

New Meccano Model

Farm Tractor and Hay Rake

THE realistic Tractor and Hay Rake that forms the subject of our new model this month is powered by a Clockwork Motor No. 1 that drives it at a good speed. The Hay Rake is fitted with a simple mechanism that raises and lowers the tines automatically as the model is driven along the ground.

The Tractor chassis is assembled from two built-up strips, each made from two $5\frac{1}{2}$ " Strips overlapped three holes. These strips are joined together by two $2\frac{1}{2}$ " x 1" Double Angle Strips 1 and 2, and by two $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strips 3 and 4. The Clockwork Motor is fixed to Angle Brackets bolted to Double Angle Strips 1 and 2, and a $2\frac{1}{2}$ " Strip on each side is bolted between the Double Angle Strips for bracing purposes.

The front axle is made by fixing a $3\frac{1}{2}$ " Strip to each side of small Fork Pieces 5. The axle pivots on a 1" Rod held by Spring Clips in a Trunnion bolted to Double Angle Strip 3, and in an Angle Bracket fixed to Double Angle Strip 1. The front wheels are

made by pressing 2" Motor Tyres over Boiler Ends. A Bush Wheel is bolted centrally inside each Boiler End, and the complete wheel is free to turn on a $\frac{3}{4}$ " Bolt. This Bolt is screwed into a Collar mounted between the prongs of one of the Fork Pieces 5, and is fixed on a 1" Rod passed through the Fork Piece. The lower end of each of the 1" Rods is fitted with a Crank 6.

The rear wheels are 3" Pulleys fitted with Motor Tyres, and they are fixed on a 5" Rod mounted in Flat Trunnions bolted to the chassis. The Rod is held in position by Collars, and it carries a $1\frac{1}{2}$ " Contrate 7.

A $\frac{1}{2}$ " Pinion on the Clockwork Motor driving shaft is meshed with a 57-tooth Gear on a $2\frac{1}{2}$ " Rod 8. This Rod is mounted in the Motor sideplates, and it carries a Coupling 9 loose on the Rod, and a $\frac{3}{4}$ " Pinion 10 fixed in place but spaced from the Coupling by a Washer. Pinion 10 meshes with a $1\frac{1}{2}$ " Contrate on a Rod 11, which is free to turn in Coupling 9 and is supported at the rear by a 1" Corner Bracket bolted to the flange of a $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate 12. The Plate 12 is fixed to Double Angle Strip 4, and is attached to the chassis by Angle Brackets. A $\frac{1}{2}$ " Pinion on Rod 11 engages the Contrate 7 on the rear axle. The brake and reverse levers of the Motor are each extended by a Rod held in a Rod and Strip Connector.

The bonnet is supported by three 3" Strips on each side, bolted to the chassis as shown in Fig. 1. The bonnet is assembled from six $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plates bolted together to form a built-up $4\frac{1}{2}$ " x $3\frac{1}{2}$ "

plate. The edges of the built-up plate are curved downward, and it is bolted direct to the rear set of 3" Strips and is attached to the front set by Fishplates. The exhaust pipe is a 2" Rod held in a Crank bolted underneath the bonnet, and it carries a Coupling and a Threaded Coupling.

The top of the radiator is made by bolting a $2\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip between the 3" Strips at the front of the chassis. A $2\frac{1}{2}$ " stepped Curved Strip is fixed to the Double Angle Strip, and the assembly is capped by a $1\frac{1}{2}$ " Strip curved slightly and held by a $\frac{3}{4}$ " Bolt that is fitted with a Collar to represent the radiator cap.

Two $2\frac{1}{2}$ " Strips are curved to the same radius as the $2\frac{1}{2}$ " stepped Curved Strip, and they are connected together by a 3" Strip at each side and by a similar Strip at the centre. The spaces between the 3" Strips are filled by two Tension Springs. This assembly forms the front of the radiator, and it is attached to the chassis and to the top of the bonnet by

Obtuse Angle Brackets.

Steering is controlled by turning a $6\frac{1}{2}$ " Rod mounted in two Angle Brackets bolted to one side-plate of the Motor. This Rod is held in place by Collars, and it carries at its lower end a $\frac{1}{2}$ " Bevel that engages a $1\frac{1}{2}$ " Bevel 13. Bevel 13 is free to turn on a $\frac{3}{4}$ " Bolt fixed by a nut in Double Angle Strip 2, and it is held on the Bolt by lock-nuts. A Fishplate is bolted to the $1\frac{1}{2}$ " Bevel, and a $3\frac{1}{2}$ " Strip 14 is lock-nutted to the Fishplate.

A Bolt is fixed by a nut in the slotted hole of each of the Cranks 6, and a Collar is screwed loosely on the bolt. The Collars are connected by a 4" Rod, and Strip 14 is pivoted on a bolt screwed into one of the Collars.

Each rear mudguard is a $5\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plate attached to a similar Flexible Plate bolted across the rear of the chassis. The front ends of the mudguards are supported by Angle Brackets fixed to vertical $1\frac{1}{2}$ " Strips. The seat is made from two Flat Trunnions, and it is attached by Angle Brackets to a pillar made from two 2" Strips. The lower ends of these Strips are bolted to a Double Bracket fixed to the Flanged Plate 12. The coupling hook is a large Fork Piece placed on a $1\frac{1}{2}$ " Rod passed through the rear flange of the Flanged Plate. The Rod is fitted with a Compression Spring, and is held in place by a Collar.

The Hay Rake is assembled on a $5\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate 15, and the drawbar consists of two built-up angle girders. Each of these is made from two $5\frac{1}{2}$ " Strips, one of which is bolted direct to the Flanged Plate and the other is attached to the Plate by an Angle Bracket. The $5\frac{1}{2}$ " Strips are connected at their forward ends by a Double Bracket, and a $\frac{1}{2}$ " Reversed Angle Bracket is used to couple the Rake to the Tractor.

The rake tines are Formed Slotted Strips bolted to a $5\frac{1}{2}$ " x $\frac{1}{2}$ " Double Angle Strip. One end of the Double Angle Strip is lock-nutted to a Fishplate bolted to the Flanged Plate 15, and the other end

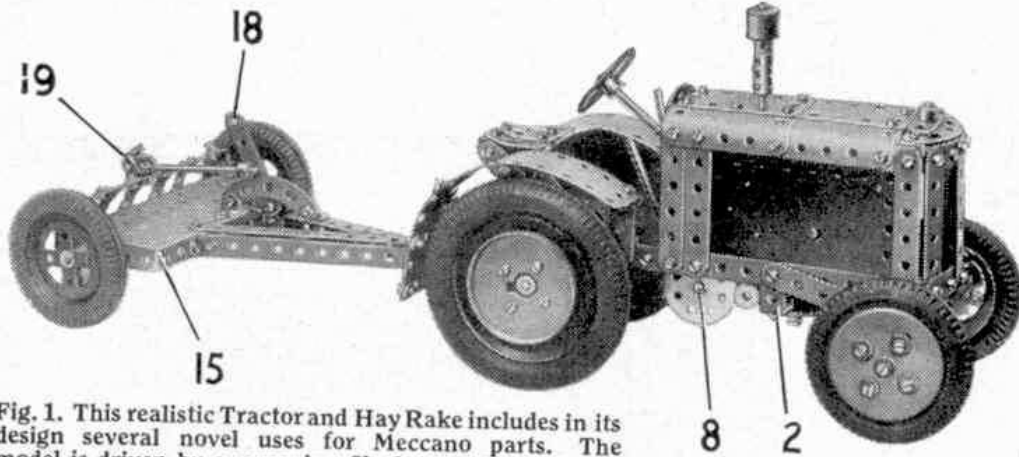


Fig. 1. This realistic Tractor and Hay Rake includes in its design several novel uses for Meccano parts. The model is driven by a reversing Clockwork Motor No. 1.

made by pressing 2" Motor Tyres over Boiler Ends. A Bush Wheel is bolted centrally inside each Boiler End, and the complete wheel is free to turn on a $\frac{3}{4}$ " Bolt. This Bolt is screwed into a Collar mounted between the prongs of one of the Fork Pieces 5, and is fixed on a 1" Rod passed through the Fork Piece. The lower end of each of the 1" Rods is fitted with a Crank 6.

The rear wheels are 3" Pulleys fitted with Motor Tyres, and they are fixed on a 5" Rod mounted in Flat Trunnions bolted to the chassis. The Rod is held in position by Collars, and it carries a $1\frac{1}{2}$ " Contrate 7.

A $\frac{1}{2}$ " Pinion on the Clockwork Motor driving shaft is meshed with a 57-tooth Gear on a $2\frac{1}{2}$ " Rod 8. This Rod is mounted in the Motor sideplates, and it carries a Coupling 9 loose on the Rod, and a $\frac{3}{4}$ " Pinion 10 fixed in place but spaced from the Coupling by a Washer. Pinion 10 meshes with a $1\frac{1}{2}$ " Contrate on a Rod 11, which is free to turn in Coupling 9 and is supported at the rear by a 1" Corner Bracket bolted to the flange of a $3\frac{1}{2}$ " x $2\frac{1}{2}$ " Flanged Plate 12. The Plate 12 is fixed to Double Angle Strip 4, and is attached to the chassis by Angle Brackets. A $\frac{1}{2}$ " Pinion on Rod 11 engages the Contrate 7 on the rear axle. The brake and reverse levers of the Motor are each extended by a Rod held in a Rod and Strip Connector.

The bonnet is supported by three 3" Strips on each side, bolted to the chassis as shown in Fig. 1. The bonnet is assembled from six $2\frac{1}{2}$ " x $1\frac{1}{2}$ " Flexible Plates bolted together to form a built-up $4\frac{1}{2}$ " x $3\frac{1}{2}$ "

is supported by a $\frac{3}{8}$ " Bolt 16. This Bolt is fixed tightly to a Fishplate by a nut, and is passed through an Angle Bracket bolted to the Flanged Plate. The Bolt 16 is then gripped tightly in the lug of the Double Angle Strip by two nuts.

The wheels of the Hay Rake are fixed on 2" Rods mounted in the flanges of the Flanged Plate 15 and in Angle Brackets bolted underneath this Plate. Collars are used to hold the Rods in position, and one Rod carries a second Collar placed outside the Plate and spaced from it by Washers. A Bolt 17 in the Collar is arranged so that as the axle turns the Bolt engages the Fishplate on Bolt 16 and acts as a simple cam. This action raises the tines clear off the ground.

When necessary the tines can be held off the ground by operating a lever 18. This is a $2\frac{1}{2}$ " Strip lock-nutted to an Angle Bracket fixed to the drawbar, and it slides between two $2\frac{1}{2}$ " stepped Curved Strips also attached to the drawbar by Angle Brackets. A $3\frac{1}{2}$ " Rod is fixed in a Collar pivoted to the lever, and the free end of the Rod carries a Fishplate 19 attached by a bolt to a Collar. This assembly is slipped over a $\frac{3}{4}$ " Bolt that is held by a nut in the $5\frac{1}{2}$ " x $\frac{3}{8}$ " Double Angle Strip.

When the assembly is completed the No. 1 Clockwork Motor and the driving shafts and gears of the model should be lightly oiled to ensure that the mechanism is free running, and the bearings for Rod 11 should be lined up carefully so that the Rod is able to turn freely.

The hay rake is only one of many interesting farming implements that are used in conjunction with tractors, and we suggest that readers should try modelling some of these. Ploughs, harrows, hay carts and trailers are some of the good subjects to be found among farm equipment. Models of them are quite easy to assemble and do not require an extensive collection of parts.

Model-builders who are also Dinky Toys collectors will find the agricultural implements included in the Dinky Toys range useful as prototypes on which to base their models. For example, the many moving parts of the Massey-Harris Manure Spreader make

this an attractive subject for those who like plenty of "gadgets" in their models, and a well-built reproduction of this would look most realistic when hitched to the tractor described here.

At this time of the year farmers all over the country are busy preparing the land for next season's crops, and in most parts tractors are to be seen hard at work towing and driving implements of various kinds. Readers travelling through the country should be on the look out for new ideas for their models.

There is no doubt that agricultural machinery can be reproduced with a great deal of accuracy

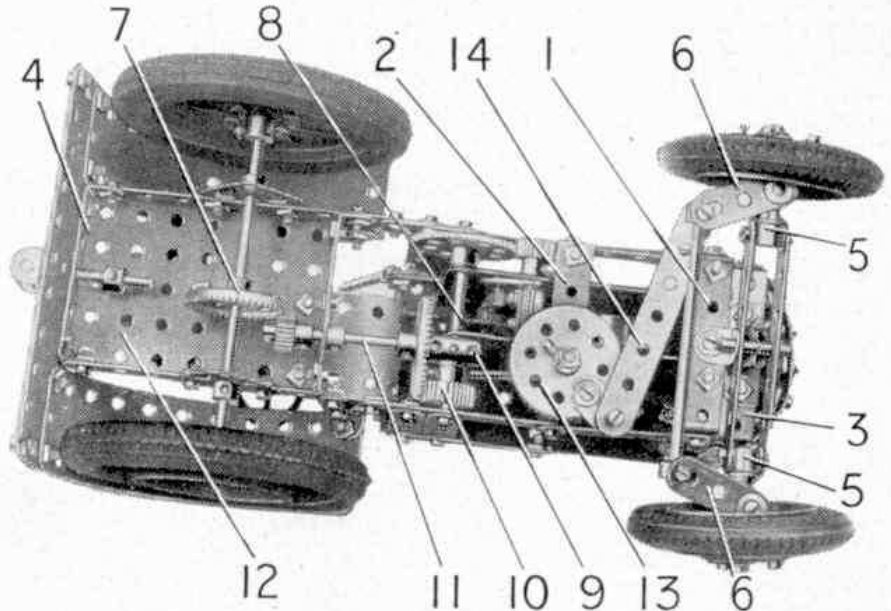


Fig. 2. The arrangement of the steering mechanism, and the drive to the rear wheels, are shown in this underneath view of the Tractor.

and realism with even a comparatively small Outfit. If a Clockwork or Electric Motor is available as a power unit it is fascinating to watch the machinery in motion, but careful choice in the selection of a subject can make even a simple hand-operated model attractive. For instance, automatic raising or lowering of the tines of the hay rake described above gives an air of realism even when the towing tractor is pushed or pulled along the floor.

Model-builders living in cities or towns who are considering agricultural implements or machines as subjects for their entries in the great 1952-53 Meccano International Model-Building Competition may well find a short trip in the country to study farming equipment at first hand well worth while.

Parts required to build model Farm Tractor and Hay Rake: 9 of No. 2; 3 of No. 3; 9 of No. 4; 6 of No. 5; 2 of No. 6; 3 of No. 6a; 6 of No. 10; 1 of No. 11; 21 of No. 12; 2 of No. 12b; 4 of No. 12c; 1 of No. 14; 1 of No. 15; 1 of No. 15b; 1 of No. 16; 1 of No. 16a; 4 of No. 17; 3 of No. 18a; 3 of No. 18b; 2 of No. 19b; 2 of No. 20a; 2 of No. 24; 1 of No. 25; 2 of No. 26; 1 of No. 27; 2 of No. 28; 1 of No. 30a; 1 of No. 30c; 2 of No. 35; 141 of No. 37; 10 of No. 37a; 51 of No. 38; 2 of No. 43; 2 of No. 46; 4 of No. 48a; 1 of No. 48d; 1 of No. 52; 1 of No. 53; 17 of No. 59; 3 of No. 62; 2 of No. 63; 1 of No. 63c; 4 of No. 90a; 6 of No. 111; 4 of No. 111c; 1 of No. 116; 2 of No. 116a; 1 of No. 120b; 1 of No. 125; 1 of No. 126; 4 of No. 126a; 1 of No. 133a; 2 of No. 137; 4 of No. 142a; 2 of No. 142b; 2 of No. 162a; 1 of No. 164; 1 of No. 185; 7 of No. 188; 3 of No. 189; 2 of No. 212; 6 of No. 215; 1 No. 1 Clockwork Motor.

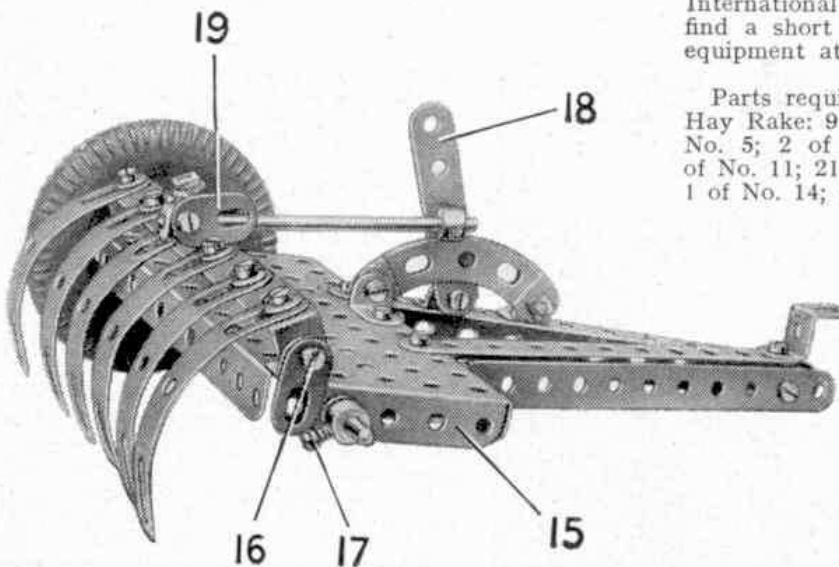


Fig. 3. One of the wheels is removed from the Hay Rake in this view in order to show the cam system that automatically raises and lowers the tines.