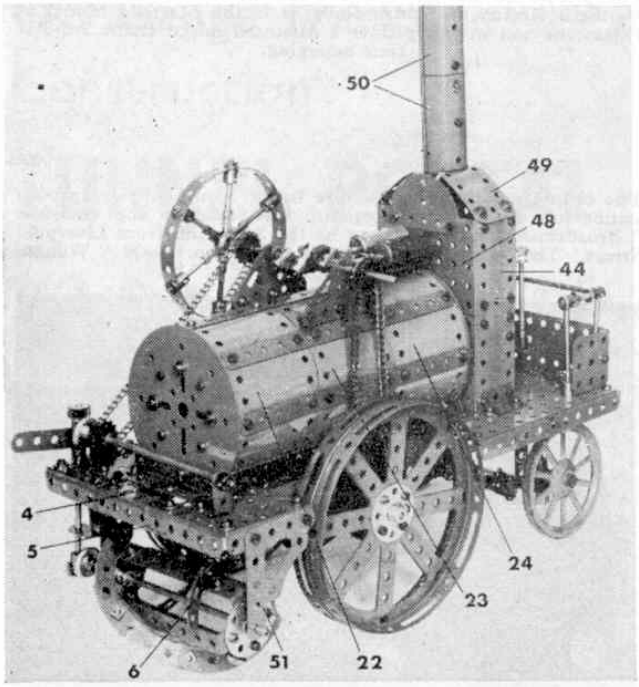


MORE THAN 100 YEARS OLD!

A ROTARY CULTIVATOR

by Spanner

Reaching back into history we have come up with this working model of an ancient steam-powered farm implement, deisgned by the engineer Rickett in 1858

A HUNDRED years ago nearly all work on the rich farmlands of Britain was done either by man or by that proven beast of burden, the horse. Mechanisation as we know it was in its infancy, but, nevertheless, the great engineers of the time were hard at work on machines designed to replace men and horse power with the infinitely greater power of steam. In 1860 the traction engine was introduced and used with considerable success, but even before this, in 1858, Rickett produced a rotary cultivator—an enormous, smoke-belching, steam-hissing monster designed to break up the earth to keep it fresh, soft and "healthy." Despite its awesome appearance, however—guaranteed to scare every horse in sight—it proved reasonably successful and became the forerunner of one of the most useful farm implements in existence today. Our model-builder has reproduced Rickett's cultivator in Meccano, using an Emebo Electric Motor to power the various working movements, and full building instructions are given below.

Chassis and steering

Bolted to each of two 12½ in. Angle Girders 1, at opposite ends, are a 2½ × 2½ in. Flat Plate 2 and a 5½ × 2½ in. Flat Plate 3, the latter projecting a distance of two holes past the end of the Girder. Plates 2 are joined by a 3½ in. Angle Girder 4 and a 6½ in. compound angle girder 5, obtained from two 4½ in. Angle Girders, each Plate also being edged by a 2½ in. Angle Girder 6. Plates 3, in turn, are joined by another 6½ in. compound angle girder 7, a 4½ × 2½ in. Flat Plate 8 and a 3½ in. Angle Girder 9, as shown. Bolted to the tops of Plates 3 is a 5½ in. Angle Girder 10, to the vertical flange of which are fixed two 1½ in. Angle Girders connected by a 5½ × 1½ in. Flexible Plate. The free flange of each 1½ in. Girder is extended by a 1½ × 1½ in. Flat Plate 11, while a Double Bent Strip is bolted to the centre of the horizontal flange of Girder 10. Another Double Bent Strip is bolted to the underside of compound girder 7 and this, along with the first Double Bent Strip, provides the bearing for a 5½ in. Rod 12, forming the steering column.

Now bolted to the underside of Plates 3 and 8 are two 2½ × 1 in. Double Angle Strips, the lower lugs of which are joined by a 4½ in. Strip 13. Fixed to each end of this Strip is a Crank 14, in the boss of which a 1½ in. Rod is secured. Mounted on this Rod, above the Strip are, in order, three Washers, a Coupling 15 and a Collar, the Rod passing through one end transverse smooth bore of the Coupling, which must be free on the Rod. Fixed in the longitudinal bore of the Coupling is another 1½ in. Rod on the end of which a Swivel Bearing 16 is mounted. The Swivel Bearings at each side are joined by a 3 in. Rod.

Lock-nutted to the upper arm of the nearside Swivel Bearing is a 2½ in. Strip 17 which is, in turn, lock-nutted to a 3 in. Strip bolted to a Crank fixed on the lower end of Rod 12. A 1 in. Screwed Rod is then screwed into one end transverse tapped bore of Coupling 15, being prevented from fouling the vertical 1½ in. Rod by a Nut. Loose on the Screwed Rod is a 3 in. Spoked Wheel 18, held in place by two lock-nuts.

Two 2 in. Perforated Slotted Strips 19 are now bolted to each Angle Girder 1 through its thirteenth and seventeeth holes, counting from the forward end. These Strips are brought to a point to provide bearings for a 6½ in. Rod serving as the rear axle. Mounted on

PARTS REQUIRED:

1—1	4—16b	4—55a	4—118
7—1b	6—18a	14—59	4—133
1—2a	4—18b	5—62	2—146a
2—4	2—19a	3—63	2—161
3—5	1—19b	6—63d	2—163
4—6a	1—20	2—70	4—164
2—8	1—23a	2—72	2—165
3—9	4—24	3—74	2—166
4—9a	2—26	1—79a	6—179
2—9b	2—29	1—80	1—185
4—9f	214—37a	2—82	1—186a
1—10	189—37b	2—90	2—188
5—12	54—38	4—90a	3—189
3—12a	2—45	1—94	6—194e
14—12b	2—46	1—95a	1—213a
4—12c	1—48b	3—96a	1—213b
2—14	4—48c	2—111	2—214
2—14a	3—53	4—111a	2—216
3—16a	1—53a	4—111c	2—235b

1 EMEBO MOTOR

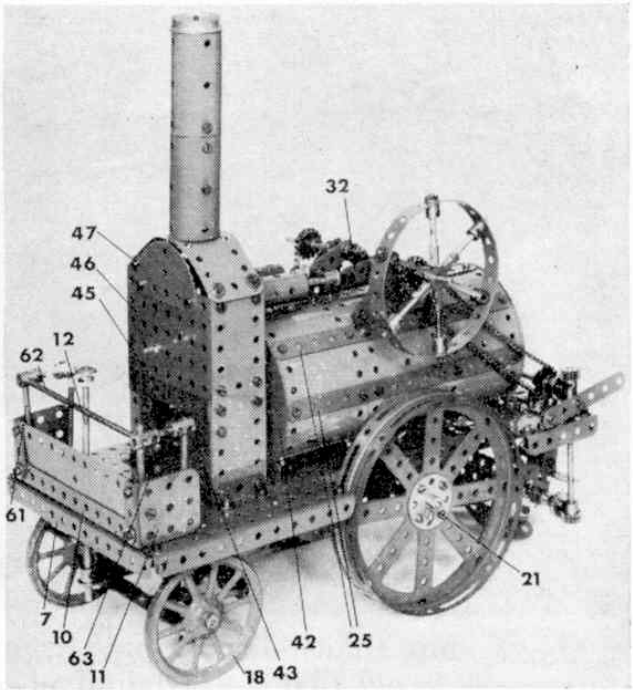
the Rod are a 3 in. Pulley and a 1½ in. Sprocket Wheel 20, in addition to the two rear road wheels, each obtained from two Hub Discs bolted to an 8-hole Bush Wheel 21. The Pulley is connected by a 6 in. Driving Band to a ½ in. Pulley on the output shaft of an Emebo Motor bolted to one Flat Plate 3 and to a Fishplate attached to corresponding Girder 1.

Boiler, crankshaft and cylinders

Next we come to the boiler and the various equipment mounted on top of it. Before describing its construction, however, I should stress that it is advisable to build the entire thing separately and then fit it to the chassis when completed. The actual boiler consists quite simply of three 10½ × 2½ in. compound plastic plates 22, 23 and 24, each obtained from two 5½ × 2½ in. Plastic Plates, connected by seven 7½ in. Strips 25. Attached by Obtuse Angle Brackets to two of these Strips, as shown, are two 1½ in. Corner Brackets 26, overlayed by a 2½ in. Strip 27.

The apex holes of these Corner Brackets provide the bearings for the crankshaft which is one of the few complicated items in the model. A 2½ in. Rod 28 is fixed in one transverse bore of a Short Coupling 29 while screwed into the adjacent tapped bore of the same Coupling is a ¾ in. Bolt carrying, in order, a Nut, a 1½ in. Strip 30, two Washers, another Nut and a Coupling 31. The Nuts should be tight against their respective Couplings, but Strip 30 must be free to move on the Bolt which, incidentally, passes through one end transverse *tapped* bore of Coupling 31. Screwed through the other end tapped bore of this Coupling is another ¾ in. Bolt carrying, again in order, a Nut, two Washers, a 1½ in. Strip 32, a further Nut and a Short Coupling 33, the latter also carrying a 3 in. Rod 34. The completed crankshaft is held in Corner Brackets 26 by Collars 35.

With the crankshaft in position two ¾ in. Sprocket Wheels 36 and 37 are mounted one on Rod 28 and the other on Rod 34. Also mounted on Rod 34 is the flywheel, built up from two 3-way Rod and Strip Connectors 38, one with and one without a boss. Six 2 in.

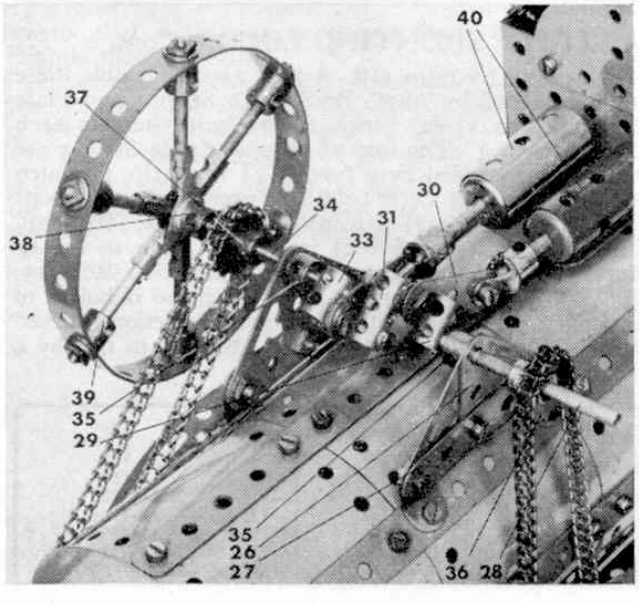


Based on a steam-driven rotary cultivator built in 1858, this intriguing model has various working movements powered by a Meccano Emebo Motor.

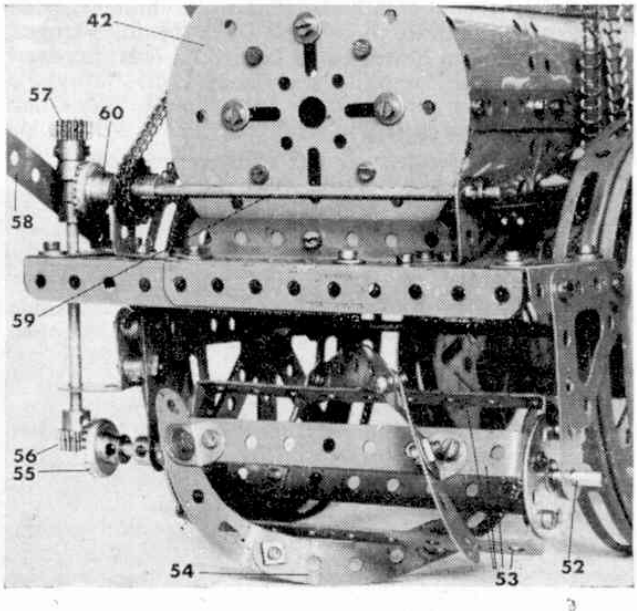
Rods are mounted in these parts, their other ends being held in Rod Sprockets 39, fixed in a 12½ in. Strip bent to form a circle. Sprocket Wheel 36 is connected by Chain to Sprocket Wheel 20 on the rear axle.

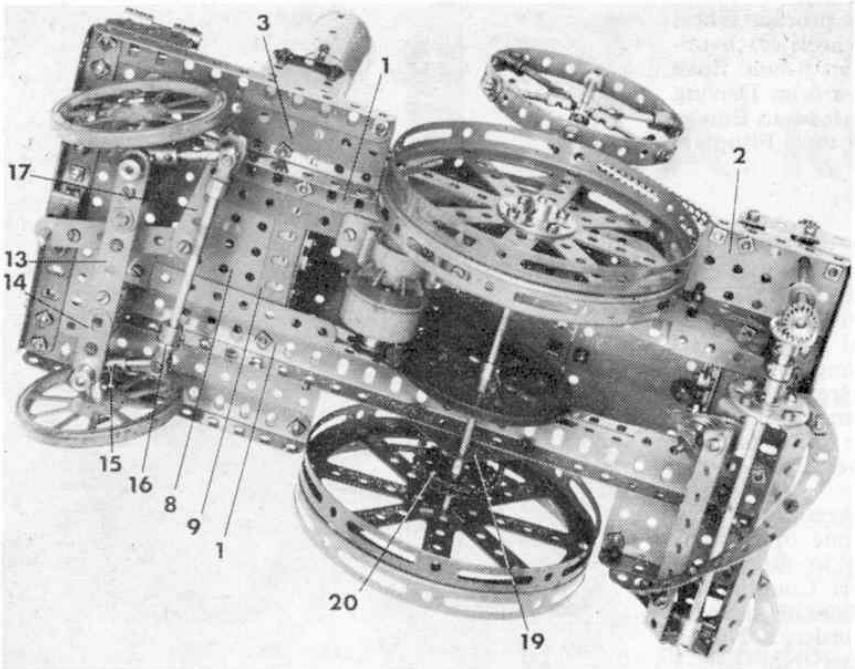
Fixed by ½ in. Bolts to top-most Strip 25, but spaced from it by a Collar on the shank of each Bolt, is a 1½ × 1½ in. Flat Plate, to which two Sleeve Pieces 40 are attached to represent the cylinders. Chimney Adaptors inserted into the Sleeve Pieces act as bearings for two 2½ in. Rods on the end of each of which

The crankshaft, flywheel and pistons, mounted on top of the boiler. Pay particular attention to the construction of the crankshaft.



The cultivator mechanism in close-up. The " rotor " is easily built and can be taken out of operation, while the Motor is running, with the special gearing provided.





An underside view of the Cultivator showing the steering mechanism, Motor-mounting and drive system.

an End Bearing 41 is mounted. These End Bearings are lock-nutted to Strips 30 and 32.

Having got this far, the main boiler plates are curved to shape and the boiler ends—two 4 in. Circular Plates 42—are added using several 1 × ½ in. Angle Brackets at each end to make the connections. The positions of these Angle Brackets coincide with Strips 25. The finished assembly is then bolted to Angle Girders 4 and 9, after which the firebox is built-up from two Girder Brackets 43, joined to a 3½ × 2½ in. Flanged Plate by a 5½ × 1½ in. Flexible Plate 44 attached to Flat Plate 3 by a 1½ in. Angle Girder. The front of the firebox is then completed by a 3½ × ½ in. Double Angle Strip 45, another 3½ × 2½ in. Flanged Plate 46 and a Semi-circular Plate 47. A further 3½ × 2½ in. Flanged Plate 48 and a second Semi-circular Plate completes the back, while the top is enclosed by two 2½ × 1½ in. Flexible Plates 49, joined together, the joining Bolts also holding two 1½ in. Strips, one on top of the other, beneath the Plates. A chimney made up of two Clinders 50, topped by a 1⅛ in. Flanged Wheel, is fixed to Plates 49 by Nuts on a 6 in. Screwed Rod running the length of the chimney.

Cultivator mechanism

The only major feature left to be reproduced is the actual cultivator mechanism. Two Corner Gussets 51 are bolted, one to each Angle Girder 1, and in these are journalled a 6½ in. Rod 52, held in place by Collars. Mounted on the Rod are two 8-hole Bush Wheels, joined by four 4½ × ½ in. Double Angle Strips 53 to which two spiral blades are fixed by Angle Brackets. Each blade consists of two 2½ in. Stepped Curved Strips connected by a 2½ in. Curved Strip 54, all bent to shape. Fixed on the end of Rod 52 is a ¾ in. Contrate Wheel 55.

Attached by two ½ in. Bolts to nearest Corner Gusset 51, but spaced from it by two Washers and a Collar on the shank of each Bolt, is a 1 × 1 in. Angle Bracket. Journalled in this and in corresponding Plate 2 is a 4 in. Rod carrying two ½ in. Pinions 56 and 57, one at each end, and three Collars side-by-side, the centre one free on the Rod. Screwed into one tapped bore of this centre Collar is a Bolt carrying a loose 3 in. Strip 58, one end of which is lock-nutted to one Angle Bracket bolted to Angle Girder 6. Two 1 × 1 in. Angle Brackets are bolted one to each Plate 2 to provide bearings for a 5½ in. Rod 59, carrying a ¾ in. Sprocket Wheel, and held in place by a Collar and a ¾ in. Contrate Wheel 60 spaced from the nearby Angle Bracket by two Washers. The Sprocket Wheel is connected by Chain to Sprocket Wheel 37. Movement of Strip 58 should move Pinions 56 and 57 in and out of mesh with Contrates 55 and 60, simultaneously.

Finally, a 1¾ in. Steering Wheel is mounted on the upper end of Rod 12 and a safety rail for the driver is built up as follows: four Rod Sockets, each carrying a 2½ in. Rod 61 are fixed to the "footplate" and four Short Couplings are mounted on their upper ends. These Short Couplings are then joined, as shown, by a 5 in. Screwed Rod 62 and two 1 in. Rods 63.

A LITTLE SHUNTING LOCO.—Cont.

Lastly we have the cab. A 2½ × 2½ in. Flexible Plate 12 is attached by Angle Brackets to Strip 4 and Plate 8, while two 2½ in. Strips 13 are bolted one to each end of Strip 4. The lugs of Double Angle Strip 3 are then each extended by a further 2½ in. Strip, to which a Flat Trunnion 14 is bolted. Trunnions 14 are connected by another 2½ × ½ in. Double Angle Strip and, to this, is bolted a 2½ × 2½ in. Plastic Plate 15 that is curved under and wedged above Strips 1 and 13. Finally, a 2½ in. Stepped Curved Strip 16 is bolted to the upper edge of Plate 12 and a U-section Curved Plate 17, straightened slightly, is attached to this by a Double Bracket.

PARTS REQUIRED:

4—2	4—22	2—48a	2—188
5—5	1—24	1—90a	2—189
2—10	4—35	2—111c	2—190
1—11	35—37a	1—125	1—194a
8—12	33—37b	2—126	1—199
2—17	10—38	2—126a	1—212