. A thin elastic band should be passed round the groove in the top Pulley Wheel 2 and over a Spring Clip fastened to the top of the Rod 1. When the governor is driven at high speed by means of a cord passed round the groove in the lower Pulley 2, the Pulleys 5 tend to fly outward due to centrifugal force. The top Pulley 2 is consequently drawn down against the tension of the elastic until it touches the 'stop' 4 which limits its downward travel. By adjusting the Bush Wheel to which the Bracket 4 is secured, the speed of the model can be altered.

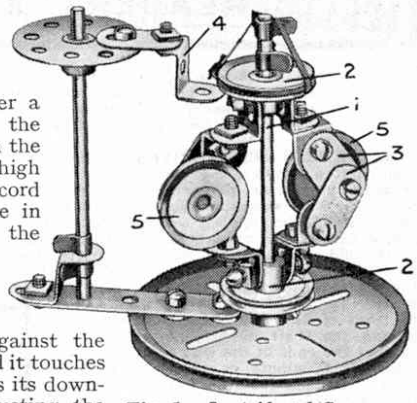

Fig. 1. Centrifugal Governor.

In order to construct the model centrifugal governor the following parts will be required:—1 of No. 5; 5 of No. 10; 8 of No. 12; 2 of No. 16; 1 of No. 19b; 4 of No. 22; 1 of No. 24; 4 of No. 35; 17 of No. 37; 4 of No. 37a; 2 of No. 38; 2 of No. 125; small elastic band.

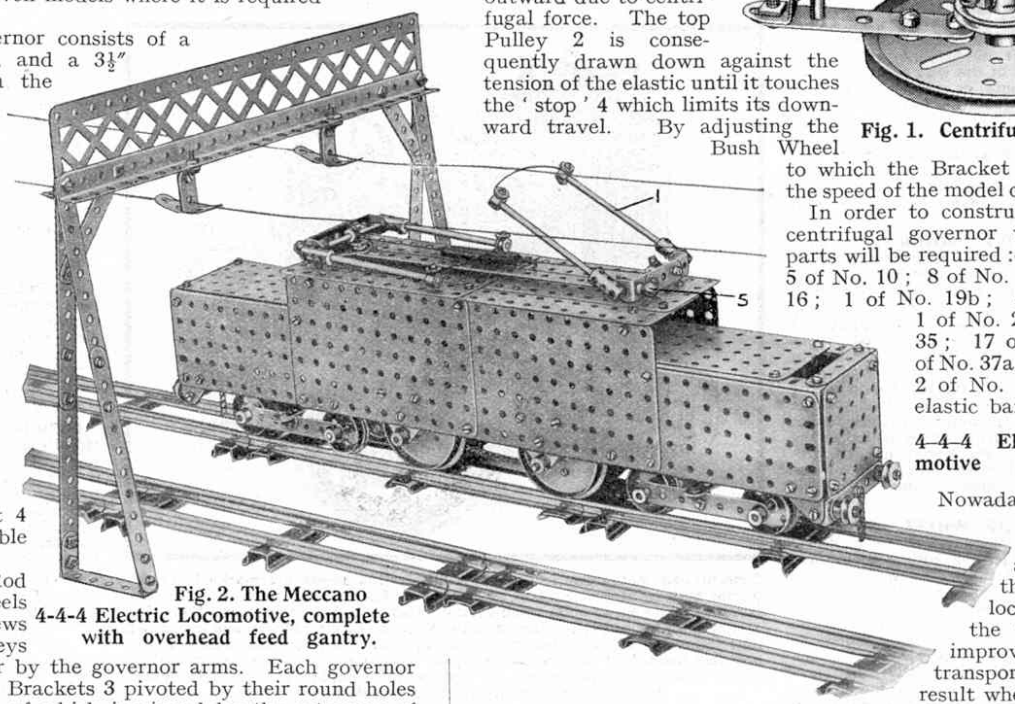

Fig. 2. The Meccano 4-4-4 Electric Locomotive, complete with overhead feed gantry.

4–4–4 Electric Locomotive

Nowadays we hear a great deal about the advantages of the electric locomotive and the wonderful improvement in transport that will result when high speed electric traction becomes universal. The Meccano model shown in Fig. 2 is a particularly realistic example of a modern type of 4–4–4 electric locomotive using the overhead system of current collection. The model incorporates a Meccano 6-volt Electric Motor and when run on standard Hornby track will be found to possess considerable hauling capacity.

The housing of the locomotive, as can be seen in Fig. 3, is built up from a number of 4½" × 2½" and 5½" × 3½" Flat Plates reinforced with 5½" and 2½" Angle Girders.

The Electric Motor is secured by its flange to the 5½" Girder secured to one of the sides, and the drive from the armature shaft to the driving wheels is transmitted as follows: A ½" Pinion is first secured on the armature shaft and this is meshed with a 57-teeth Gear Wheel on a secondary shaft. A ¾" Pinion is secured on the other end of the secondary shaft and gears with a 50-teeth Gear mounted on a further shaft journalled in the Motor side plates. A ¾" Sprocket Wheel is secured to the centre of this shaft and is coupled to a 1½" diam. Sprocket mounted on the rear driving axle by means of an endless length of Sprocket Chain. The forward driving axle is in turn connected to this shaft by a further length of Chain passed round two 1" diam. Sprockets. The driving axles are journalled in Flat Trunnions bolted to the sides of the housing and the driving wheels themselves are built up

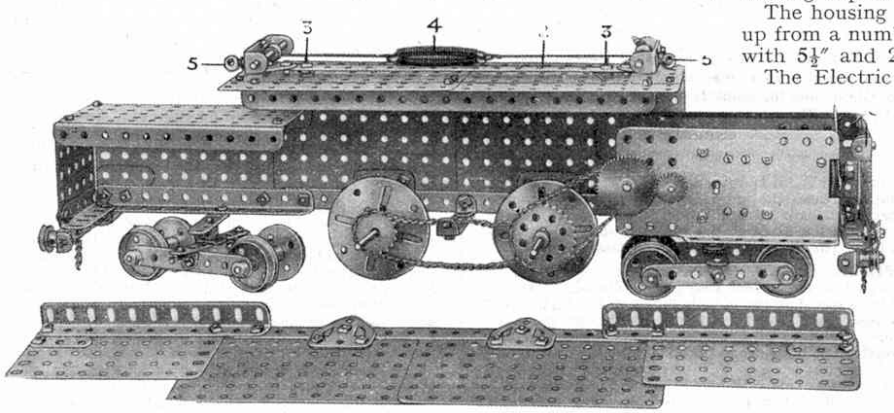

Fig. 3. The Electric Locomotive partly dismantled to show assembly of drive transmission.

from Wheel Flanges and Face Plates.

Each bogie frame consists of two 3½″ Strips held apart by means of 3″ Strips secured to the former by Angle Brackets. An Eye Piece is slipped on to each 3″ Strip, the boss being secured pivotally to the frame of the engine by means of a ¾″ Bolt passed through the centre hole of a 2½″ Strip secured to the frame and nipped by the set-screw in the boss of the Eye Piece.

Each current collector is composed of two 3½″ Rods 1 secured by Couplings to a 3″ Rod that is journalled in a 2½″ × ½″ Double Angle Strip. The Double Angle Strips, in turn, are secured to a Trunnion at either end of a 9½″ Strip 2 (see Fig. 3), and the latter is attached to the roof of the locomotive by means of two 6 B.A. Bolts 3, which are insulated from the roof by Insulating Bushes and Washers. A standard metal Washer is placed over each Insulating Washer in order to prevent the bolts on the Strip 2 touching the roof.

A Collar is secured by means of a set-screw on each of the 3″ Rods journalled in the Double Angle Strips, and a short length of cord is tied to the set-screw and passed round the Rod before being fastened to two Springs 4. This results in both collectors tending to rise. Either of the collectors may be locked horizontally, however, by a Handrail Support 5, which is passed through a hole of the Double Angle Strip and inserted in the grub-screw hole of a Collar, so that by turning the Handrail Support, the Rod is gripped and prevented from rotating.

Those parts of the collectors that are in contact with the overhead wire, consist of short lengths of thick copper wire (24 or 22 gauge for instance) secured by set-screws to Collars on the ends of the 3½″ Rods. A length of insulated wire is fastened to the 9½″ Strip 2 and is taken to one of the Motor terminals, whilst the remaining Motor terminal is connected to the frame of the model.

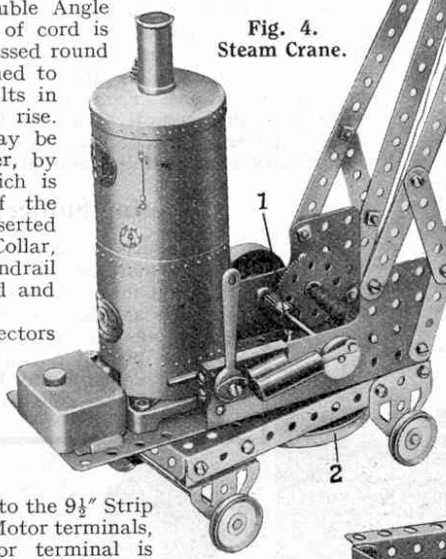

Fig. 4. Steam Crane.

Each of the ½″ × ½″ Angle Brackets 6 is duplicated in order that a nut may be held between their lugs. Hence it is only necessary to insert the bolt in the hole and screw it home. This method of construction is necessary because the interior of the model is inaccessible when the sides are in place.

The construction of the gantry for supporting the overhead feed wires will be clear from Fig. 2. The gantry shown in the illustration has been designed for use with a double track system, but it can quite easily be modified if it is intended to use only one set of rails.

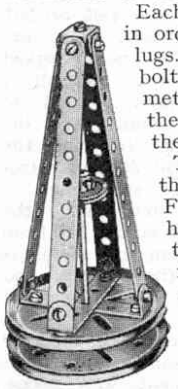
Fig. 6. A modest attempt at an Eiffel Tower !

When connecting up the system, the 22 gauge bare copper wire that forms the overhead current line should be anchored at each end to a screw eye attached to any convenient object. One terminal of the accumulator should be joined to the framework of the gantry, while the other pole of the accumulator should be connected to the rails on which the model runs. Care should be taken to see that the framework of the gantry does not come into contact with the rails as this would result in a short circuit of the battery.

In order to build the Electric Locomotive the following parts will be needed :—3 of No. 1a ; 4 of No. 3 ; 2 of No. 4 ; 6 of No. 5 ; 4 of No. 6a ; 2 of No. 8a ; 8 of No. 9 ; 2 of No. 9d ; 4 of No. 10 ; 18 of No. 12 ; 6 of No. 16 ; 5 of No. 16a ; 2 of No. 16b ; 1 of No. 17 ; 8 of No. 20 ; 4 of No. 23 ; 1 of No. 25 ; 1 of No. 27 ; 1 of No. 27a ; 116 of No. 37 ; 4 of No. 37a ; 16 of No. 38 ; 2 of No. 43 ; 2 of No. 48a ; 2 of No. 50a ; 4 of No. 52a ; 4 of No. 53a ; 25 of No. 59 ; 4 of No. 63 ; 6 of No. 70 ; 2 of No. 72 ; 20″ of No. 94 ; 1 of No. 95a ; 2 of No. 96 ; 1 of No. 96a ; 4 of No. 109 ; 4 of No. 111 ; 2 of No. 111c ; 2 of No. 126 ; 4 of No. 126a ; 2 of No. 136 ; 4 of No. 137 ; 2 of No. 302 ; 2 of No. 303 ; 2 of No. 304 ; 2 of No. 305 ; 1 Electric Motor.

Steam Travelling Crane

In Fig. 4 is shown a simple model crane operated by the Meccano Steam Engine. This model clearly illustrates the advantages of the special reversing block incorporated as an integral part of the Steam Engine, for by means of it it is possible to carry out both hoisting and lowering of the load attached to the crane hook ; when using an ordinary type of engine these two movements could only be arranged by incorporating a separate reversing gear which would complicate matters considerably.

The travelling base of the crane consists of a 5½″ × 2½″ Flanged Plate to which two Flat Trunnions and two Trunnions are secured, the latter Trunnions being first attached to Angle Brackets which, in turn, are secured to the Plate. The Steam Engine base plate serves as the swivelling superstructure and to it are attached four 12½″ Strips to form the jib of the crane. A ½″ loose Pulley mounted on a 1½″ Rod journalled at the top of the jib carries the hoist cord which is then wound round the secondary shaft of the Engine. The superstructure swivels about the Rod 1, which is passed through the base of the engine frame and is secured above by a Bush Wheel and below by the 3″ Pulley 2.

The Steam Swivelling Crane contains the following parts :— 4 of No. 1 ; 2 of No. 10 ; 4 of No. 12 ; 2 of No. 16 ; 2 of No. 18a ; 1 of No. 19b ; 4 of No. 22 ; 1 of No. 23 ; 1 of No. 24 ; 2 of No. 35 ; 22 of No. 37 ; 1 of No. 52 ; 2 of No. 126 ; 2 of No. 126a ; 1 Steam Engine.

Steam-driven Sifter

Steam-operated models have a particular fascination, and another interesting example incorporating the Meccano Steam Engine is shown in Fig. 5. This represents a type of mechanical sifter often employed for grading and refining chemicals in large factories.

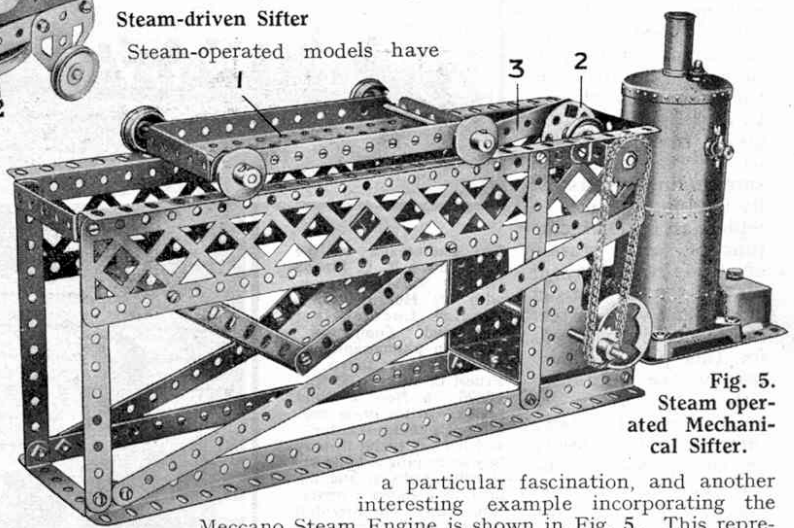

Fig. 5. Steam operated Mechanical Sifter.

The framework of the model is built up from 12½″ Angle and Braced Girders spaced apart by means of 2½″ × ½″ Double Angle Strips, and the Steam Engine base plate is bolted to one end of the framework as can be seen in Fig. 5. The actual sifter consists of a 5½″ × 2½″ "Perforated" Flanged Plate 1 mounted on ¾″ Flanged Wheels, which run on the top pair of 12½″ Angle Girders of the framework of the model. A Trunnion is secured to one end of the Flanged Plate and one end of a 5½″ Strip 3 is pivotally secured to the Trunnion by means of a lock-nutted bolt. The other end of the Strip 3 is pivotally attached to a Bush Wheel 2 mounted on a 4½″ Axle Rod journalled in the frame.

A 1″ Sprocket Wheel is mounted on the 4½″ Axle and connected to a ¾″ Sprocket Wheel mounted on the secondary shaft of the Steam Engine by means of an endless length of Sprocket Chain.

When the Engine is set in motion, the tray 1 is oscillated backward and forward thus producing the required sifting action.

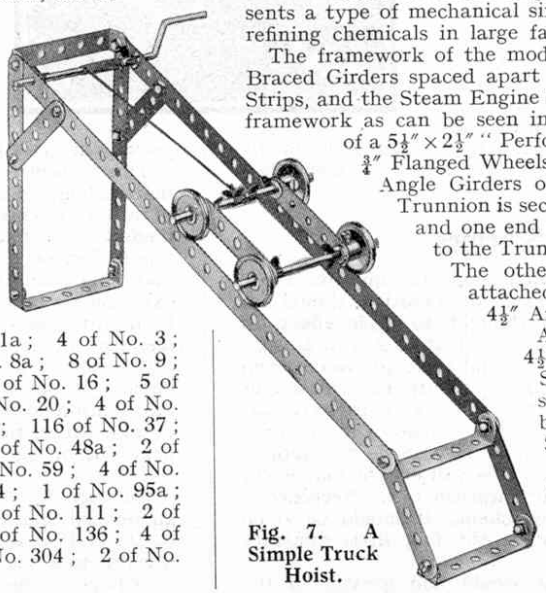
Fig. 7. A Simple Truck Hoist.

In the construction of the Mechanical

(Continued on page 258)

B.T.H. Gramophone Motors

We regret that owing to a printers' error the price for the B.T.H. Gramophone Motor was shown in our February issue as £3. This should have been three guineas, as is announced on page 260 of the present issue.

New Meccano Models—(*Continued from page 235*)

Sifter, the following parts are used: 2 of No. 1; 5 of No. 2; 4 of No. 8; 3 of No. 15a; 4 of No. 20b; 1 of No. 22; 1 of No. 24; 4 of No. 35; 30 of No. 37; 2 of No. 37a; 1 of No. 38; 1 of No. 45; 5 of No. 48a; 1 of No. 52; 2 of No. 54; 1 of No. 59; 9" of No. 94; 1 of No. 96; 1 of No. 96a; 2 of No. 99; 1 of No. 126; 1 Steam Engine.

Eiffel Tower

Model-builders will have difficulty in refraining from smiling after reading the caption that we have placed under Fig. 6. But although the diminutive model bears little resemblance to the world's highest tower, it nevertheless has good claim to being the "smallest," and as such will be of interest to Meccano boys. The model is very simple to build and its construction should not present any difficulty.

In order to build the model the following parts will be required: 4 of No. 2; 2 of No. 11; 1 of No. 16; 2 of No. 19b; 1 of No. 22; 9 of No. 37; 2 of No. 48a.

Truck Hoist

The final example shown this month is a model truck hoist that will please the younger constructor. This is a very simple working model, and its construction can be seen quite clearly from the illustration.

In building this model the following parts will be needed :—2 of No. 1; 2 of No. 2; 6 of No. 5; 2 of No. 16; 1 of No. 19s; 4 of No. 22; 6 of No. 35; 12 of No. 37; 1 of No. 40; 4 of No. 48a.

Great Arch Bridge Across the Tyne—

(*Continued from page 187*)

an average weighed 20 tons each, from the light railway track laid alongside the completed portion of the suspended roadway, and placed them in position for riveting.

The manner in which the cranes worked is very interesting. The first to be erected was a 20-ton crane, which was built up by means of a 5-ton derrick erected on a wooden tower at the end of the approach span. When the steelwork within reach of this crane had been placed in position, it was dismantled and re-erected further out from the bank, from which position it continued the erection of the arch ribs and also that of two 5-ton cranes. When the larger crane had completed the work possible from this post, it was again dismantled, this time by the 5-ton cranes; and these re-erected it ahead of them in order that it could carry on with the work of construction. Thus the cranes jumped over each other in turn as the sections of the arch grew toward midstream.

Work continued on these lines until 23rd February, 1928, when the two halves met with remarkable accuracy. The cables were then slackened off in order to allow the sections of the top chord to meet, and a temporary pin was placed in position between the two halves of the upper chords of the arch. At that moment the arch was of the three-hinged type, one hinge being at its crown and the other two at its ends on the opposite banks of the river. The centre panels of the lower chord were then raised into position and with the completion of the arch and the removal of the temporary pin the two-hinged condition was attained.

The bridge was opened for traffic by His Majesty the King on 10th October, 1930.