Among the Model-Builders

By "Spanner"

A SELF-CHANGING GEAR-BOX

Figs. 1 and 2 on this page show another variation of the three-speed gear-box, to add to the many already described in past issues of the *M.M.* The one illustrated here, however, is a self-changing type, and it was designed by R. M. Minshull, Macclesfield.

Readers who wish to build this mechanism should begin by bolting together two 2½" Flat Girders through their round holes. The bolts joining the Flat Girders are used to fix also two 1"×1" Angle Brackets 1. Two 2½"×1" Double Angle Strips 2 and 3 are then attached to the slotted holes of the Flat Girders. The slotted holes enable the Double Angle Strips to be positioned so that a ¾" Pinion on a Rod mounted in either of them meshes accurately with a ½" Pinion on a Rod supported in the Angle Brackets 1.

The input shaft is a Rod 4 passed through one of the Angle Brackets 1. The Rod carries four Washers, a ½" Pinion 5 and a ¾" Pinion 6. The Rod 4 projects about ¼" beyond the Pinion 6, into a ¾" Pinion 7 on the output shaft. This shaft carries also a ½" Pinion 8, which is spaced from the Angle Bracket 1 by three Washers.

The layshaft is a 3½" Rod 9, fitted with a ¾" Pinion 10, two ½" Pinions 11 and 12 and a ¾" Pinion 13. The layshaft carries two Collars, with the end of a Pawl 14 located between them. The Pawl is fixed on a 3½" Rod 15, which is fitted with three Washers, a Compression Spring, a Cord Anchoring Spring 16 and a Collar 17. A ¾" Bolt in the Collar bears against the housing and serves to keep the Pawl 14 between the Collars on the layshaft.

Two "spiders" 18, taken from Swivel Bearings, are screwed on to bolts passed through the housing, but are spaced from it by two Washers on each bolt. A 1" Screwed Rod is threaded through each spider, and is fitted with a ½" Pinion 19. A ½" Pinion 20 is free to turn on a ¾" Bolt, which is held by two nuts in a 2½" Strip. The Strip is attached to the framework by Angle Brackets. A 3½" Rod is supported in the Double Angle Strip 3, and a ¾" Pinion on the Rod engages the Pinion 5 on the input shaft. A Worm on the Rod drives one of the Pinions 19.

The mechanism is set by pushing the Rod 15 to the right (Fig. 1) and then turning the Screwed Rods until they just touch the Rod 15. The gear-box is then in bottom gear, and the Rod 15 is prevented from moving to the left by the Screwed Rod catching against the Cord Anchoring Spring 16. When the model is set in motion, the Screwed Rods rotate slowly, and gradually the Cord Anchoring Spring is released. The Rod 15 is then forced to the left by the Compression Spring and second gear is engaged. The second Screwed Rod now catches against the Collar 17, but as the Screwed Rod turns it is slowly withdrawn from the Collar, until the Compression Spring can force the Rod 15 to the extreme left to engage top gear.

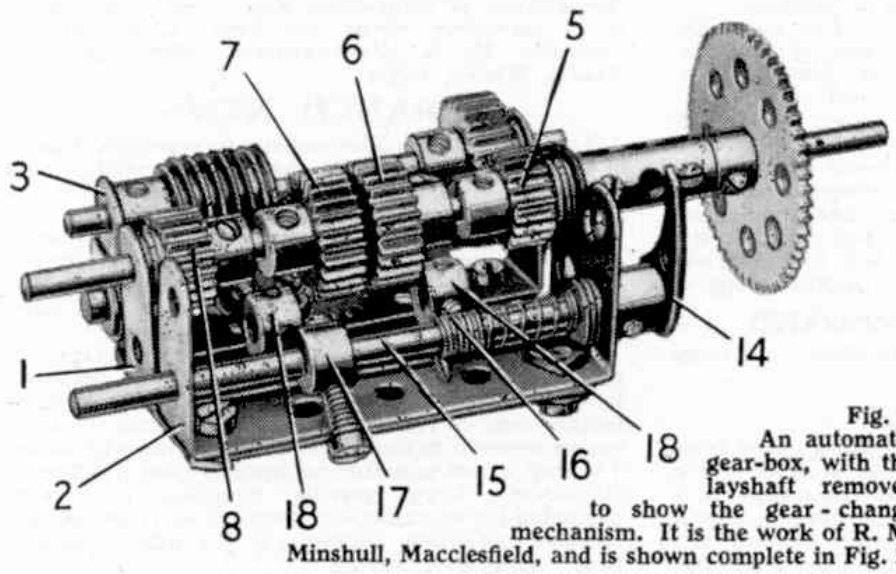


Fig. 1 An automatic gear-box, with the layshaft removed to show the gear-change mechanism. It is the work of R. M. Minshull, Macclesfield, and is shown complete in Fig. 2.

COMBINED BRAKE AND GEAR SELECTOR FOR CRANES

Mr. A. R. Seymour Dale, Eastbourne, recently built a model of a Jones K.L.66 Mobile Crane, and for use in it he designed a neat mechanism for operating and controlling the two winding drums. Each drum is controlled by a single lever, and as soon as the drive to the drum is disengaged a friction brake comes into action to prevent the drum from unwinding. The brake is released automatically when the drive is engaged. The mechanism is shown in Figs. 3 and 4.

The housing for the two drums is made from two 2½"×2½" Flat Plates attached to 2½" Angle Girders, which are bolted to two 5½"×½" Double Angle Strips 1. The Flat Plates are connected by a 2½"×½" Double Angle Strip 2. This arrangement provides a compact housing particularly suitable for models where space is rather limited, but of course the details can be varied in many ways.

The driving shaft is a Rod 3 supported in two Trunnions bolted to the Double Angle Strips 1.

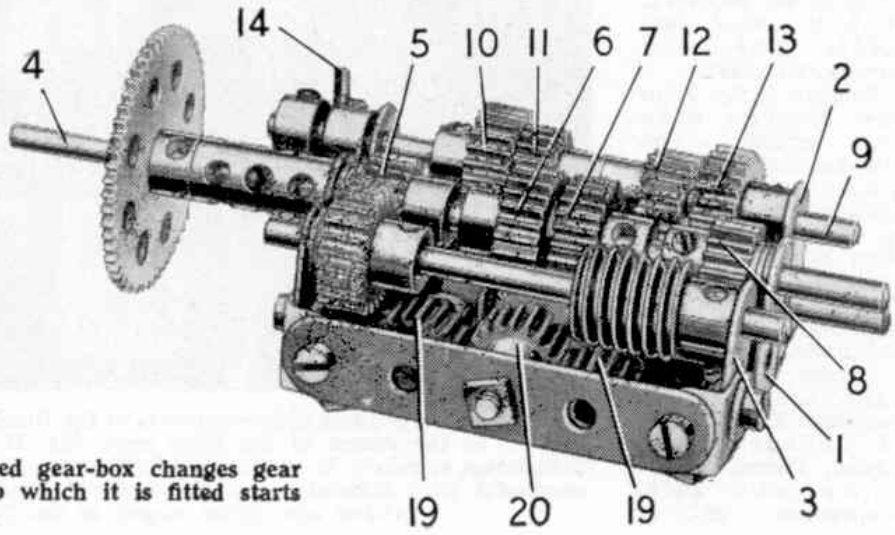


Fig. 2. This automatic three-speed gear-box changes gear automatically when the model to which it is fitted starts to run.

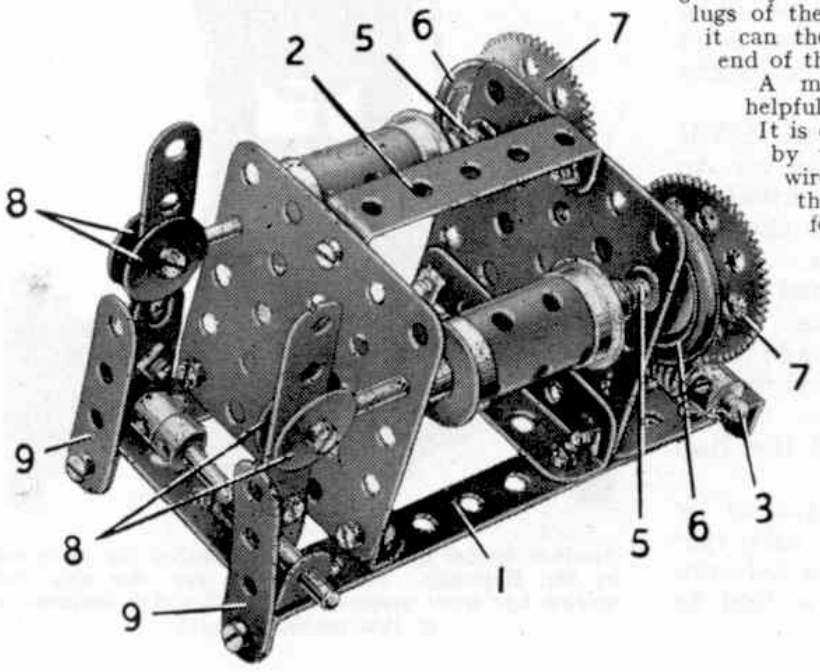
M. J. Hibell, Brixham, who won a prize of £5 in the Meccano International Model-Building Competition.

The Rod is fitted with two Worms 4, and the drive to it is transmitted through a ⅞" Bevel Gear mounted between the Trunnions.

The two winding shafts are identical in arrangement. The winding drum in each case is a Sleeve Piece fitted with two ¾" Flanged Wheels, and it is fixed on a Rod supported in the Flat Plates. A Compression Spring 5 is placed between the drum and one of the Flat Plates and the Rod carries a 1" Pulley with Rubber Ring 6 and a 57-tooth Gear 7.

Each of the levers operating the winding shaft is a 3" Strip bolted to a Crank. The Cranks are held in place by Collars on a 3" Rod mounted in a 2½" × ½" Double Angle Strip bolted across the Double Angle Strips 1. Two ¾" Washers 8 spaced apart by four Washers are attached by a ½" Bolt to each lever, and the ¾" Washers fit on either side of the winding drum shaft. The levers are held against the shafts by 2" Strips 9, bolted to the ends of the Double Angle Strips 1.

The operation of the mechanism is as follows. The Gear 7 is arranged so that when the 1" Pulley with Rubber Ring 6 is pressed against the Flat Plate the Gear is just clear of the Worm 4. The drive is then disengaged and the drum is prevented from turning by the friction between the Rubber Ring and the Flat Plate. When the operating lever is moved the Rubber Ring is forced away from the Flat Plate, thus releasing the brake, and at the same time the Gear 7 is moved into mesh with the Worm to engage the drive.



USEFUL MODEL-BUILDING HINTS

It sometimes happens in building certain kinds of models that a completely boxed-in structure is required. At first glance this may appear very difficult to construct, but actually it is quite simple if a supply of Screwed Rods of suitable sizes is available.

Three sides of the structure should be built up in the usual manner using ordinary nuts and bolts. The remaining side can then be fixed in position by passing Screwed Rods through the opposite faces and fitting nuts at each end.

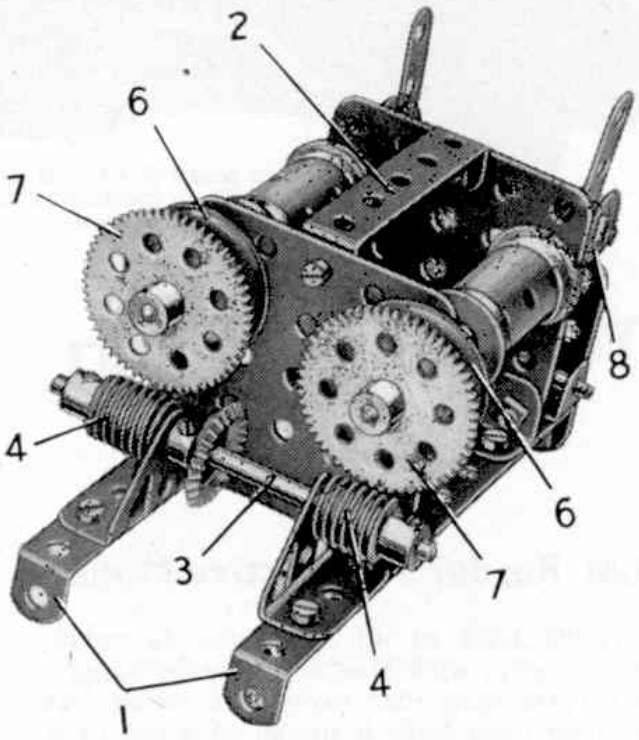


Fig. 3. A combined brake and gear selector for operating and controlling twin winding drums in cranes. It was designed by A. R. Seymour Dale, Eastbourne.

When building certain complicated models or compact and intricate mechanisms it is sometimes necessary to fit a nut in a position not readily accessible by normal methods. The Meccano Box Spanner has been designed specially for use in such cases and generally will be found quite satisfactory. The lugs of the Spanner hold a nut securely, so that it can then be positioned quite easily over the end of the bolt.

A magnetised Screwdriver will be found helpful in placing bolts in difficult positions. It is quite easy to magnetise the Screwdriver by winding 20 or 30 turns of insulated wire around the shaft and then connecting the free ends of the wire to an accumulator for a few seconds. The Screwdriver will then be magnetised sufficiently to hold a bolt while it is inserted in the appropriate hole. An alternative method to magnetising the Screwdriver is to place a small piece of Plasticine or gum on the head of the bolt.

Here is another tip that may come in useful in simple models such as cranes, when a Cord Anchoring Spring is not available. A Cord can be secured firmly to a Rod by tying it round the lugs of a Spring Clip placed on the Rod.

Fig. 4. Another view of the combined brake and gear selector.