MECCANO Magazine

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MAP HOBBY MAGAZINE

FRONT COVER

Artist Laurie Bagley captures the Spectrum Pursuit Vehicle racing up a hill with the Spectrum Patrol Car just about to close up behind it. Both these exciting television series vehicles, are made as Dinky Toys.

NEXT MONTH

Watch out for the very picturesque, Napoleonic Battle Gaming cover. Charles Grant describes Battle Game rules and model soldier fans will be pleased with a feature on how to build and detail a Napoleonic plastic soldier kit. Meccano models include a really realistic tram for advanced enthusiasts and a simple plastic crane for the novice. Among the Model Builders will have yet more interesting ideas from readers, written up by the ever-popular Spanner. Railway modellers will have a real bonanza with the A.B.C. of Model Railways describing station track layout, while OO gauge Trackside Construction describes the use of reinforced plaster scenic materials. For the young and old railway modeller alike, Two Approaches to Railway Modelling describing the past and present attitudes will be invaluable. Great Engineers, Have you Seen, Dinky Toy News and Book Reviews make this an issue not to be missed.

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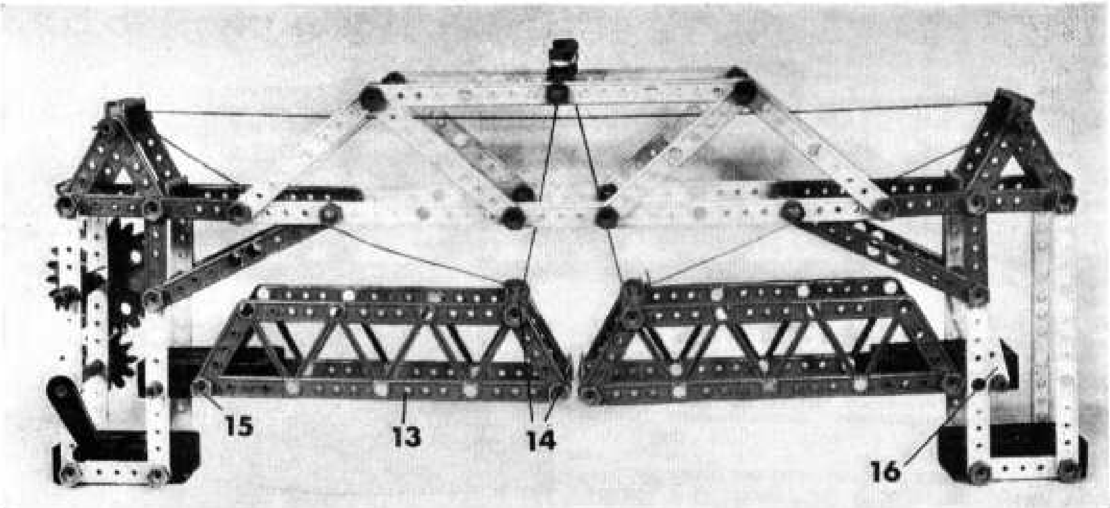
MODEL AERONAUTICAL PRESS LTD.

13-35 BRIDGE STREET, HEMEL HEMPSTEAD, HERTFORDSHIRE

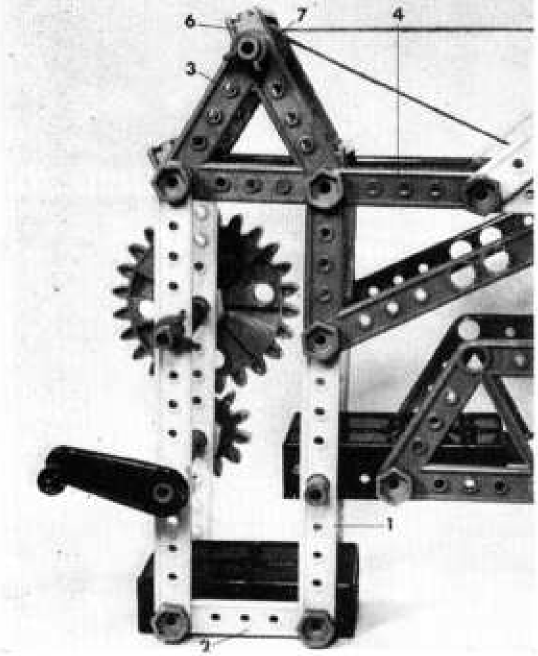


BUILD A BASCULE BRIDGE

by Spanner

A working model that can be built from a Plastic Meccano Set C. Study the operation of a real lifting arm bridge in miniature, easy to construct and operate

BRIDGES—DO you ever think about them? I must admit that I don't often do so and I doubt if many other people do so, either. We tend to take them for granted, yet ever since man learned to travel, bridges have been one of the most essential constructions in existence. You can build as many roads and railways as you like to make travel quick and easy, but unless you have bridges to carry them over natural obstacles such as rivers, gorges, etc., those roads and railways would never take you very far.



Bridges, therefore, are very necessary, particularly in these days of high-speed, long-distance transportation. They are also typical engineering structures and, as such, make excellent subjects for Meccano modellers. In fact, we have featured innumerable bridges of all types in *Meccano Magazine* over the years, but these have all been built with standard metal Meccano —never with the junior Plastic system. I thought it was about time this situation was rectified and so I present the working Bascule Bridge described below. A Bascule Bridge, incidentally, is one which has lifting arms or "bascules" and the example illustrated here can be built with Plastic Meccano Set C.

One of the many good things about Plastic Meccano is that, with it, it is possible to build good, big models which are nonetheless very simple in design and use comparatively few parts. Our bridge is no exception. Two towers are each built up from four 4-hole Strips 1, bolted two to each side of a Base. Note, however, that each pair of Strips is spaced from the Base by a 2-hole Strip 2. Fixed to the top of each pair of Strips is a 2-hole Triangular Girder 3, the inner securing Bolt also holding a 3-hole Triangular Girder 4 in position as well as a Double Angle Strip 5, the latter joining the sides of the tower. A similar Double Angle Strip is held by the outer securing Bolts.

Held by Axle Clips in the apex holes of Triangular Girders 3 is a 4½ in. Axle carrying a Double Angle Strip 6 and, in the case of one of the towers, two Pulley Wheels 7. Only one Pulley Wheel 8 is carried on the Axle in the other tower.

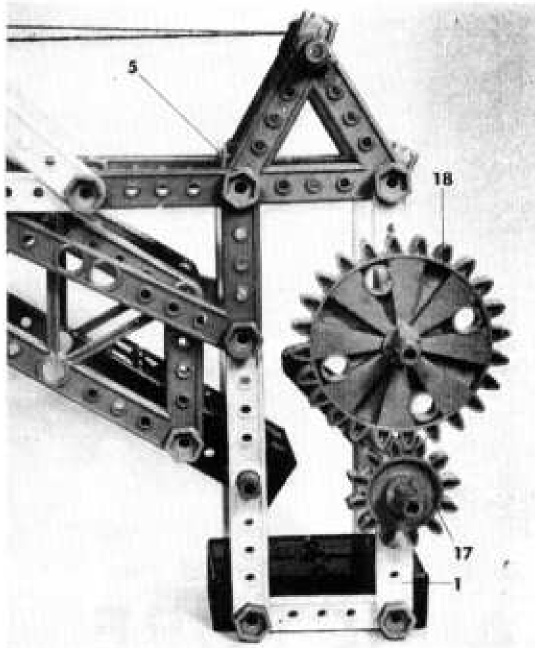
PARTS REQUIRED:

8—2-hole Strips	3—Pulley Wheels
8—3-hole Strips	8—Axle Clips
8—4-hole Strips	4—4½ in. Axles
6—5-hole Strips	4—2-hole Triangular Girders
4—Bases	2—6 in. Axles
49—Bolts	1—Handle
4—1 in. Bolts	1—24-teeth Gear Wheel
51—Nuts	1—12-teeth Gear Wheel
2—Angle Brackets	4—Bridge Girders
10—Double Angle Strips	4—3-hole Triangular Girders

Two special braced girders are now each built up from two 5-hole Strips 9, overlapped two holes and connected to a third 5-hole Strip 10 by four 3-hole Strips 11, positioned as shown in the accompanying pictures. The braced girders are then used to join the towers by being bolted between 3-hole Triangular Girders 4, the braced girders themselves being joined by a 3-hole compound strip 12, obtained from two 2-hole Strips and attached to Strips 10 by Angle Brackets.

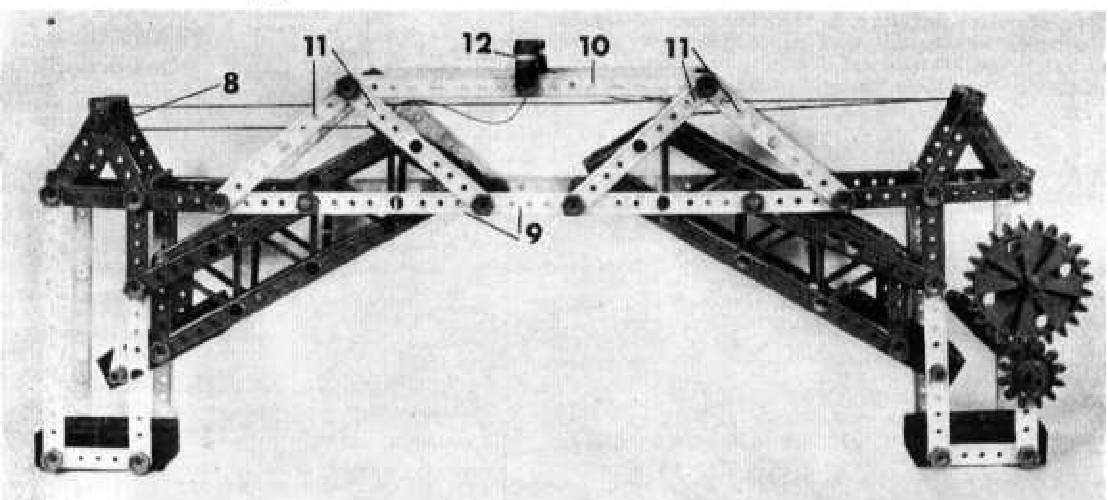
Next we come to the bascules or lifting arms, both of which are similarly and very easily built: two Bridge Girders 13, joined at one end by two Double Angle Strips 14, are bolted to a Base 15—that's all! The actual fitting of the bascules to the main structure, however, requires a little more concentration as the method used differs slightly between the two towers. In one a 4½ in. Axle, held by Axle Clips in Base 15, is journalled in the second holes in inner Strips 1, but, in the other, a similar 4½ in. Axle is journalled in two 2-hole Strips 16 bolted to inner Strips 1. This is to bring the pivot point of the latter bascule backwards a little so that a small gap is left between the bascules, when in the lowered position, to prevent them locking together. Lengths of cord tied to upper Double Angle Strips 14 and compound strip 12 prevent the bascules from dropping past the horizontal lowered position.

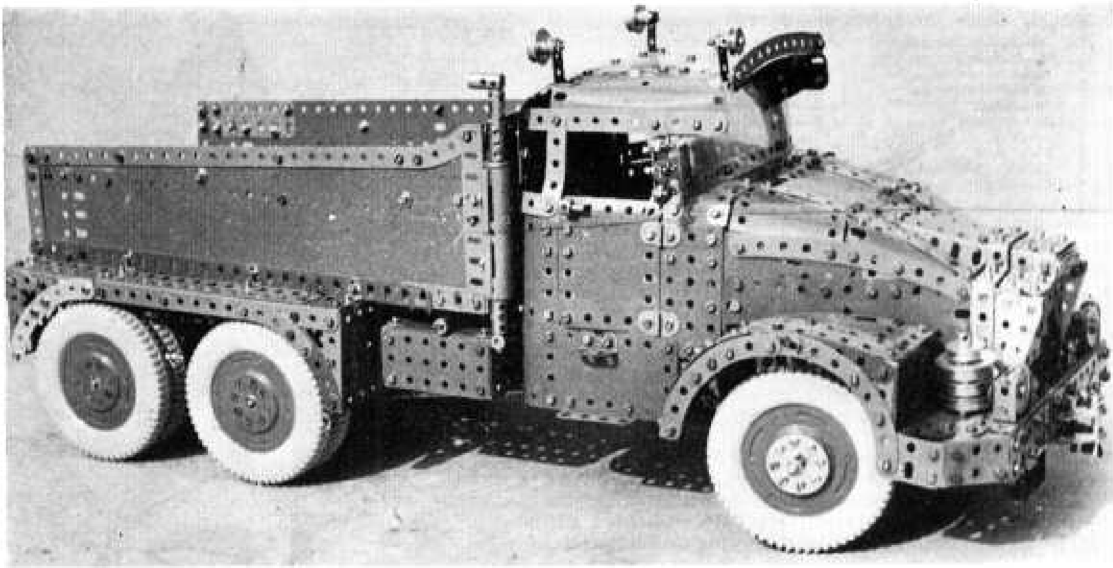
Finally, we have the operating mechanism for the bascules which, again, is very simple. A 6 in. Axle carrying a 12-teeth Gear Wheel 17 and a Handle is mounted in outer Strips 1 of one of the towers. Gear Wheel 17 engages with a 24-teeth Gear Wheel 18 on another 6 in. Axle also mounted in outer Strips 1. Attached to this latter Axle are two lengths of cord, both of which pass over Pulleys 7 and one being tied directly to upper Double Angle Strip 14 in the nearest bascule. The other cord is taken the full length of the bridge and is passed around Pulley Wheel 8 before being tied to the upper Double Angle Strip in the remaining bascule. It is important to remember, by the way, that, if both sections of the bridge are tò open together, the lengths of the cords must be such that both cords tighten at exactly the same time, not one before the other.



The two close-up views of the "control" tower show its simple but adequate construction. Note the Gear Wheels used to transfer the drive from the Handle axle to the winding drum axle.

Below, and at top of opposite page. This model Bridge has lifting bascules or arms controlled by a Handle built into one of the towers. You can construct this with Plastic Meccano Set C.

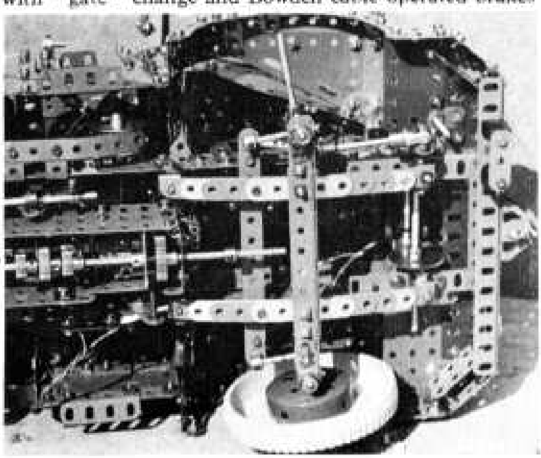




A PICTURE OF POWER

Meccano Magazine reader P. W. BRADLEY describes the main features of his self-designed model, based on the Scammel "Contractor" heavy tractor.

MAN HAS a disturbing habit of biting off more than he can chew, and I had this thought very much in mind when I set myself the task of reproducing in Meccano one of the most powerful vehicles on Britain's roads today. It was, I knew, an ambitious project. The very complexity of the prototype would require the use of an enormous number as well as variety of parts and, of course, any detailed model of a complicated vehicle must automatically be complicated itself. Yet, in spite of this, the model had to be "driven" realistically by quite young children and so over-complexity of the mechanical features had to be avoided. Comparative simplicity, in fact, was essential—despite intricate mechanisms such as constant-mesh gearbox with "gate" change and Bowden cable-operated brakes



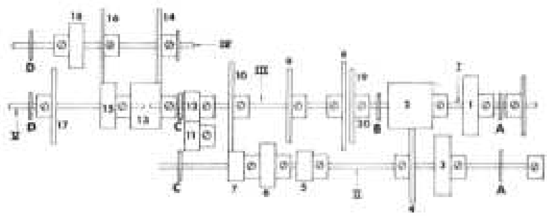


DIAGRAM OF GEARBOX
(8 Forward, 2 Reverse Speeds)

Nos. ON DIAGRAM	PART No.
19	24
6,15,18	25
13	25a
2	25b
5,7,11,12	26
4,9,14,16,17	27
8,10	27a
1,3	31
20	59

SHAFTS

I (not sliding) Journalled A and B.
II (sliding) Journalled A and C.
III (not sliding) Journalled C and in Wheel Disc bolted to Gear 8 and running on Shaft I.
IV (sliding) Journalled C and D.
V (not sliding) Journalled D and in bore of Pinion 13 on Shaft III.

A, B, C and D represent bearings in which Shafts are Journalled.

SUMMARY OF GEAR RATIOS

PRIMARY DRIVE
(Shaft I to III via II)

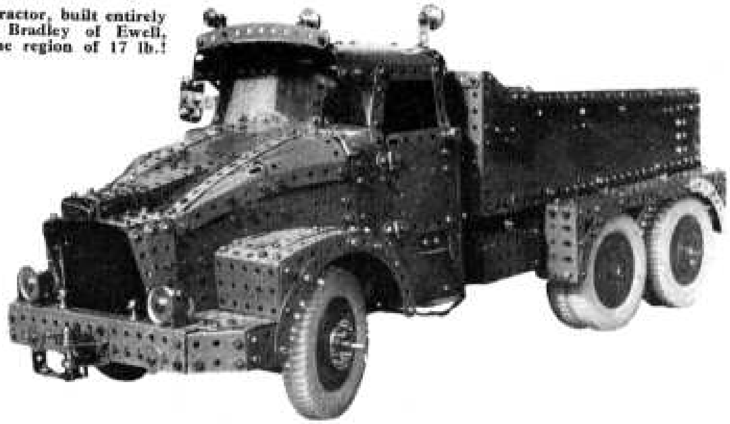
Position of Shaft	Gears in mesh	Direction and ratio
1 (rearmost)	2,4,7,11,12	2:1 reverse
2 (as drawn)	2,4,7,10	6:1 forward
3	2,4,6,9	4:1 forward
4	1,3,6,9	2:1 forward
5 (foremost)	1,3,5,8	3:1 forward

SECONDARY DRIVE
(Shaft III to V via IV)

Position of shaft	Gears in mesh	Ratio
Rearmost	13,14,17,18	4:1
Foremost (as drawn)	13,14,15,16	1:1

OVERALL RATIOS—Forward: 24, 16, 12, 8, 6, 4, 3 and 2:1. Reverse: 8 and 2:1.

A Scammell "Contractor" heavy haulage tractor, built entirely from current Meccano parts by P. W. Bradley of Ewell, Epsom, Surrey. It weighs something in the region of 17 lb.!



being perfectly feasible in Meccano.

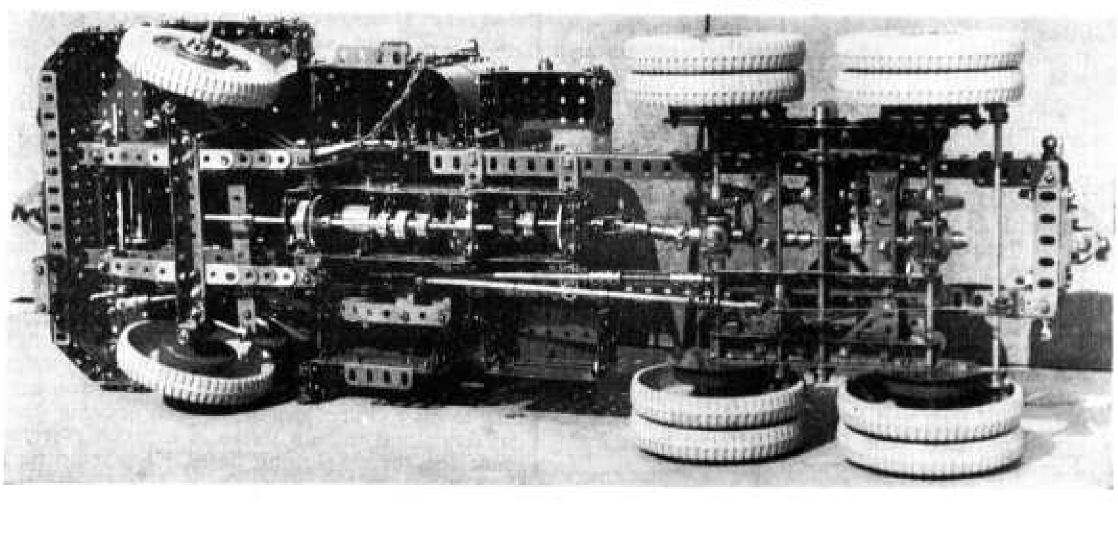
Problems, I felt sure, would arise, but nothing ventured, nothing gained, so I started work. Surprisingly, problems were few and easily overcome and, in due course, the working Scammell "Contractor" shown in the accompanying photographs took shape, was improved and was finally completed.

Two 26½ in. compound channel girders, with a 1 × ½ in. cross-section, serve as the mainframe side-members. Several cross-members keep them rigidly connected, one being a particularly heavy-duty example to take the drawbar coupling. The steering gear is shown in one of the photographs, from which it can be seen that the Couplings carrying the stub axles have the steering "king pin" rods passed through their central transverse bores. Carried in the inner end transverse bores of the same Couplings are short rods to which a compound strip, forming the track rod, is pivotally connected, as shown. Consequently, the distance between these pivots is half an inch less (¼ in. each side) than the distance between the king pins, thus giving correct Ackermann steering, where the angle of the inner wheel exceeds that of the outer wheel, when cornering, to an extent proportional to the turning circle.

Ackermann steering in this Meccano form first appeared in the M.M. in 1928, and in the ensuing 40 years I have used it many times. The same effect can, in theory, be achieved by securing Cranks to the king pin rods at an appropriate angle, but in a heavy model there is always a risk of their slipping. The 40-year-old idea used here, however, is absolutely positive.

In Meccano models of motor vehicles, it is usual to gear the steering column to the horizontal (drop-arm) Rod by means of contrate, bevel, helical or worm gearing. While all these methods are perfectly adequate in most cases, it is true to say that the realism of the final steering ratio can leave something to be desired. With any of the first three examples, one turn or less of the steering wheel moves the road wheels from lock to lock. In the case of worm drive, too many turns are necessary and the drive, as you will know, is completely irreversible, resulting in no "steering feel." Realistic driving in the Scammell was insisted upon from the beginning and it was achieved by first using a ½ in. Pinion and a 50-teeth Contrate Wheel, as shown. From the Rod carrying the Contrate, the movement is transferred to the drop-arm shaft below by 3:1 ratio gearing using a ½ in. Pinion and a 57-teeth Gear Wheel. The final steering ratio is perfectly acceptable.

Below, an underside view of the Scammell showing the steering gear, gearbox, three differentials and other details. At left, a close-up view of the front suspension and steering gear. Note that one road wheel has been removed to show the stub axle.



Motive power is supplied by an E15R Electric Motor connected to the gearbox by worm and chain drives, as can be seen. The gearbox arrangement itself is shown in the accompanying drawing and, as on the prototype, incorporates eight forward and two reverse speeds. I must admit, though, that the design is not wholly original, being a development of a four-speed box featured in the November 1951 M.M., and it has certain disadvantages. One is that the second and third ratios in the primary box are out of sequence and another, always very difficult to overcome, is that the reverse ratio is the same as top forward gear instead of being equivalent to first forward gear. On the other hand, this design does give a smooth progression of forward ratios, and is certainly not difficult to make, particularly in that it does not demand extreme accuracy in the positioning of the Gear Wheels and Pinions on their Rods.

In some ways the hind bogie was the most interesting part of the model as it includes—like the original—a third (inter-axle) differential mechanism which can be locked from the cab. All three differentials are built up in the usual way from ¾ in. Pinions and ¾ in. Contrate Wheels, as described in the Motor Chassis article in last month's issue. The inter-axle unit, however, is built onto a drilled 50-teeth Gear and is offset 1 in. towards one side of the lorry so that the input shaft carrying its driving ¾ in. Pinion is central. Its two output shafts carry ½ in. Helical Gears which engage drilled 1½ in. Helical Gears onto which the main axle differentials are built.

The above-mentioned locking mechanism for the inter-axle differential necessitated the fitting of a 50-teeth Gear Wheel to its rear output shaft in addition to the 1½ in. Helical Gear. The input shaft alongside this 50-teeth Gear is extended rearwards by a Keyway Rod to which a ¾ in. Pinion is Key-bolted. This Pinion is free to slide on the Rod, being controlled by a built-up fork actuated through rodding from the cab, and when in mesh with the Gear, it causes the differential planetary Pinions and one output shaft to rotate as one. In other words, it locks the differential, transforming the complete unit into a normal straight-through axle.

Also of interest is the brake gear acting on the four rear wheels. Each shoe consists of several 3 in. Stepped Curved Strips bolted together and acting on the inner surface of the rim of the corresponding 4½ in. Road Wheel. This gives a much more powerful braking effect than is possible with the usual "small area" brake shoes acting in Wheel Flanges.

Finally, some of those enthusiasts who have enjoyed the Meccano hobby since the Twenties say that the system is "not what it used to be." I do not share this view, even though certain pre-war parts are inevitably mourned. For instance, the differential lock and powerful brakes of this model would not have been feasible without parts introduced in comparatively recent years.

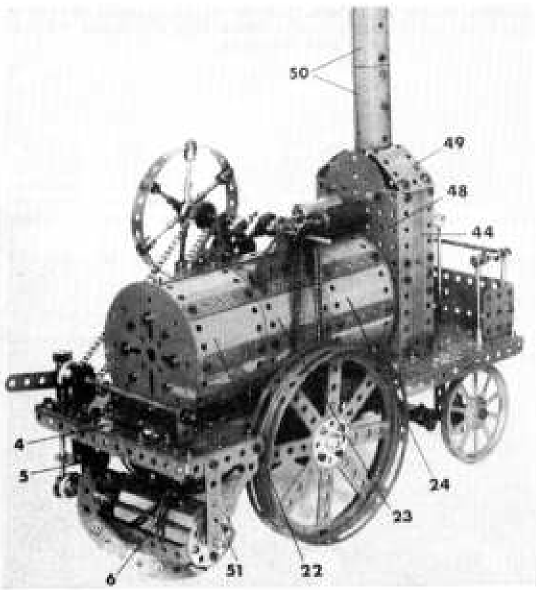
LIGHTNING

By E. R. Yarham

Did you know that lightning travels at a speed of 72,000,000 miles an hour, or that the air inside a stroke of lightning may be heated as high as 30,000 degrees? If not, read on.

HERE'S WHY it's no use trying to get away from a "Streak of Greased Lightning," and why there is really no need to bother. The average flash of lightning is two miles long, but takes only one ten-thousandth of a second to travel that distance. This works out to a speed of 72,000,000 m.p.h.; this and many other things are among the findings of a team of South African scientists who made a study of lightning.

Not much hope of outdistancing a lightning flash, then, even if one did get the wind up. Actually there is no need for this, because the average risk works out at one in four million. If you would like to get a clearer idea of the odds of being struck, sit down and make a stroke of a pencil every second, one for a lightning flash. Keep it up for 24



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

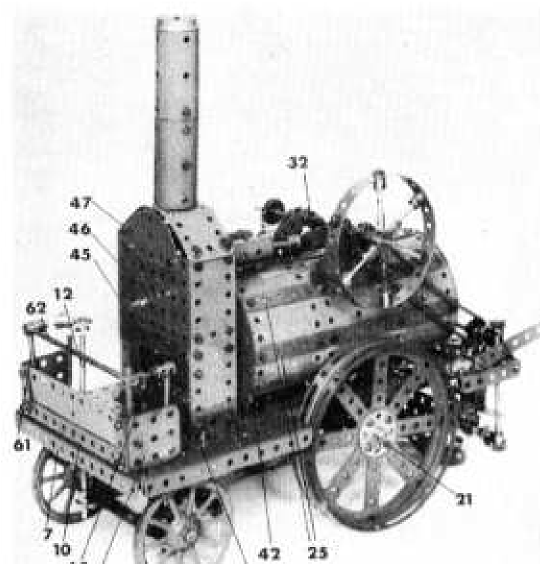
the Rod are a 3 in. Pulley and a 1½ in. Sprocket Wheel 20, in addition to the two rear road wheels, each obtained from two Hub Discs bolted to an 8-hole Bush Wheel 21. The Pulley is connected by a 6 in. Driving Band to a ½ in. Pulley on the output shaft of an Emebo Motor bolted to one Flat Plate 3 and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

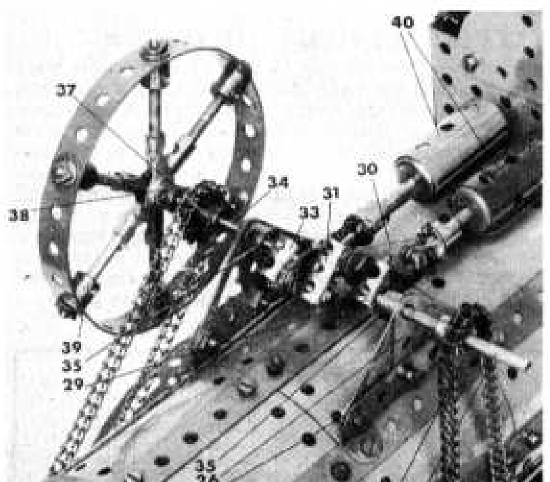


Based on a steam-driven rotary cultivator built in 1858, this intriguing model has various working movements powered by a Meccano Emebo Motor.

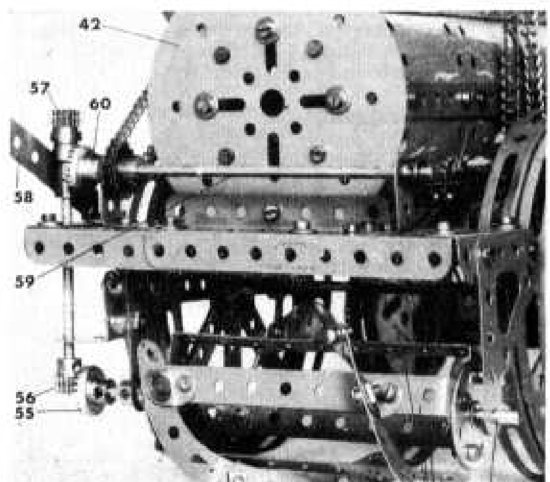
Rods are mounted in these parts, their other ends being held in Rod Sprockets 39, fixed in a 12½ in. Strip bent to form a circle. Sprocket Wheel 36 is connected by Chain to Sprocket Wheel 20 on the rear axle.

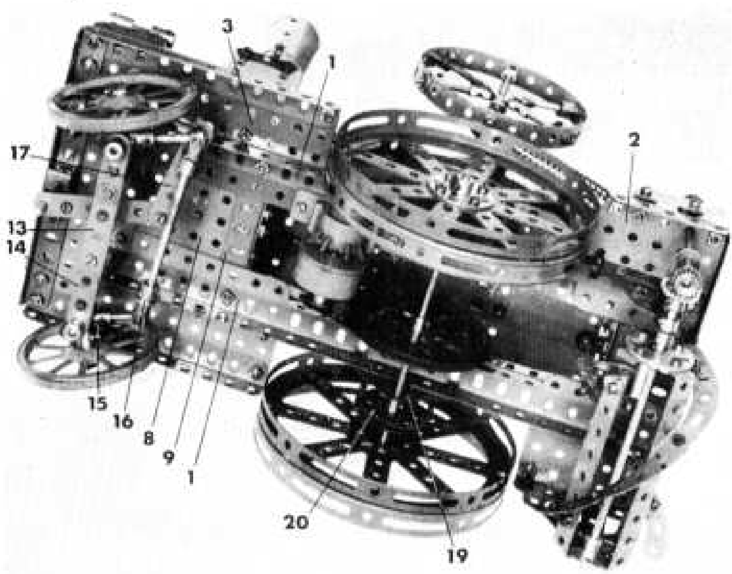
Fixed by ½ in. Bolts to top-most Strip 25, but spaced from it by a Collar on the shank of each Bolt, is a 1½ × 1½ in. Flat Plate, to which two Sleeve Pieces 40 are attached to represent the cylinders. Chimney Adaptors inserted into the Sleeve Pieces act as bearings for two 2½ in. Rods on the end of each 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 ⅜ 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.

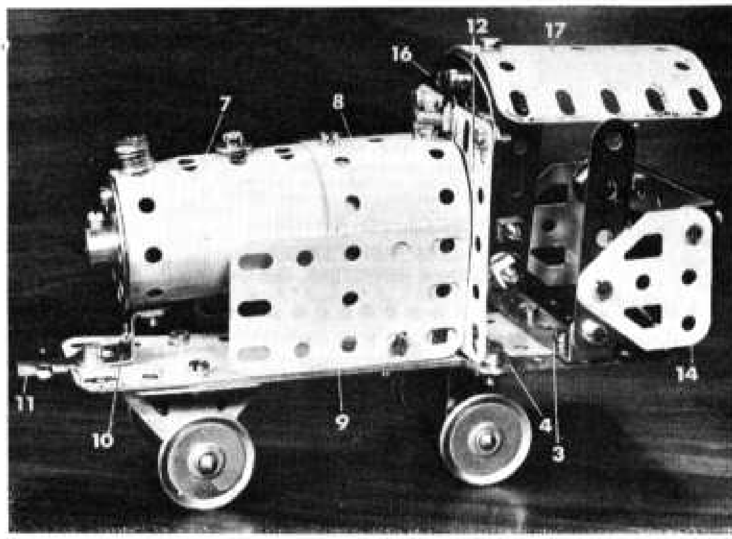
PARTS REQUIRED:

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

Rebuilt from the December 1955 Meccano Magazine

A LITTLE SHUNTING LOCOMOTIVE

by Spanner



Included specially for the younger readers, this small and simple, but realistic, model can be built with Outfit No. 2

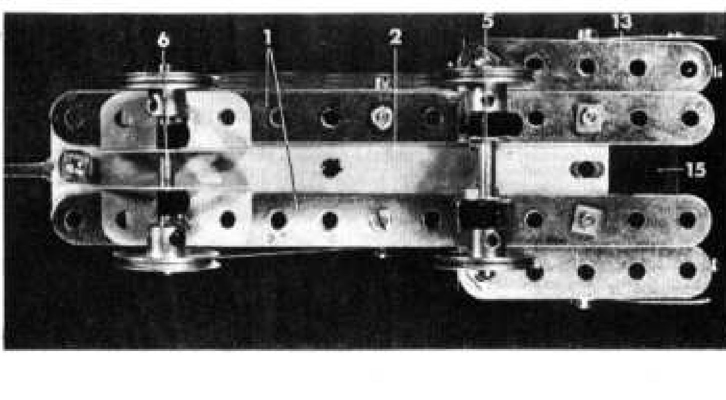
EVEN IN these days of space travel, rocket-ships and nuclear power, it's safe to say that most mechanically minded people still like the good old steam engine. On the railways, for example, you have diesel locomotives and electric locomotives as well as diesel electric locomotives—big, powerful machines, all—but they don't create much interest. Take one of the rare occasions when a now almost obsolete steam engine makes it appearance, however, and you'll find all sorts of people gazing at it with delight. They can't help it. There's something fascinating about a big, whistling monster roaring on its way amidst clouds of dense smoke, white steam and soot!

We have often featured railway engines in *Meccano Magazine* and, as the M.M. was going long before the advent of diesel or electric locomotives, most of these have been based on steam engines. One such example, built with Meccano Outfit No. 2, appeared in the December 1955 issue and it looked so good for a simple model that I decided to feature it here in a very slightly modified form.

Described originally as a " Shunting Locomotive " the model is very easy to build. The chassis consists of two $6\frac{1}{2}$ in. compound strips 1, each obtained from two $5\frac{1}{2}$ in. Strips, which are joined by a $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 2. Bolted to the top of the Plate is a $2\frac{1}{2} \times \frac{1}{2}$ in. Double Angle Strip 3 and a $2\frac{1}{2}$ in. Strip 4, the Bolts securing the latter also fixing two Angle Brackets to the underside of Strips 1. The free lugs of these Angle Brackets are extended by Fishplates which provide bearings for a 2 in. Rod 5, held in place by Spring Clips. A 1 in. Pulley with Boss is mounted on each end of this Rod, while two similar 1 in. Pulleys are mounted on another 2 in. Rod 6, held by Spring Clips in two Trunnions bolted towards the forward ends of Strips 1.

In the case of the boiler, a $2\frac{1}{2} \times 2\frac{1}{2}$ in. Flexible Plate 7 is curved to form a cylinder and is bolted to a shaped $5\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plate 8, attached to the chassis by Angle Brackets. The Bolts fixing the Plate to the Angle Brackets also hold two $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flexible Plates 9 in position, one each side. At the front, the boiler is connected to the chassis by a Reversed Angle Bracket 10, the lower securing Bolt fixing a Rod and Strip Connector 11 in place at the same time. The front of the boiler is enclosed by an 8-hole Bush Wheel, attached by an Angle Bracket. Note, however, that a $\frac{3}{8}$ in. Bolt is used to fix the Angle Bracket to the boiler, five Washers being carried on the shank of the Bolt to represent the chimney. *(Continued on opposite page)*

Rebuilt in slightly modified form from the December 1955 Meccano Magazine, this delightful little locomotive is produced from parts contained in Meccano Outfit No. 2.



An underside view of the locomotive showing the layout of the chassis and the 0-4-0 wheel arrangement.