# Prize-Winning Working Models

## Ingenious Ideas of "M.M." Readers

IN this article we describe five models selected from the thousands of excellent efforts submitted by readers of the "*M.M.*" in Model-building Contests. Each of these models is original in type, and contains features that make it of interest to other model-builders on the look out for original ideas. All are working models that are easy to build and remarkably realistic in their movements.

The first model to be dealt with is the fine beam lifting bridge shown in Fig. 1. Bridges of this type are not often seen in England, although they are used to a great extent in Europe for bridging canals. The model was built by J. H. Beecroft, Nottingham, and is a particularly good example of bridge construction.

The main framework consists of 3" Angle Girders supporting 12½" Angle Girders and is bolted to 18½" Angle Girders, that form the base for an Electric Motor. The 12½" Angle Girders are joined together at their upper ends by a 12½" Braced Girder and are clamped between further Angle Girders. The sides of the bridge are made with 18½" Angle Girders and are linked together with five 12½" Angle Girders. Flat Plates are bolted to this framework to form the roadway, which is provided with pavements 2½" wide on each side.

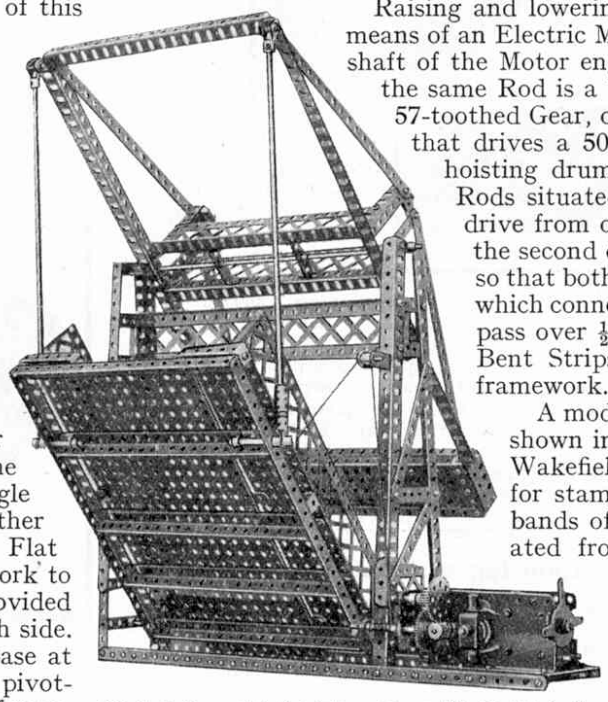

Fig. 1. A fine model of a balanced beam lifting bridge built by J. H. Beecroft, Nottingham.

The bridge is hinged to the base at its lower end. Two 11½" Rods are pivoted on 2" Rods journalled in the framework of the bridge, and these connect the bridge with the beam, which is pivoted on a 11½" Rod journalled in the Strips that connect the top ends of the vertical framework.

The beam consists of two 24½" Angle Girders connected together at their ends and centres by four 12½" Angle Girders. In the middle of the beam so formed four 3½" Angle Girders are bolted two and a half inches apart, and to these are attached two 12½" Braced Girders. To the tops of the 3½" Angle Girders 12½" Strips are connected, the other ends of the Strips being bolted to the ends of the 24½" Angle Girders to form tension bars. The weight of the lifting span is counter-balanced by weights carried in a box constructed from 5½"×2½" Flat Plates and 12½" Flat Girders and mounted on the rear end of the beam.

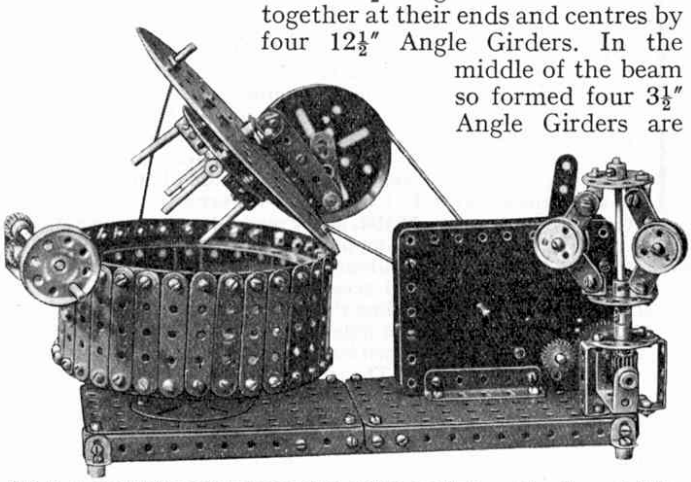

Fig. 2. A model of a governor-controlled clothes washing machine. It was built by M. Lyzet, Gauderan, France.

Raising and lowering of the bridge is carried out by means of an Electric Motor. A ½" Pinion on the armature shaft of the Motor engages with a 57-toothed Gear. On the same Rod is a Worm that engages with a second 57-toothed Gear, on the shaft of which is a ½" Pinion that drives a 50-toothed Gear on the Rod of the hoisting drums. The drums consist of two 1½" Rods situated on each side of the model. The drive from one of the drums is transmitted to the second drum by means of Sprocket Chain, so that both drums rotate together. The Cords, which connect the bridge to the hoisting drums, pass over ½" loose Pulleys carried in Cranked Bent Strips placed midway up the vertical framework.

A model of a roller feed stamping press is shown in Fig. 4. It was made by D. Hirst, Wakefield, and represents a machine used for stamping small parts from continuous bands of metal. The punching die is operated from a built-up crankshaft formed from two short Rods, to each of which is secured a Coupling. These are fastened tightly in place by a Screwed Rod that forms the crank pin, and which carries a further Coupling that serves as the big end for the connecting rod that operates the die, which is a short Rod held in a Coupling. The crankshaft is driven by a 3½" Gear Wheel that engages a ½" Pinion on the Rod of the flywheel. Normally, as this Rod rotates the Pinion is held out of engagement with the Gear by a Compression Spring, but on depressing a foot pedal, the Pinion slides into mesh and causes the punching die to operate. The Pinion remains in engagement with the Gear only so long as the foot-pedal is depressed, so that the press is under perfect control at any point of the stroke.

The foot pedal is an Angle Bracket bolted to one end of a 3½" Strip. This Strip is pivoted at its centre, and its other end is connected by means of a Rod and Strip Couplings to a Bell Crank, pivoted in a Cranked Bent Strip attached to the upper part of the model. A Rod connected to the other arm of the Bell Crank passes through the side plates of the model, and a selector fork consisting of two 1" Rods held in a Coupling, is fixed to its end. This fork fits in the narrow part of a Socket Coupling, which holds the ½" Pinion in a similar way to the withdrawal mechanism of a friction clutch. In this way the ½" Pinion is moved into mesh with the 3½" Gear when the foot pedal is depressed.

The drive is taken from the crankshaft to the feed mechanism by Bevel and spur gearing, the final stage being through Sprockets and Chain to a drum formed from two $1\frac{1}{8}$" Flanged Wheels butted together. A Strip of paper that represents the metal to be punched passes over the drum and is gripped by a $\frac{3}{4}$" Pinion mounted on a short Rod carried in the end transverse bore of a Coupling. A Spring keeps the Pinion continually pressing on the paper.

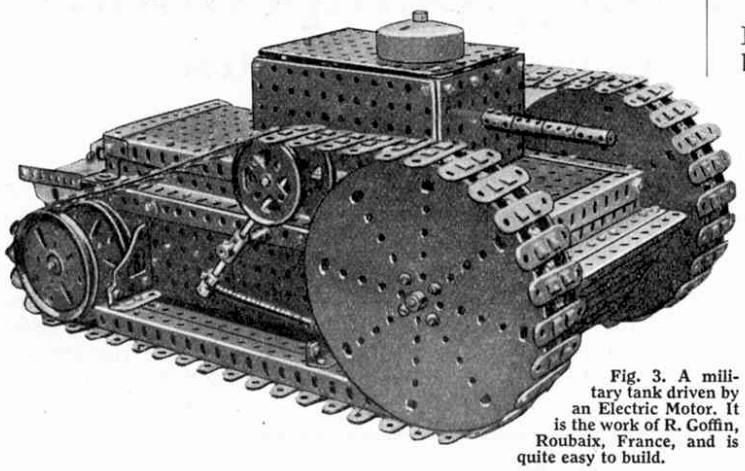

Fig. 3. A military tank driven by an Electric Motor. It is the work of R. Goffin, Roubaix, France, and is quite easy to build.

The accuracy with which the model operates depends to a large extent on the rigidity of its construction, and on the accurate fit of the sliding ram that holds the stamping die.

Fig. 3 shows a model of a French army tank built by R. Goffin, Roubaix, France, and readers who like to build working models will find it an excellent subject for their attention. It is driven by an Electric Motor mounted on a framework of Angle Girders inside the body. This framework accommodates also all the controls and forms the skeleton for the outer casing. A train of gears transmits the drive from the Motor to a differential gear, each side of which drives two pairs of 3" Pulleys on the outside of the tank casing. The purpose of the differential gear is to enable each of the creeper tracks to be driven independently of the other. The movement of each track is controlled by an internal expanding brake, and the tank is steered by varying the speeds of the two creeper tracks.

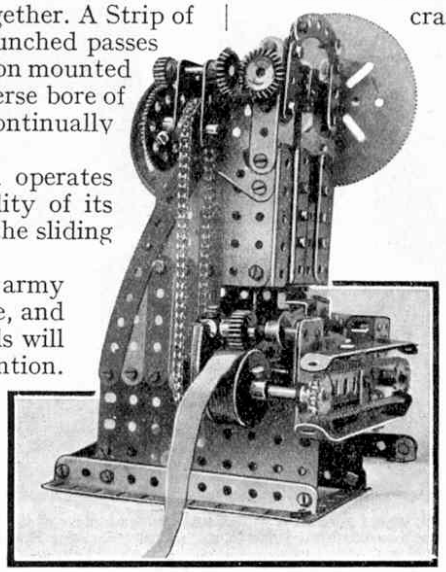

Fig. 4. This stamping press, which is fitted with automatic feed, was built by D. Hirst, Wakefield.

The construction and method of mounting the creeper tracks are interesting on account of the original ideas incorporated. Each track consists of a length of Sprocket Chain to which a number of 2" Strips are clamped by means of Flat Brackets and Bolts. The track passes round 6" Circular Plates mounted on a Rod journalled in the casing at the front of the tank and round the pairs of 3" Pulleys at the rear. Two $9\frac{1}{2}$" Girders are bolted to $1\frac{1}{2}$" Angle Girders to form a channel section girder and this is then bolted on the side of the tank by means of Flanged Brackets. The purpose of the channel section girders is to keep the track in contact with the ground.

The track is maintained in tension by a jockey pulley, which consists of two 2" Pulleys mounted on a 2" Rod that is held in the prongs of a Fork Piece secured on a second Rod that has a Coupling fastened on its end. This Coupling is mounted on a Rod that is passed through the side of the tank and is held in position by a Collar placed on its end inside the tank. A Spring hooked on to a second Rod journalled in the Coupling, is bolted at its other end to the side of the tank. As a result of the pull of the Spring the jockey pulleys are forced against the creeper track and maintain it in correct tension.

The gun barbette is built up from two $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flat Plates and two $3\frac{1}{2}" \times 2\frac{1}{2}"$ Flanged Plates, these being bolted together by means of the flanges of the smaller Plates. The roof, a $5\frac{1}{2}" \times 3\frac{1}{2}"$ Flat Plate, rests on $\frac{1}{2}" \times \frac{1}{2}"$ Angle Brackets fastened on the inside of the barbette, and it is fitted on top with a Boiler End that represents a revolving look-out post.

Many ingenious machines have been introduced in recent years for the purpose of washing clothes quickly and with the minimum amount of labour. One of the most commonly used forms of these machines is reproduced in the simple, but neatly designed model shown in Fig. 2. This model was built by M. Lyzet, Gauderan, France.

In machines of this kind the clothes to be washed are placed in the tank, which is then partly filled with boiling water. An arrangement of vertical pegs fixed to the lid of the tank are then oscillated rapidly by a crank arrangement driven at a constant speed by machinery. In this way the clothes are whirled through the water and are thoroughly washed in a much shorter time than would be possible by hand.

The model consists essentially of a circular tank constructed from Circular Girders, round the outside of which $2\frac{1}{2}$" Strips are bolted. The complete tank is secured by two Face Plates to a base that consists of two $5\frac{1}{2}" \times 2\frac{1}{2}"$ Flat Plates fastened together by $5\frac{1}{2}$" Angle Girders and Strips. Inside the tank a set of agitators or pegs are arranged to oscillate backward and forward, being driven by a governor-controlled Clockwork Motor.

The pegs consist of short Rods mounted on a Face Plate by means of Couplings, as shown in the illustration. A $\frac{1}{2}$" Pulley on the Motor driving shaft is connected by a belt with a 3" Pulley on a Rod journalled in a Double Bent Strip bolted to the Circular plate that forms the cover for the washing tank. This Rod carries at the end opposite to the 3" Pulley a Double Arm Crank, to one arm of which a $2\frac{1}{2}$" Strip is pivotally attached. The other end of the Strip is pivotally bolted to an Angle Bracket secured to the centre spindle of the agitator pegs.

Fig. 5 shows a model drawbridge of the kind used at the entrances to Norman castles. It is quite easy to build and was submitted by A. Chew, Wilmslow.

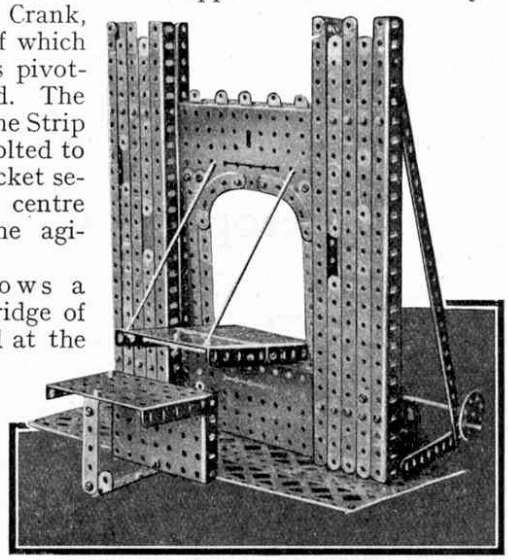

Fig. 5. A simple drawbridge suitable for incorporating in a model of a castle. It is the work of A. Chew, Wilmslow.