

# 9-Speed and Reverse Gearbox

Described by the Editor

Designed by **Andreas Konkoly**

This model published in 1959 April the French Meccano Magazine firstly. They called in French: 'Boite à 12 Vitesses'. It is incredible: how pass away the time! **Andreas Konkoly**

**HEAVY-DUTY VEHICLES**, machine tools, drilling machines, etc, all need a wide range of speeds. It was with this special need in mind that this mechanism was designed. The ratios provided are:

FORWARD		REVERSE
12:1	2:1 2:3	2:1
8:1	1:1 1:3	1:3
3:1	4:3 1:9	3:1

## BUILDING INSTRUCTIONS

### THE GEAR SHAFTS

A 3½" Perforated Strip is bent at a right-angle between holes 2 & 3, and is secured by two Bolts to the 5½" X 2½" Flanged Plate (Figs. 2 & 4).

Referring to Fig. 4, place between the two 2½" Flat Plates the following parts:

Above from left to right: a Rod-with-Keyway is extended by a 2" Rod attached to it with a Coupling. The order of the Gears — all of which are fitted with Key Bolts — is then: a ½" Pinion, a 1½" Gear, and a ¾" Pinion; these are followed by a Collar without its Grub Screw. The next item on the Rod is the end hole of the right-angled Strip mentioned above, which is followed by a Washer, a 60-tooth Gear fixed to the Keyway Rod by its Grub Screw, a ½" Pinion, a Coupling, a 1" Gear, another ½" Pinion, and finally, a Washer.

Below from left to right: a 3½" Rod is freely journalled in the bore of a ½" Pulley-with-Boss, which is fixed by its boss section only to the end of the other Keyway Rod. The order of the parts on the Rod is then: a ¾" Sprocket Wheel, two Collars, three Washers, two more Collars, another Washer, the 2½" Flat Plate, and a further Washer. These are followed by a 1½" Gear Wheel, a ½" Pinion, a 1¼" Gear Wheel, a Washer, a ½" Pulley-with-Boss, and a Washer; all four bossed parts just mentioned are fixed to the Rod by their Grub Screws. The Rod then passes through the right-angled Strip, after which the following parts — all with Key Bolts — are fitted: a 15-tooth Pinion, a 1½" Gear Wheel, a 1" Gear, and a ½" Pinion. These are followed by a Collar, the other 2½" Flat Plate, and finally, a small Fork Piece.

### THE REVERSING LAYSHAFT

Between the upper and lower gear shafts, the ½" Pinion which serves as the reversing idler, runs on a ¾" Bolt.

### THE SHIFT LINKAGE

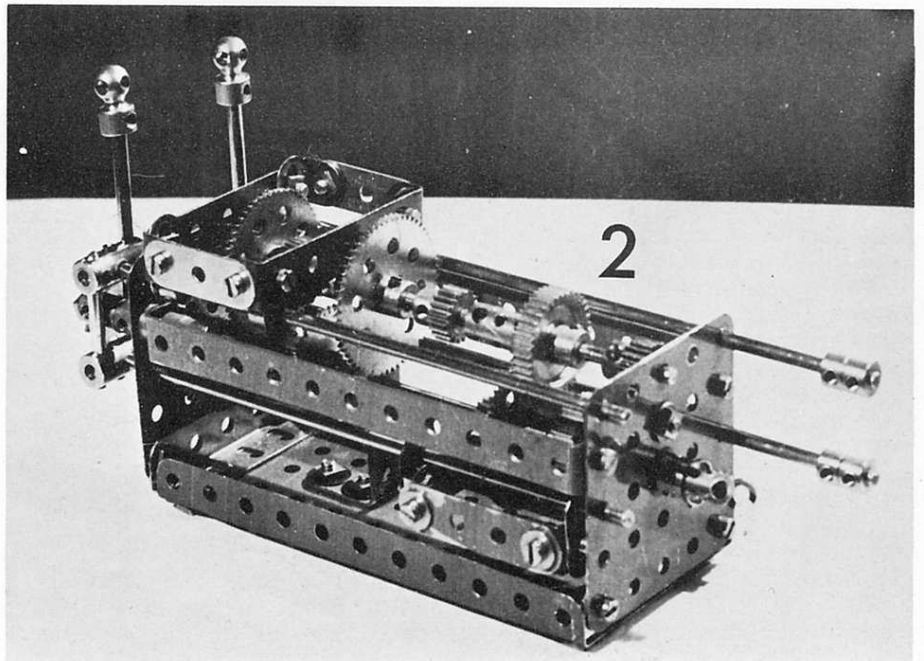
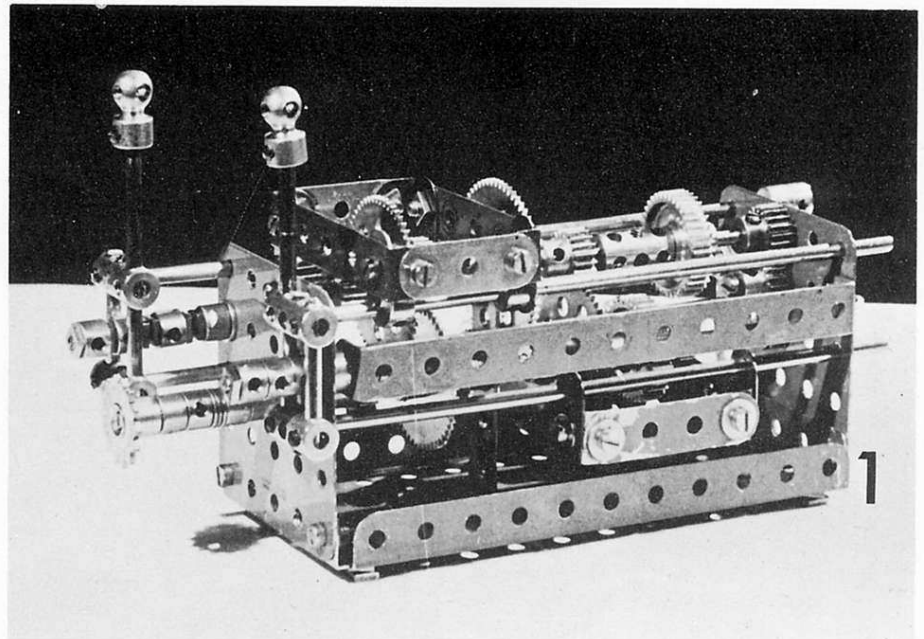
The above-mentioned Gears with Key Bolts are slid along the Keyway Rods by means of the frames shown in Fig. 5. The frames are actuated by the gear shift levers seen at the right of that picture.

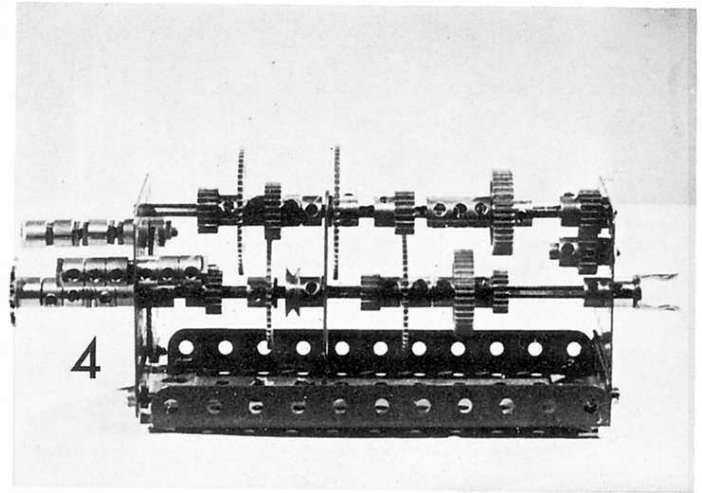
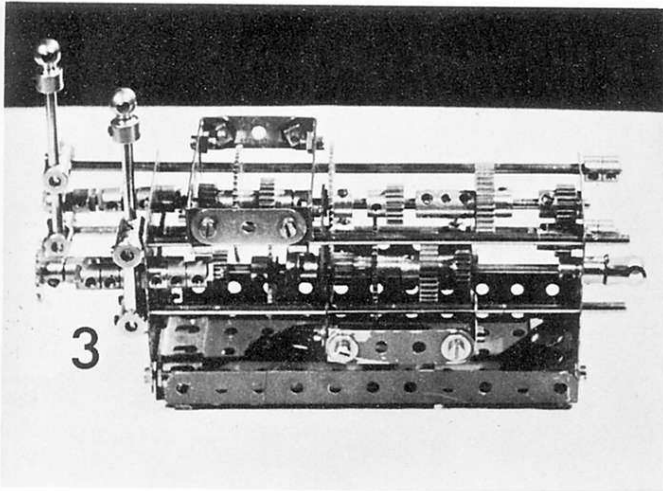
The frames are situated on shafts as shown in Fig. 5, the nearer pair

being 8" Rods, and the farther pair 6½" Rods. The upper frame is fixed to the upper 6½" Rod by two Collars, and the lower frame is similarly fixed to the lower 8" Rod.

The gear shift levers (Figs. 1 & 5) are each composed of two Couplings joined as shown by a 3" and a 1½" Rod. A pair of Handrail Couplings form the knobs.

Between both Coupling units there is a specially-constructed shaft composed of Collars and Washers locked to a 2" Screwed Rod by Nuts. The exact order of





parts on these Rods is as follows:

The Collar row on the left: Nut, Collar, Nut, Collar, 2 Nuts, Collar, 2 Nuts, Collar, Washer, 2½" Flat Plate, end lug of a 5½" Double Angle Strip, and finally, a Nut.

The Collar row on the right: Nut, 3 Collars, Nut, 2½" Flat Plate, Collar, end lug of another 5½" Double Angle Strip, 2 Collars, and a final Nut.

**COMPLETION AND OPERATION**

The other lugs of the Double Angle Strips are fixed to the other Flat Plate as shown in the illustrations.

The required ratio is set with the

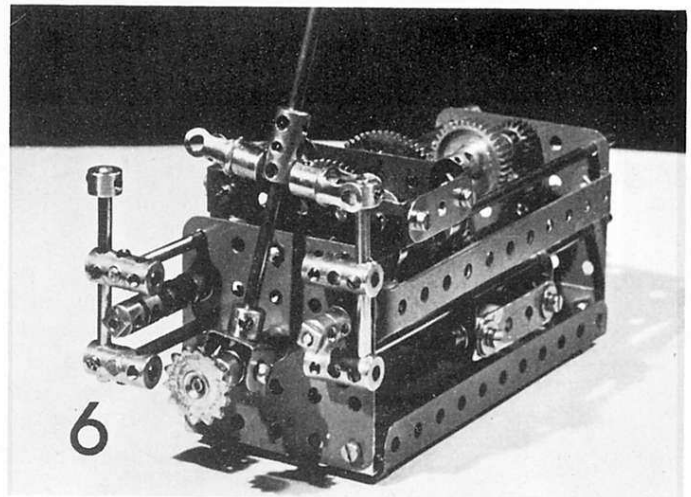
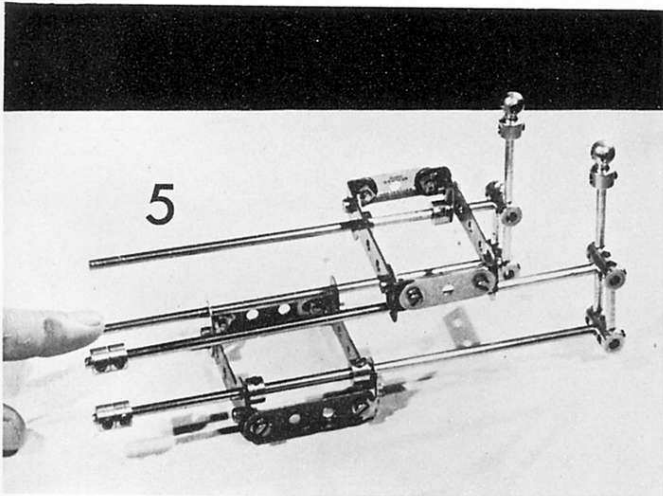
two levers. The levers are slid so that the Couplings on them run along the Collar rows.

If it is required to change gear with one lever only, reference should be made to Fig.6, where it will be seen that a 5" Rod has been fitted with a Large Fork Piece, which is in turn fitted to the second Collar of the lower gear shaft with two Nuts and Bolts.

A Coupling is fixed to the Rod as shown, and to this are firmly fixed two Small Fork Pieces by means of ¾" Bolts. The single lever is then swung in an arc so that the required Collar (replacing the Handrail Couplings) is located in its respect-

ive Fork before sliding the selected linkage into gear.

PARTS LIST		
1 of No 3	1 of No 17	2 of No 48d
2 of No 5	2 of No 18a	1 of No 52
2 of No 6	2 of No 23a	26 of No 59
2 of No 6a	1 of No 25	6 of No 63
8 of No 10	6 of No 26	2 of No 72
2 of No 9d	1 of No 26c	2 of No 81
4 of No 12	1 of No 27	1 of No 96a
2 of No 13a	3 of No 27a	1 of No 111
2 of No 14	1 of No 27d	2 of No 111a
1 of No 15	2 of No 31	1 of No 116
1 of No 16	30 of No 37b	3 of No 116a
2 of No 16a	45 of No 37c	2 of No 136a
2 of No 16b	21 of No 38	2 of No 230
	2 of No 48a	7 of No 231



# MM COMPETITION

A MECCANO CONSTRUCTION PUZZLE  
DEvised BY ALAN PARTRIDGE

WIN  
A 1.5 - 4.5 v  
Mk 2 JUNIOR  
POWERDRIVE  
MECCANO  
'(CRANE)'  
MOTOR

Can you build a differential mechanism, which would serve to connect the propeller shaft of a motor vehicle to the half-shafts carrying the rear wheels, using only four toothed parts?

The crown wheel and its driver, or equivalent, are included in the total of four, and only standard Meccano parts are to be used, without mutilation, and in conventional alignments. The drive is to be completely positive: no cords or

frictional devices are allowed. The first correct answer (described on paper please) that we receive, wins the Motor.

Alan Partridge assures us that it is possible, and that he will reveal the solution in time for us to print it and announce the winner in the next MM. Meanwhile, he asks distracted readers not to send a strong-arm squad to the Midlands, as the drawing is in his bank, and he himself, like any good mechanism, will not squeal!

The competition (which is not open to Alan Partridge!) closes on March 1st.