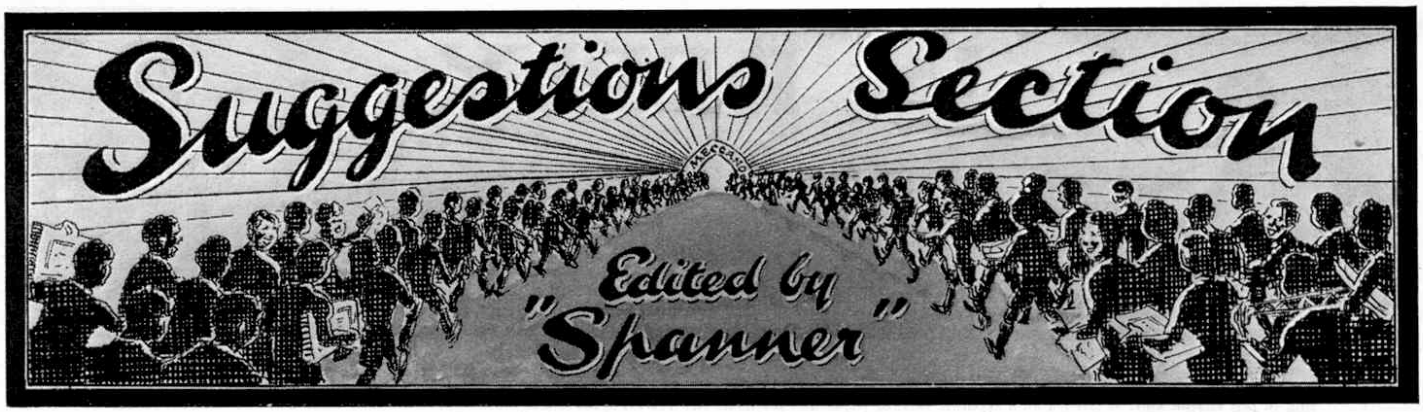


## (162)—Sliding Dog Constant Mesh Gear Box

*(J. M. and A. M. Johnston, Dunstable)*

THE gear box shown in Fig. 162 possesses several features of unusual interest. An efficient "gate" change is included, all the gears are in constant mesh, and extensive use is made of the new Socket Coupling. The fact that the gears are in constant mesh eliminates wear to a large extent and facilitates gear-changing, while the employment of the "gate" ensures that a particular gear cannot be engaged unless all the others are in neutral. The model very closely follows the design used in nearly all motor cars.

The gear box is composed of $5\frac{1}{2}'' \times 2\frac{1}{2}''$ Flat Plates with $3\frac{1}{2}'' \times 2\frac{1}{2}''$ Flanged Plates connecting their ends. The shaft 1, which is driven by the engine, is a short Rod journalled in one of the end Plates and also halfway through the top transverse bore of the Coupling 14. The latter is secured to a Threaded Pin that, in turn, is secured to a $3\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strip bolted to the side Plates of the gear box. The Rod has a 1" Gear 12 secured to it, which meshes with both the similar Gears 11 and 13 on the Rods 3 and 4 respectively.

The Rod 3 carries two sliding clutch units 9 and 10. The unit 9 comprises a portion of a Dog Clutch and a $\frac{1}{2}''$ Pinion ($\frac{1}{2}''$ face), connected together rigidly by means of a Socket Coupling; the other member of the Dog Clutch is secured on the Rod.

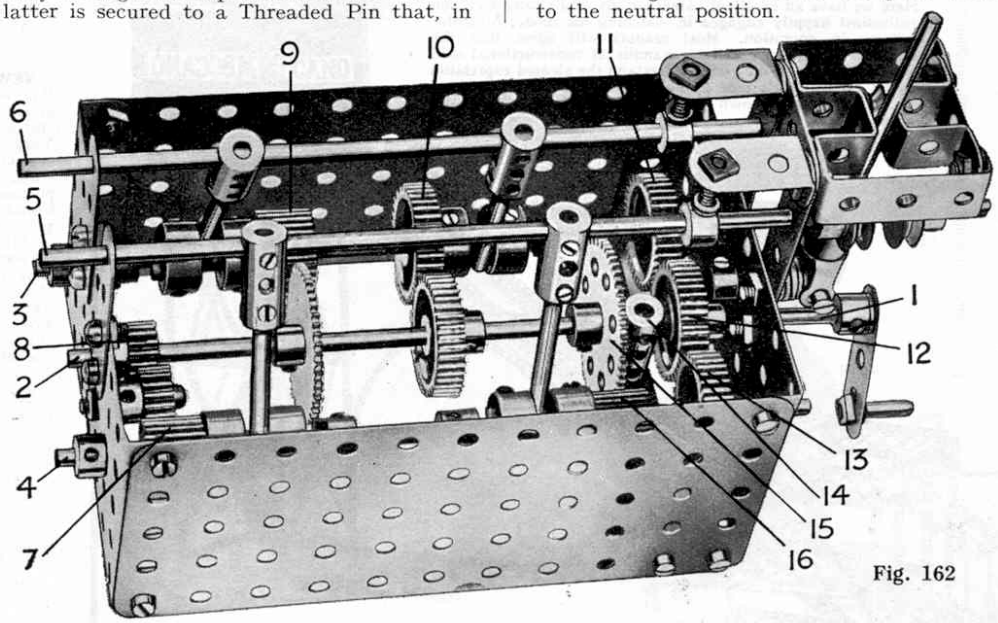


Fig. 162

The unit 10 is similar but a 1" Gear is employed instead of the Pinion. The two clutch units on the Rod 4 are identical, each consisting of a $\frac{1}{2}''$ Pinion ($\frac{1}{2}''$ face) and one portion of a Dog Clutch held together by a Socket Coupling. Either of these engage at will with the appropriate fixed portions of the Dog Clutches on the Rod.

The "gate" in which the gear change lever moves and which prevents a false change being made, is composed of two $1\frac{1}{2}''$ Strips, two $1\frac{1}{2}'' \times \frac{1}{2}''$ Double Angle Strips, and two Double Bent Strips, the entire assembly being attached to $2\frac{1}{2}''$ Strips secured to the end Plate of the gear box. The gear lever is held in the boss of a Swivel Bearing that is mounted freely on a Pivot Bolt. The lever, when moved sideways through the gate, engages between the pair of $\frac{1}{2}''$ fast Pulleys on either of the gear selector rods 5 and 6; the latter may then be moved backwards or forwards to change gear. The selector rods have short Rods secured to them by Couplings and engaging with opposite sides of the grooves of the Socket Couplings.

The device for locking each selector rod after movement of the lever is shown clearly in the illustration. It consists of a $\frac{1}{2}''$ Bolt mounted on the end of a $1'' \times \frac{1}{2}''$ Angle Bracket. The head of the bolt rests in the hole of a Collar secured to the rod to lock the gears in the neutral position, and on either side of the Collar to prevent the gears riding out of mesh after engagement.

The travel of each selector rod should be just sufficient to permit of the bolt heads springing over the edges of the Collars when a gear comes into engagement. This result may be attained by adjusting the positions of the Clutches on the Rods 3 and 4, the Gears on the Rod 2, and the distance between the Couplings on the selector rods. Matters must be so arranged, of course, that when both selector rods are in the neutral position, they are retained therein by the heads of the bolts of the locking devices falling into the holes of the Collars. If the construction of the model has been carefully carried out, it should be impossible to move the gear lever across the gate, without first restoring it to the neutral position.

When the gear lever is on the near side of the gate and moved forward, the unit 16 will slide along the Rod and come into engagement with the fixed portion of its clutch. Thus the Rod 2 is driven through the gears 12, 13, 16 and 15, giving first forward speed. By moving the lever in the opposite direction, reverse gear will be obtained. By first restoring the gear lever to neutral, moving it through the gate, and then forward, the unit 9 will drive the Rod 2 through the medium of the 50-teeth Gear secured to it. This is second forward gear. Then, by shifting the gear lever back, the top gear ratio will be obtained.

Although the general design of the gear box is excellent, there are one or two points that require criticism. A departure from actual practice exists in the fact that the reverse gear ratio is the same as that of the top forward gear. This is a fault that could only be overcome by making radical alterations in the layout of the model.

The following readers have also sent in excellent designs of gear boxes: S. Herbert, London, S.E.15; H. Hankey, Limpsfield; M. Jackson, Berkhamstead; F. Case, East Grinstead; G. Redfern, Matlock; L. Stone, Plumstead, S.E.18; L. Hogarth, Cardiff, and many others. These gear boxes do not make any considerable advance on those already published, however.

*The ideas printed in the "Suggestions Section" should prove a real help to thousands of Meccano enthusiasts. Often we receive letters from readers who describe how they have solved some knotty problem or evolved an interesting model after studying some of the ideas that have appeared. We shall always be pleased to receive further contributions for the "Suggestions Section." Cash payments are made for all Suggestions published (excluding those mentioned in the "Miscellaneous" Suggestions column). Contributions should be accompanied by clear photographs or drawings and should be addressed to "Spanner," c/o The "Meccano Magazine."*