

# Off The Beaten Track!

By "Spanner"

## A Fine Meccano Model of Unusual Type

THE possibilities for model-building of a Meccano Outfit are practically unlimited, and there are few machines, mechanisms or structural devices that cannot be reproduced in one form or another from the parts it contains. Many model-builders fail to obtain the maximum enjoyment from their hobby,

yield of the furnace is reduced. The best way to meet this difficulty is to get rid of as much gangue as possible before the ore is placed in the furnace, and in the case of magnetite, an iron ore that has strong magnetic properties, this can be done quickly and efficiently by means of the magnetic concentrator that forms the subject of Adair's model. Magnetite is another name for load-stone, which my readers will already know as an ore of iron that is magnetic, and which seems to have been used in the earliest compasses.

The action of the machine is simple. Crushed ore and gangue are fed on to a vibrating chute 1, Fig. 2, which delivers it to a conveyor belt 2. The belt carries it under another belt 3 placed transversely in the machine, and above which magnets are arranged. As the mixture of iron and earthy matter travels under the transverse belt the magnetic portion of it is pulled upward by the magnets and held firmly against the underside of the cross-belt, to which it adheres until it is carried beyond the influence of the magnets, when it falls from the belt and drops down a chute 4. The non-magnetic gangue remains on the main conveyor and travels along until it is discharged down a chute 5.

The model is driven by an Electric Motor, and its main constructional details are fairly easy to follow from the illustrations. In the drive to the various parts of the mechanism a Worm on the Motor shaft engages two  $\frac{1}{4}$ " Pinions 4, Fig. 3. A Coupling 5 is fixed on the shaft 7 and serves as a bearing for the shaft 6.

From the upper Pinion 4 the drive is taken by a  $\frac{1}{2}$ " Pinion 8 to a 50-teeth Gear 9 fixed to shaft 7. This shaft bears also a  $\frac{3}{4}$ " Pinion 10, which drives a 50-teeth Gear, the latter being fixed by a Socket Coupling to a  $\frac{1}{4}$ " Pinion 12 running free on its shaft. This  $\frac{1}{4}$ " Pinion drives 57-teeth Gears 13 and 14.

The Gears 13 are mounted on longitudinal shafts that transmit the drive to the rollers carrying the main conveyor belt. The rollers consist of Boilers

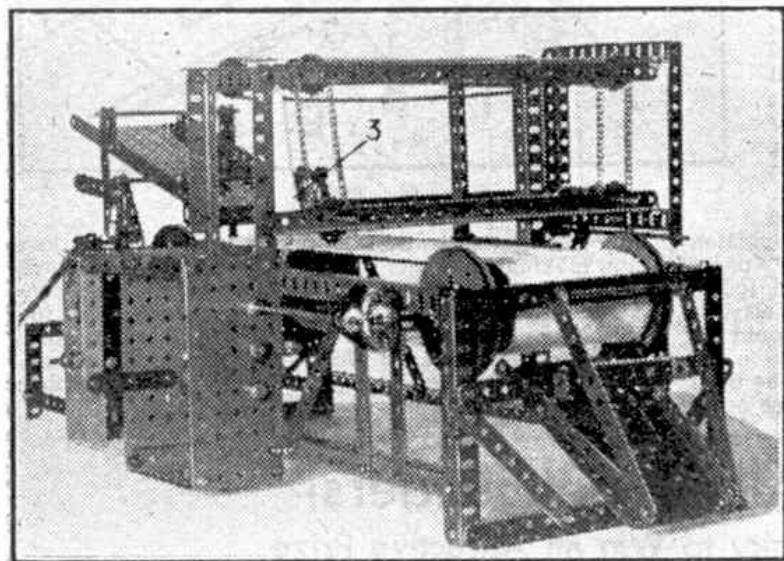


Fig. 1. The model magnetic concentrator described on this page. It was built by B. Adair, Maryport.

however, because they do not vary the subjects of their models sufficiently. The chief subjects to receive their attention are ships, locomotives, motor cars, aircraft, excavators and cranes of various types, and I am afraid that many of them seldom venture beyond this limited range.

By trying to reproduce some of the less common machines and engineering devices, and relying more on his inventive abilities, a model-builder will get even greater pleasure from Meccano, for once the kernel of an idea is formed it is really jolly good fun developing it, and finally putting it into practical shape with Meccano parts. This I am sure was the experience of Brian Adair, Maryport, in designing and building the interesting model of a magnetic concentrator shown in Figs. 1 and 2 on this page, for in addition to breaking new ground, he had the satisfaction of including in it novel ideas of his own. It is the first Meccano model of this type that has come to my notice, representing a special type of machine known as a magnetic concentrator, which is used in the iron smelting industry.

When iron ore is treated in a blast furnace to reduce it to metallic iron, it is necessary to get rid of or "flux away" the earthy matter in the ore, which is known as gangue. This is done by mixing with the ore a certain amount of lime, but as the lime takes up furnace room the effective

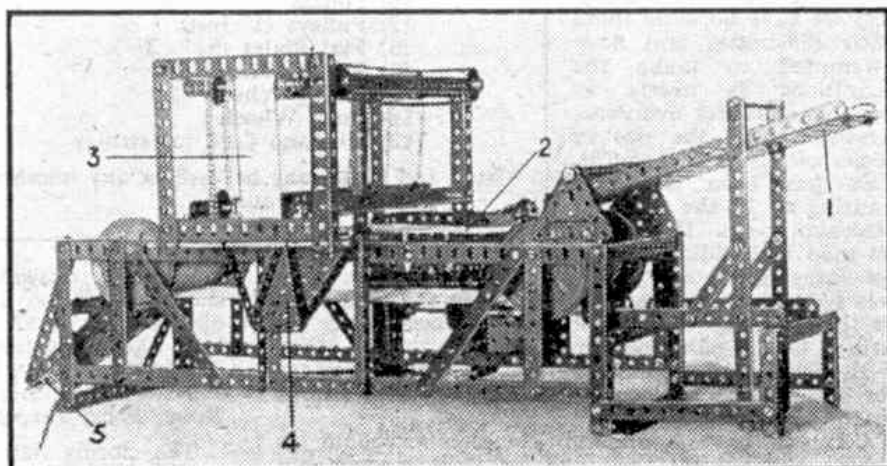


Fig. 2. Another view of the concentrator, showing the side opposite from that seen in Fig. 1.

complete with ends, bolted to 3" Pulleys.

The necessary vibratory action is given to the chute 1 by an Eccentric 16, Fig. 3, connected by links and levers to the chute. The shaft on which the Eccentric is fixed is driven by the Motor through lower Pinion 4. The drive from the Motor to the transverse conveyor is taken through the Pinion 12 and Gear 14, the final drive to the conveyor rollers being by means of Sprockets and Chain. This conveyor travels around four rollers, each of which consists of a Sleeve Piece mounted between  $\frac{1}{4}$ " Flanged Wheels, and each roller is power driven. This multiple drive system is necessary owing to the very considerable friction and the "drag" caused by the magnets.

If suitable permanent or electro magnets are arranged above the transverse belt, the model will work in a realistic manner. If it is decided to use an electro-magnet this can be made from two Meccano Bobbins, fully wound with No. 26 S.W.G. cotton-covered wire and fitted with pole pieces formed from  $1\frac{1}{2}$ " Angle Girders. To the inside flange of each Angle Girder four  $1\frac{1}{2}$ " Strips are bolted, and to the outside of the same flange are fixed six Flat Brackets, all the parts being secured by means of a  $\frac{1}{2}$ " Bolt. The Bobbins are each fitted with a  $1\frac{1}{2}$ " Rod that forms the core, and these are inserted in the end holes of the Strips and the Angle Girders. The whole unit is then fitted inside a Boiler End, where it is held in place by nuts on the shanks of the  $\frac{1}{2}$ " Bolts.

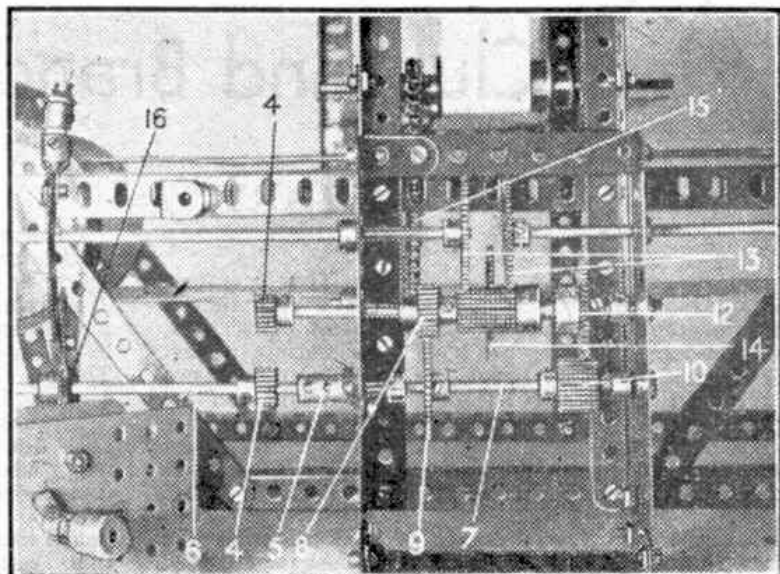


Fig. 3. The operating mechanism of the model.

Suitable conveyor bands can be made quite easily from a piece of thin cloth. Care should be taken to cut the strips parallel sided and to sew the joint neatly and carefully to eliminate any lumpiness.

For demonstration purposes the iron ore and gangue with which the real machine has to deal can be represented by a mixture of dry soil or sand, with iron filings or other small bits of metal.

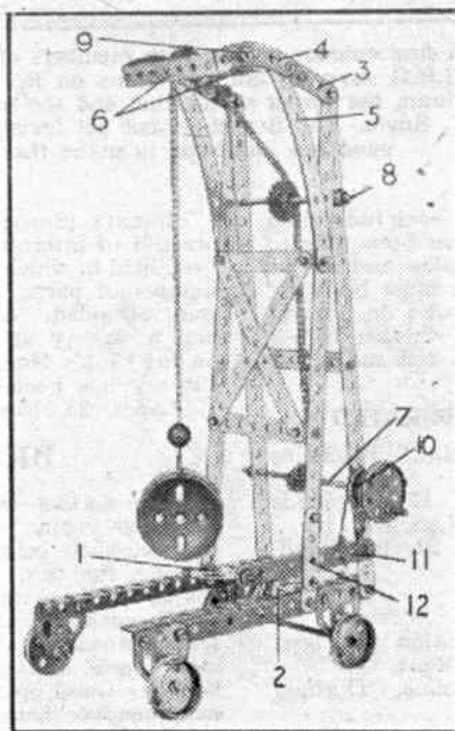
## New Meccano Model Portable Garage Crane

Many "M.M." readers will be familiar with the light and handy portable cranes sometimes seen in repair garages, where they are used for lifting engine units and other car parts into and out of the chassis. It is one of these useful hoisting devices that forms the subject of the New Model shown below. The tower-like jib of the crane is supported on a wheeled base, which consists of two  $7\frac{1}{2}$ " Angle Girders joined at their rear ends by a  $3\frac{1}{2}$ " x  $2\frac{1}{2}$ " Flat Plate. Two  $1\frac{1}{2}$ " Corner Brackets 1 and 2 brace the Girders to the Plates and ensure rigidity. The travelling wheels are  $1\frac{1}{2}$ " Flanged Wheels and they are fixed on Rods journalled in Flat Trunnions bolted to the  $7\frac{1}{2}$ " Angle Girders.

The jib is formed from four  $12\frac{1}{2}$ " Strips, two of which are bolted at each side of the base. A 2" Strip 3 and a Curved Strip 4 extend the jib forward at each side, the two sides being spaced apart by Double Angle Strips 6. Bracing is provided by a  $5\frac{1}{2}$ " Curved Strip 5 at each side. The tower portion is also braced by means of  $3\frac{1}{2}$ " Strips and crossed  $5\frac{1}{2}$ " Strips, bolted in the positions indicated.

The hoisting handle is a 2" Pulley mounted on a Rod 7 journalled in the  $12\frac{1}{2}$ " Strips, and it is fitted with a Threaded Pin. Also fixed on this Rod is a 1" Pulley 10 and a Cord Anchoring Spring. A piece of

Sprocket Chain is tied at one end to the Cord Anchoring Spring, then passed over a 1" Sprocket Wheel fixed to a Rod 8, and finally over the jib-head Sprocket, which is fixed to a Rod 9. A Loaded Hook is attached to the other end of the Chain.



A working model of a portable garage crane.

The winding shaft is fitted with a band brake constructed as follows. A  $4\frac{1}{2}$ " Strip 11 pivoted to the rear  $12\frac{1}{2}$ " Strip of the tower, slides between the front  $12\frac{1}{2}$ " Strip and a  $2\frac{1}{2}$ " Strip 12 bolted to it. The front end of the  $4\frac{1}{2}$ " Strip is fitted with a Threaded Pin, which forms a convenient handle. A piece of Cord is tied at one end to the  $4\frac{1}{2}$ " Strip in the hole indicated, then is passed over 1" Pulley 10 and its other end is tied to the Strip. By pressing on the Strip the Cord is tightened around the Pulley and so prevents the load from dropping when the winding handle is released. It is then possible to push the crane and its load to any required place.

Parts required to build model Portable Crane: 4 of No. 1; 2 of No. 2; 1 of No. 2a; 2 of No. 5; 1 of No. 6; 2 of No. 8b; 2 of No. 15a; 1 of No. 15b; 4 of No. 20; 1 of No. 21; 1 of No. 22a; 1 of No. 33; 40 of No. 37a; 43 of No. 37b; 5 of No. 48b; 1 of No. 57b; 5 of No. 59; 2 of No. 89; 2 of No. 90; 1 of No. 94; 1 of No. 96; 1 of No. 96a; 1 of No. 115; 4 of No. 126a.