MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
England

Vol. XXXV
No. 1
January 1950

With the Editor

Forthcoming Articles

Once more we come to the beginning of a New Year, and this is a good opportunity to peep into the future of our own small world—the world of the "*Meccano Magazine.*"

I have been looking over the list of special articles that are in preparation, many of them by writers already familiar to us. Next month there will be an article on the Bertram Mills Circus, with splendid illustrations and a fine cover picture. The same issue will include an account of the French trains that run on pneumatic tyres, and of a remarkable U.S.A.F. test hangar in which every climate in the world can be imitated. Articles in later issues will deal with harnessing the wind for power, an extraordinary mechanical man and his dog, a great tramway and light railway system in Belgium, the Clifton Suspension Bridge, the Kingston Power House, and the production of sugar from beet. For the many readers who demand an occasional nature article there will be one dealing with the otter at home and in captivity, and another on newts and lizards. These are just a few of the good things for 1950.

Here is a good resolution for every reader: "I will write to the Editor at least two or three times during the year."

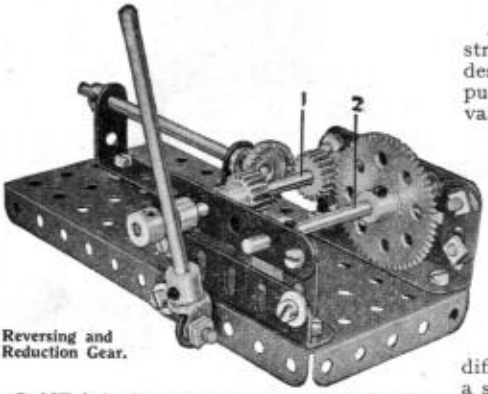
A Famous Silver Thimble

One of the historic romances of the 19th Century, the laying of the first telegraph cables across the Atlantic, is recalled by the recent gift to the Science Museum of a silver thimble. After repeated and disastrous failures in 1857 and 1858, the laying of two cables from Valentia in Ireland to Newfoundland was successfully achieved in 1866. As an experiment, the two ends of the cable were connected together in Newfoundland and a current from an electric battery was sent through the cables from Ireland to Newfoundland and back again, a distance of some 3,700 miles. Even after the double journey across the Atlantic, the current was strong enough to produce large deflections on the reflecting galvanometer which had recently been devised by Professor William Thomson, later Lord Kelvin.

The "battery" used for this experiment consisted only of a tiny silver thimble containing a few drops of acid and a wire of zinc. This had been borrowed from Miss Emily FitzGerald, daughter of the Knight of Kerry upon whose land was erected the building known as Telegraph House in which the cables terminated.

This Month's Special Articles

The New Meccano Gears Outfit



Reversing and Reduction Gear.

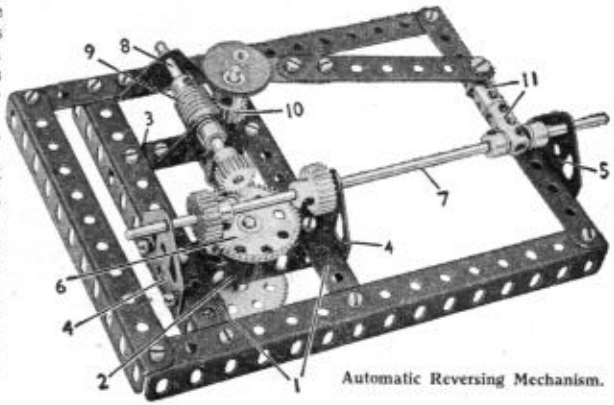
ONE of the most important Meccano developments since the war is the introduction of the new Gears Outfit A, which is announced in the advertisement on the back cover of this issue.

Gears Outfit A is not a complete outfit in itself, but is an Accessory Outfit of very great value to the owner of a standard Meccano Outfit. It is specially suited to Outfits No. 3 to No. 6. At present models built with Outfits up to and including No. 6 can be driven only through belts and Pulleys; the addition of a Gears Outfit enables the model-builder to drive them by means of fascinating gear mechanisms, just like those used by real engineers.

When a Clockwork or Electric Motor is used to drive a model, even a small and simple one, the best results are obtained when suitable speed-reduction gearing is arranged in the drive. All the gears required to assemble such reduction gearing are provided in this Outfit.

A splendidly illustrated Book of Instructions is packed with the Outfit. This describes in an interesting manner the purpose and use of gearing, and explains various types of gears, such as spur, contrate and worm, and the special uses of each. Next come more detailed explanations of the applications of Meccano gearing, accompanied by examples of the different ways in which it can be used to provide speed-reducing mechanisms, drive-reversing mechanisms including automatic types, a two-speed gearbox, an intermittent motion device, miscellaneous constructions such as differential and steering mechanisms, and a simple epicycloidal arrangement.

All these mechanisms are illustrated with actual examples constructed from the gears contained in the Outfit. In each of these mechanisms the gears are fitted into a simple Meccano framework to make their assembly perfectly clear and to show how they would be arranged in actual models. The frameworks themselves would not be used in models unless they happen to be convenient for the purpose.



Automatic Reversing Mechanism.

The Meccano Gears Outfit "A"

LIST OF CONTENTS

2	of	Part No. 25	Pinion, ½" diam., ½" face, 25 teeth.	2	of	Part No. 29	Contrate Wheel, ½" diam., 25 teeth.
2	„	„ 26	Pinion, ½" diam., ½" face, 19 teeth.	1	„	„ 32	Worm Gear, ½" diam.
1	„	„ 27	Gear Wheel, 1½" diam., 50 teeth.	1	„	„ 94	Sprocket Chain, 40" length.
1	„	„ 27a	Gear Wheel, 1½" diam., 57 teeth.	1	„	„ 95	Sprocket Wheel, 2" diam., 36 teeth.
1	„	„ 28	Contrate Wheel, 1½" diam., 50 teeth.	2	„	„ 96a	Sprocket Wheel, ½" diam., 14 teeth.

Book of Instructions.

Among the Model-Builders

By "Spanner"

A Giant Astronomical Clock

One of the best examples of Meccano model-building that has come to my notice in recent years is a giant astronomical clock built by Mr. John Nowlan, Dagenham. Mr. Nowlan is a Meccano enthusiast of many years experience, and he is seen with his clock in the illustration on this page.

The clock is made almost entirely from Meccano parts, and contains over 50 dials. These dials are constantly moving, and show the time, day, date, month, year and season. They also indicate sunrise and sunset, phases of the Moon, and the state of the tide in any of the coastal towns of Britain. It is also possible to obtain other astronomical data from the machine, including the stars that are visible overhead at any particular time of the year, and the time in any part of the world. In addition to all this the mechanism includes a complete Westminster chiming clock.

The model was begun in 1945 and is not yet completed. Already, however, it weighs several hundredweight, and over 6,000 nuts and bolts are used in its construction. The mechanism includes 11 motors, some of which are slave motors and are brought into operation only once in a year. Some idea of the fascinating nature of the many mechanisms in this clock may be gained from the fact that one of the gears revolves at 250 revolutions per minute while another moves so slowly that 25,782 years will have elapsed by the time it has made one revolution.

Mr. Nowlan is now working on the final stages of the mechanism.

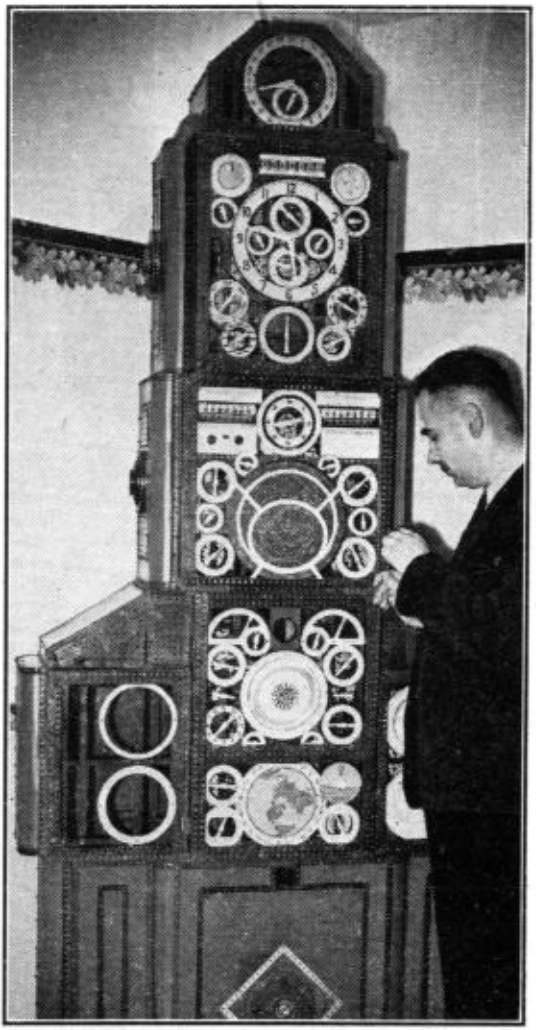


Fig. 1. Mr. John Nowlan, Dagenham, and his wonderful astronomical clock, which is described on this page.

How to Use Meccano Parts

Bevel Gears (Parts Nos. 30, 30a, and 30c)

In order to reduce friction to a minimum and to obtain a smooth even drive, bevel gearing is always designed so that the surfaces of the teeth of two bevels that mesh with each other lie in planes which, if extended, would all meet in a common point, and this point would coincide with the imaginary point of intersection of the axes of the shafts carrying the bevels. The Meccano Bevels are made with the teeth at such an angle that two $\frac{3}{4}$" Bevels (Part No. 30) can be meshed together, or

a ½" Bevel (Part No. 30a) can be engaged with a 1½" Bevel (Part No. 30c). Two 1½" Bevels should not be meshed together, nor should a ⅞" Bevel be engaged with a 1½" Bevel, for the teeth would not be properly in line.

Fig. 2 gives a good idea of some of the more important applications of the Meccano Bevel Gears. It represents a differential gear suitable for use in a motor chassis. The ½" and 1½" Bevel Gears are used to transmit the drive from the propeller shaft to the rear wheels, and the series of four ⅞" Bevels are arranged so that power can be applied to both road wheels under varying working conditions.

In Fig. 3, three ⅞" Bevels are employed to form a simple and compact reversing gear. The driving power is applied to the shaft 2 and is directed via the ½" diam. ½" width Pinion 3 to the Gear Wheel 4, which is secured to the Rod 6 carrying two Bevel Gears 5. The reverse is effected by a hand lever connected to a rocking arm that causes the Rod 6 to move longitudinally in its bearings by striking one of the Collars secured against the faces of the Bevels 5. The direction of rotation of the driven Rod 10 is changed by bringing one or other of the Bevels 5 into engagement with the third Bevel fastened to the Rod 10.

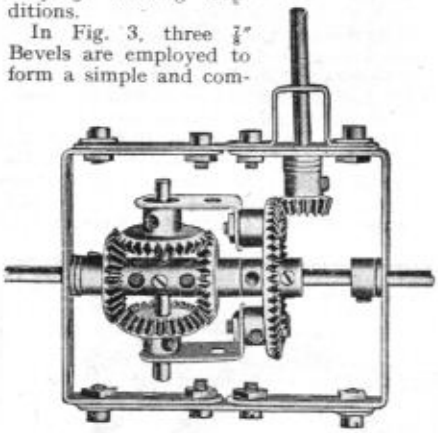


Fig. 2. Meccano Bevel Gears used in a differential mechanism suitable for a car chassis.

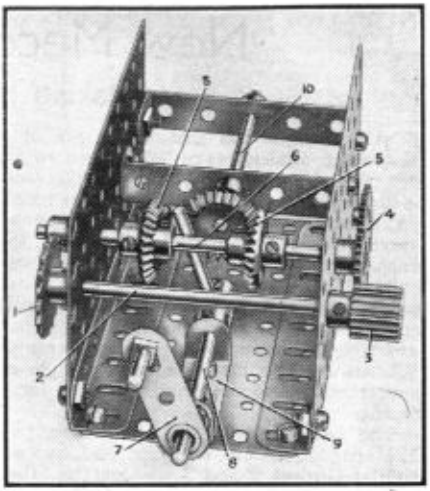


Fig. 3. Another example of the use of Bevel Gears. Here three of these parts are used to form a drive reversing mechanism.

A Prize-winning Model from Holland

I am always glad to have news of model-builders overseas, and many of them write to me quite regularly. I received a letter from C. F. Th. von Ziegenweidt, Delft, Holland, one of many Dutch friends who write to me from time to time, enclosing a photograph and a few details of a fine Ford Truck he has built. The photograph is reproduced as Fig. 4 on this page, and I think readers will agree with me that the model is a most praiseworthy effort.

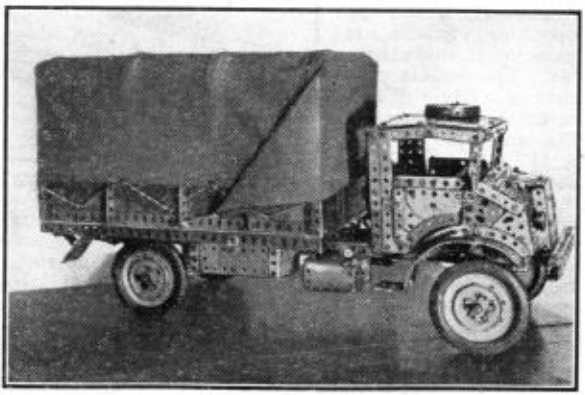


Fig. 4. A model of a typical army lorry built by C. F. Th. van Ziegenweidt, Delft, Holland.

New Meccano Models

Fence-Making Machine—Log Saw

OUR new models this month are of a most unusual type. The first to be described is a fence-making machine and is illustrated in Fig. 1. This model is based on a machine designed to produce the special wood and wire fencing used for enclosing fields, and it works most realistically. The model can be used with short pieces of round or square section wood, such as meat skewers; but if these are not available, Meccano Rods make a useful substitute. The model is quite simple in construction and does not require a large Outfit.

The base is made by connecting two 12½" Angle Girders 1 at one end by two similar Girders 2 and 3, and at the other end by a 12½" Angle Girder 4. Two 9½" Angle Girders 5 are bolted to 5½"×½" Double Angle Strips fixed to Girders 2 and 4.

The housing for the operating mechanism is assembled next. It is formed by 4½"×2½" Flat Plates bolted to the Angle Girders 2 and 3 as shown in the illustration, and the Flat Plates are joined across at each of their upper corners by 2½"×½" Double Angle Strips 6 and 7. A Double Bent Strip is bolted to Double Angle Strip 7, and the operating handle is mounted in this assembly. The handle consists of a Bush Wheel fitted with a Threaded Pin, and it is fixed on a 1½" Rod. The Rod carries also a ½" Pinion 8.

Two 5" Rods 9 and 10 are mounted in the 4½"×2½" Flat Plates, and each is held in position by a 1" Sprocket and a Collar. The 1" Sprockets are linked by Chain, so that the Rods rotate simultaneously. Rod 9 is fitted with a 1½" Contrate that meshes with the ½" Pinion 8. Rod 10 carries a Worm that engages a ½" Pinion 11 fixed on a 4" Rod mounted in 2½"×½" Double Angle Strips bolted between the Flat Plates. The outer end of the 4" Rod carries a 1" Sprocket connected by Chain to a similar Sprocket on the winding drum shaft.

The winding drum is a Boiler complete with Ends. A Bush Wheel is bolted to each Boiler End, and these are used to fix the drum on its shaft. The shaft is a 6½" Rod and is mounted in 2½" Triangular Plates bolted to the Girders 5.

The wire used in the fence is carried on bobbins fixed to the driving Rods 9 and 10. Each bobbin assembly consists of two 1½" Rods fixed in a Coupling locked on one of the driving Rods. The Couplings are not fixed exactly in line, but are staggered slightly so that they can rotate freely. It is important to make sure that the Couplings are fixed on their shafts in the same relative positions to each other. The wire is wound round three Collars that are free to turn between ¾" Washers on each of the 1½" Rods, and the free parts are held in place by Collars. A Bush Wheel is fixed at the extreme end of each of the Rods 9 and 10.

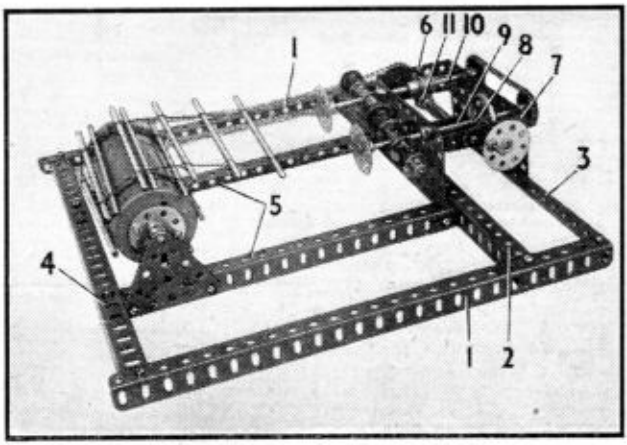


Fig. 1. A fence-making machine that is interesting to construct and operate.

Four separate lengths of wire are used in the machine, each being wound round one of the bobbins and then passed through the Bush Wheel on the same Rod. The wire used should be pliable, but stiff enough to retain the twists and hold the fencing firmly in position. Copper wire of about 22 S.W.G. is ideal for the purpose. The ends

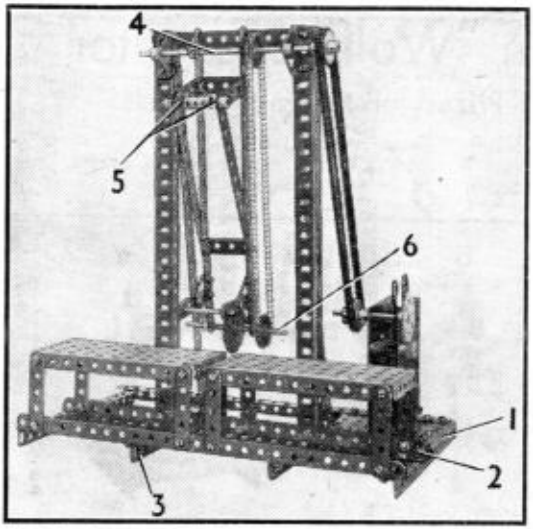


Fig. 2. A simple model of an unusual type of wood sawing machine.

of the wires are twisted together in pairs, and each pair is fastened firmly to the winding drum.

The machine is operated by placing a Rod or a length of wood between the pairs of wires and then turning the handle so that the Rod is gripped firmly between the twisted wires. A second Rod is then inserted at the spacing required, and the process is carried on until the desired length of fencing is made. The number of turns given to the handle after the Rods are in position determines the distance between the posts of the fence, and the same number of turns must be made at each step in order to get an even result.

Parts required to make the Fence-Making Machine: 5 of No. 8; 2 of No. 8a; 1 of No. 14; 2 of No. 15; 1 of No. 15b; 5 of No. 18a; 5 of No. 24; 2 of No. 26; 1 of No. 28; 1 of No. 32; 36 of No. 37; 5 of No. 38; 8 of No. 38d; 1 of No. 45; 4 of No. 48a; 1 of No. 48d; 2 of No. 53a; 20 of No. 59; 2 of No. 63; 2 of No. 76; 1 of No. 94; 4 of No. 96; 1 of No. 115; 1 of No. 162.

Vast numbers of trees are cut down every year and converted into logs, planks and boards, and the many different types of machines used in these processes make very interesting subjects for Meccano models. One of these machines forms the subject of our second model and is illustrated in Fig. 2. The model is a reproduction of a small sawing machine that is sometimes used for cutting boards. The cutter is of the circular type, and revolves at high speed. In this type of machine the saw is mounted in a pivoted frame suspended freely so that it can be drawn forward as the saw cuts through the wood.

It is best to begin construction of this model by assembling the base and saw bench. The base is rectangular in shape, and is constructed from two 12½" and two 7½" Angle Girders. One of the 12½" Girders overlaps the 7½" Girder 1 by one hole and a second 12½" Girder 2 is also bolted in position in the same way. The saw bench consists of two 5½"×2½" Flanged Plates, and these are attached to eight vertical 2½" Strips bolted to the 12½" Angle Girders of the base. A slight gap is left between the 5½"×2½" Flanged Plates to allow the circular saw to be moved across the work. The power unit is fixed to a platform bolted into a corner of the base. The platform is made from two 3½"×2½" Flanged Plates, and is connected to the 12½" Angle Girders by a 5½" Angle Girder. A second 5½" Girder is bolted in position as indicated at 3.

The saw frame is built from two supports each consisting of two 12½" Angle Girders bolted together to form U-shaped girders.

The power unit is a No. 1 Clockwork Motor, attached to Angle Brackets bolted to the platform formed by the 3½"×2½" Flanged Plates. The drive from the Motor is geared down through a ½" Pinion on the Motor driving shaft to a 57-tooth Gear fixed on a Rod mounted in the Motor sideplates. This Rod carries also two 1" Pulleys, and the drive is transferred from these to similar Pulleys on a 6½" Rod 4 by Driving Bands. Two Driving Bands are used in order to eliminate slipping. Rod 4 is mounted in Trunnions bolted to the saw frame, and the saw arm pivots on it.

The saw arm is built by connecting two 7½" Strips by two 1½"×½" Double Angle Strips and bolting to these a frame of 2½" and 5½" Strips. Two 1" Rods 5 joined by a Coupling pass through the 2½" and 5½" Strips and are held by Collars. A Sprocket on Rod 4 drives a Sprocket on Rod 6, which carries a 1½" Sprocket Wheel forming the saw.

Parts required to build the model Log Saw: 2 of No. 1; 2 of No. 1a; 2 of No. 2; 12 of No. 5; 7 of No. 8; 2 of No. 8b; 2 of No. 9; 4 of No. 12; 1 of No. 14; 1 of No. 16; 1 of No. 16a; 1 of No. 17; 2 of No. 18b; 4 of No. 22; 1 of No. 26; 1 of No. 27a; 2 of No. 35; 65 of No. 37; 2 of No. 48; 1 of No. 48d; 2 of No. 52; 2 of No. 53; 6 of No. 59; 1 of No. 63; 1 of No. 94; 1 of No. 95a; 2 of No. 96; 2 of No. 126; 2 of No. 126a; 2 of No. 186e. 1 No. 1 Clockwork Motor.

The Priestman "Wolf" Excavator

British Firm Offers Prizes for Meccano Models

PRIESTMAN BROTHERS LTD., Hull, manufacturers of cranes and excavators of all types, are offering in conjunction with Meccano Ltd. a fine range of prizes for the best Meccano models of their well-known "Wolf" Excavator illustrated in Fig. 1 on this page. The "Wolf" Excavator is an ideal general purpose machine, and can be supplied with various attachments which enable it to operate as a shovel, skimmer, dragline, crane, trencher or certain other forms of excavating appliance. In Fig. 1 the "Wolf" is shown fitted out as a mechanical shovel, and it is this form of the machine that is the subject of the competition.

Model-builders who wish to take part in this interesting competition are invited to try their skill in reproducing the outward appearance and chief mechanical features and movements of the "Wolf" as closely as possible. It is not of course expected that they will be able to reproduce all the finer features and constructional details of the actual machine, and all that is required is that their models should have an outward appearance as similar as possible to that of the Excavator seen in Fig. 1 and should be capable of carrying out its essential digging and travelling movements. The manner in which these movements are obtained in models is left to model-builders to devise for themselves.

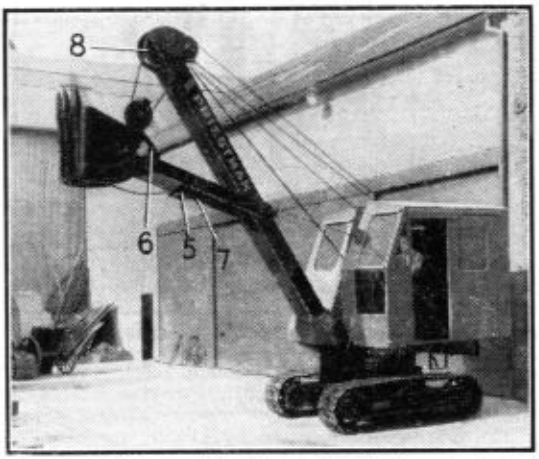


Fig. 1. The Priestman "Wolf" Excavator equipped as a mechanical shovel. Valuable prizes are offered for Meccano models of this fine appliance.

The following details of the actual machine are given for the guidance of intending competitors. The "Wolf" is driven by means of a Dorman Diesel engine mounted at the rear of the superstructure, but model-builders may substitute for this either a Clockwork or an Electric Motor. The power unit drives all the movements of the excavator, which are as follows: travelling, rotation of the superstructure, raising and lowering of the jib, and operation of the shovel arm. Model-builders are free to devise their own mechanisms for providing these movements and they are not required to follow the actual methods used in the real machine.

Briefly the "Wolf" Excavator consists of three main sections, consisting of an undercarriage,

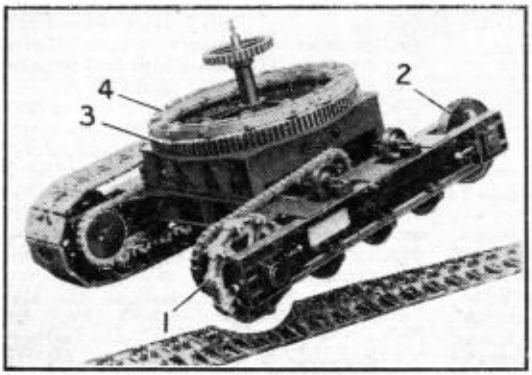


Fig. 2. The undercarriage of the "Wolf" Excavator, which carries the crawler tracks. The final drive to the crawlers is by heavy roller chain.

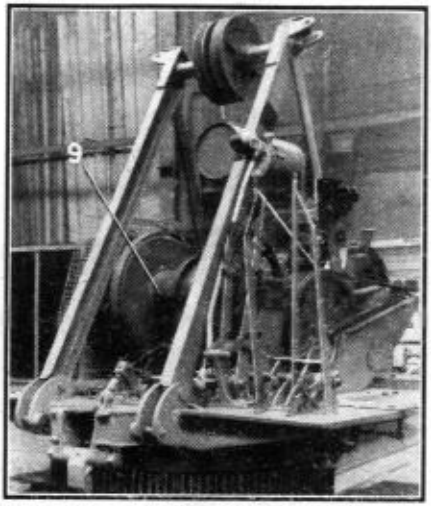


Fig. 3. The superstructure of the "Wolf" Excavator shown complete.

which carries crawler tracks, a rotating superstructure housing the mechanism, power unit and controls, and the digging attachment, which for the purpose of this competition is a jib and shovel arm with its bucket.

The undercarriage, which is shown in Fig. 2, consists of a built-up steel frame carrying two crawler belts. The crawlers are carried round a driving sprocket 1 and an idler roller 2, and supported by small bottom rollers and two top rollers. On the top of this frame is another built-up frame that supports a fixed toothed gear ring 3. On top of the gear is mounted the rotating superstructure and cab, which revolves on a ring of rollers 4. The superstructure is rotated by means of a pinion that meshes with the toothed gear ring on the undercarriage. Model-builders are free to devise their own methods of rotating the superstructure according to the Meccano parts available to them.

In the actual machine, clutches are provided to enable both crawler tracks to be driven simultaneously, or to allow either one of them to be locked and the other driven to permit steering. Model-builders may use any method they like of achieving this result in models.

The jib is pivoted at its base at the front of the superstructure as shown in Fig. 1. In the centre of the jib is pivoted the shovel arm 5, the other end of which is attached to the bucket. A strut 6 from the bucket to the arm alters the angle of the bucket and keeps it in the chosen position. The bucket has a rear door, hinged at the top, and provided with a "catch" that is operated by a rope 7 from the control point in the superstructure.

The outer end of the jib is fitted with sheaves or pulleys round which ropes are carried from two winding barrels 9 (Fig. 4) in the superstructure, which are driven through gearing from the power unit. Clutches are provided to permit either barrel to be driven as desired. The outer sheaves at the jib head are used for carrying the rope that raises and lowers the jib. This rope is attached to one of the winding barrels in the superstructure. The bucket arm is raised and lowered by a rope attached to the second winding barrel, and this passes over another pulley at the jib head, round a pulley block on the bucket and then is anchored at the jib head.

We wish to remind model-builders that they are free to use their own methods of obtaining the various movements of the excavator, but it is essential to reproduce as closely as possible the actual outward appearance of the machine and its main proportions.

The competition will be divided into two sections, one for (*Continued on page 41*)

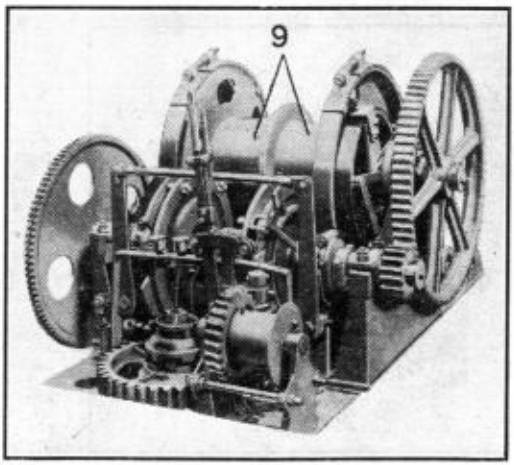


Fig. 4. The mechanism of the "Wolf" showing the winding barrels and part of the drive to the undercarriage.

Model-Building Competition Results

By "Spanner"

June "General" Model-Building Competition

One of the most successful of the "*M.M.*" Competitions organised during the past year was the "General" contest that was first announced in the June issue. This contest attracted a large number of entries, and some of the models were particularly interesting. The complete list of prize-winners in the Home Section of the contest is as follows:

First Prize, Cheque for £3/3/-: M. A. Reed, Epping. Second Prize, Cheque for £2/2/-: K. R. Pargeter, Stourbridge. Third Prize, Cheque for £1/1/-: G. I. Mackenzie, Elgin.

Five Prizes each of 10/6: D. V. J. Taylor, London N.21; W. J. Rowland, London S.E.21; H. Taylor, Huddersfield; J. McMay-Russell, Coventry; C. C. Bishop, Cardiff.

Five Prizes each of 5/-: R. J. Hilling, Ipswich; J. Dunworth, Droitwich; W. Lees, Selkirk; A. Cookson, Blackburn; G. Mason, Parkstone.

The most outstanding model was a vertical milling machine, built by Michael A. Reed, Epping, who was awarded First Prize. The model is shown in Fig. 1 on this page and the following details will be of interest and help to other model-builders who may wish to attempt models of this kind.

All the movements of the worktable have both hand and self-acting feeds. The latter are operated by a motor at the base of the column, the drive from which is taken through a three-speed gear-box controlled by handle 13, and transmitted to the knee through a shaft fitted with a Universal Coupling at each end, to allow for the vertical movement of the knee. The motor also drives another similar shaft at a higher speed, which provides a rapid "setting up" feed speed. This feed can be engaged by pressing the handle 4.

The handles which control the feed movements each have three positions, *i.e.*, "off," "forward" and "back." The table and the knee are controlled by handles 5 and 2 respectively. Handle 15 controls the traverse of the carriage.

The cutter spindle has a fine vertical feed controlled by handwheel 9. The shaft of the handwheel carries a ½" dia. Helical Gear that meshes with a 1½" dia. Helical Gear mounted on a vertical Screwed Rod, which carries a Threaded Coupling controlling the vertical movement of the spindle.

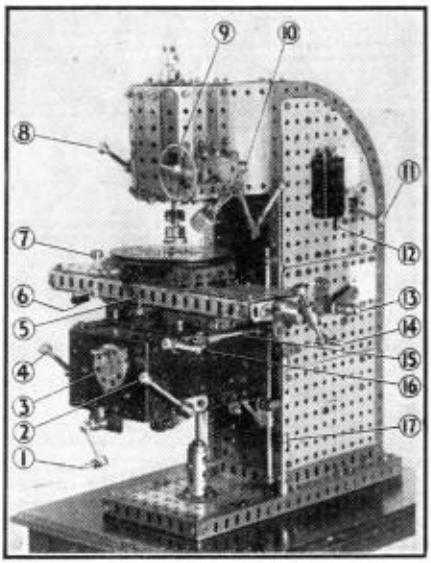


Fig. 1. Interesting mechanisms combined with a realistic and neat appearance made this vertical milling machine an outstanding entry in the June 1949 General Model-Building Contest. It was built by Michael A. Reed, Epping, who was awarded First Prize.

The cutter is driven by a further motor mounted in the upper part of the column, through a five-speed gear-box. The various speeds are selected by handle 11, vertical movement of which slides the shaft of the vertical gear-box, whilst lateral movement controls the horizontal gear-box.

The drive is taken through Bevel Gears and a clutch, which is controlled by handle 8, to the cutter spindle.

The motors are controlled by a miniature iron-clad switch 12. A dummy adjustable work light 10 is provided.

The circular worktable provided has 360 degrees of movement. Nuts are clamped between the plates of the table to provide tapped holes by means of which work can be clamped to it. The table may be removed when not required. All moving parts of the machine are enclosed, a door in the rear giving access to motors and gears.

Second Prize went to K. R. Pargeter, Wollaston, Stourbridge, builder of the mobile excavator illustrated by the drawing reproduced as Fig. 2. The details of this model are clearly shown and its main qualities are neatness and good proportions.

G. I. Mackenzie, Elgin, sent a model motor-driven lawn mower operated by a Clockwork Motor. The cutting cylinder is fitted with razor blades, and will actually cut grass!

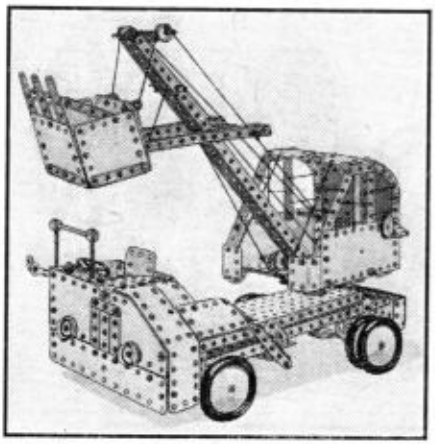


Fig. 2. A reproduction of a drawing by K. R. Pargeter, Wollaston, Stourbridge, of his model excavator which won Second Prize.