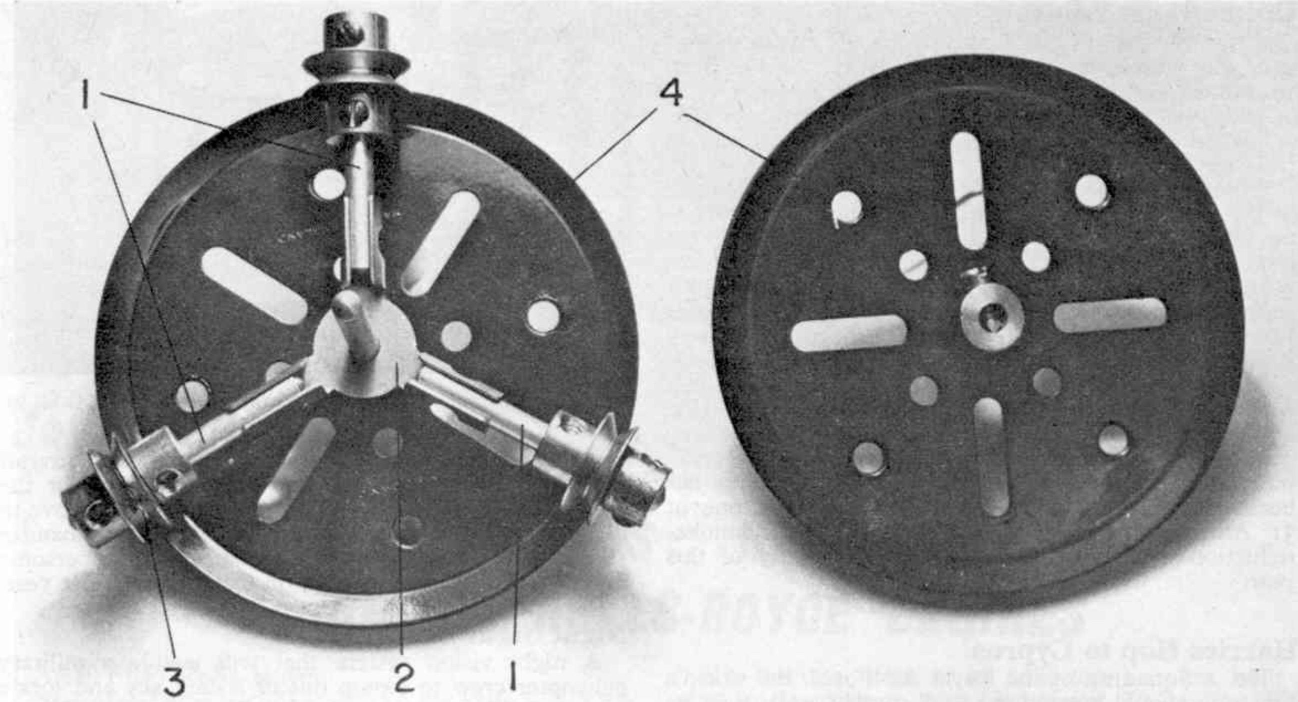


AMONG THE MODEL BUILDERS with 'Spanner'

COMPACT ROLLER RACE

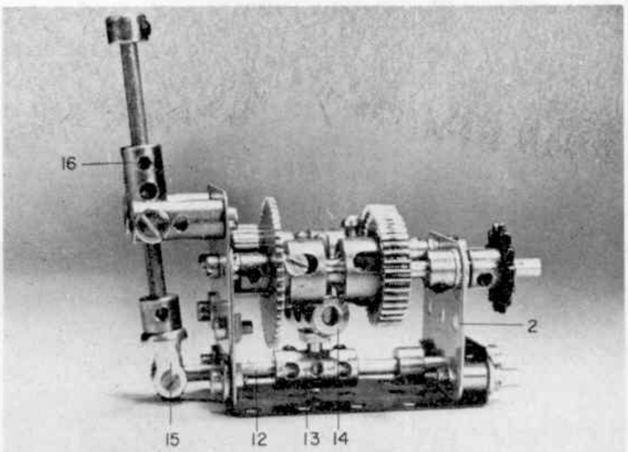
BECAUSE OF THEIR IMPORTANCE in Meccano modelling, Bert Love devotes this month's Chapter of his Meccano Constructor's Guide to crane turntables, roller races and associated mechanisms. Here, in this article—and at the danger of trying your patience too far!—I have a couple more mechanisms in this line I would like to present. The first, a very simple and compact unit, I feature, not because it is an entirely original idea—it isn't—but because this particular version of a known principle is designed by an 11 year-old enthusiast, C. J. Clotworth of Belfast, Northern Ireland. It just shows you don't need to be growing rather long in the tooth as a modeller before you have enough experience to think of useful ideas!

The Roller Race, itself, is amazingly effective in operation, yet it consists of little more than three 1½ in. Rods 1 inserted one into each arm of a 3-way Rod Connector 2, each Rod being fitted with a free-running ½ in. Pulley 3, held in place by Collars. The whole assembly is mounted between two 3 in. Pulleys 4, Pulleys 3 running on the inside lips of these 3 in. Pulleys. A Rod journalled in the bosses of the Pulleys, and running through the centre of the Rod Connector, serves to centralise the roller assembly, but remember that at least one of the Pulleys must be completely free on the Rod otherwise the mechanism will not function. That's all there is to it—well done C.J.C.!

ROLLER RACE 2

Our second roller mechanism is really only an extension of the first, with six rollers instead of the original three. As before, each roller is supplied by a free-running ½ in. Pulley without boss 1, mounted on a 1½ in. Rod 2 held in a 3-way Rod and Strip Connector 3, but, in this case, there is no need for the Pulleys to be held in place by Collars as they will be self-locating. Of course, as there are six rollers, two 3-way Rod and Strip Connectors must be used and these must be placed Rod-side to Rod-side so that the Rods interlock on the same level. The resulting "spider" is mounted between two Wheel Flanges 4, the grooves of Pulleys 1 engaging firmly with the flanged parts of the Wheel Flanges and at the same time keeping the Pulleys in place on the Rods.

Although not shown in the accompanying illustration, Bush Wheels or other suitable parts are bolted to the Wheel Flanges to provide centre bosses so that a centralising Rod may be passed through the Wheel Flanges and Rod and Strip Connectors. Again, remember that at least one of the Wheel Flanges must be left free on this Rod for successful operation.



Left: It may look very simple, but this Roller Race built by 11-year-old G. J. Clotworth of Belfast, is extremely effective in operation. Above: This compact two-speed Gearbox designed by a Lancashire reader, works on the constant mesh principle, as opposed to the mere usual "crash" system.

CONSTANT-MESH GEARBOX

Moving away, now, from roller races, we come to something entirely different: a Two-speed Constant-mesh Gearbox supplied by a Lancashire reader. The joy of this unit is that it does away with the need for a clutch and, because the gears are in constant mesh, completely removes the danger of any gear damage that might result from the "crashing" of the more usual type of gear arrangements.

In operational use the framework for the Gearbox would depend entirely on the parent model, but for the purposes of this article, a mounting is supplied by a $2\frac{1}{2} \times 1\frac{1}{2}$ in. Flanged Plate, to one flange of which a $2 \times 1\frac{1}{2}$ in. compound flat plate 1, built up from two $1\frac{1}{2} \times 1\frac{1}{2}$ in. Flat Plates, is bolted. Fixed to the other flange of the Flanged Plate, but spaced from it by a Collar on the shank of each $\frac{1}{2}$ in. securing Bolt, is a single $1\frac{1}{2} \times 1\frac{1}{2}$ in. Flat Plate 2. Journalled in the upper corner holes of this Plate and in the corresponding holes of plate 1 are two 3 in. Rods 3 and 4, Rod 3 being held in place by two Collars and Rod 4 by a $\frac{3}{4}$ in. Sprocket Wheel 5 and a Collar. Also mounted on Rod 3 are a 1 in. Gear Wheel 6, *fixed in place by a standard 7/32 in. Bolt*, and a Socket Coupling 7, in the outside end of which a $\frac{3}{4}$ in. Pinion 8 is secured. Note that the Socket Coupling and Pinion must be free to slide on the Rod.

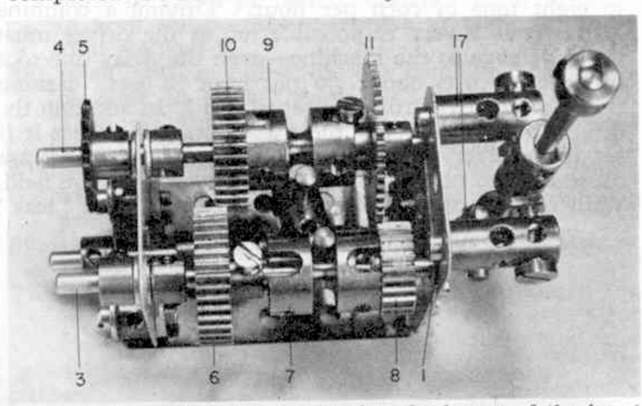
In the case of Rod 4, this also carries a Socket Coupling 9, this one fitted with a 1 in. Gear Wheel 10, both parts being free to slide on the Rod as one unit. Fixed on the Rod—again by a standard 7/32 in. Bolt —is a 50-teeth Gear 11. It will be noticed, by the way, that fixed Gears 6 and 11 are situated towards opposite ends of the Gearbox and mesh with the appropriate sliding Gear. These sliding Gears should never disengage the fixed Gears, therefore their travel should be limited to a distance slightly less than the width of Pinion 8.

Travel limitation in the model illustrated is easily achieved by the gear-change mechanism, built up from a compound $3\frac{1}{2}$ in. rod 12 mounted in the centre holes of the flanges of the Flanged Plate and prevented from sliding too far by two Collars. The compound rod, itself, is made up from a 2 in. Rod and a $1\frac{1}{2}$ in. Rod joined together by a Coupling 13, in the centre transverse bore of which a Threaded Pin is held. The threaded shank of this Pin is tightly screwed into the centre tapped bore of another Coupling 14, in the end smooth bores of which two 1 in. Rods are held. These Rods engage in the waists of Socket Couplings 7 and 9.

Fixed on one end of rod 12 is a Swivel Bearing 15, in the boss of which a 3 in. Rod is held to serve as the gear-change lever. Loose on the Rod is a Coupling 16, in the lower end transverse tapped bores of which two Pivot Bolts are held by Nuts, the Pivot Bolts, themselves, being carried in the end transverse bores of two Threaded Couplings 17 fixed to the upper corners of compound flat plate 1. A Collar is mounted on the upper end of the gear-change lever to act as a knob.

Regarding operation of the Gearbox, as all the gears are in constant mesh, actual gear-change is effected by engaging the slot in the free end of one or the other Socket Coupling with the 7/32 in. Bolt in the boss of the respective fixed Gear on Rod 3 or 4. Thus, when the gear-change lever is pulled back away from the gearbox, the two Socket Couplings are pushed forward away from the lever, engaging Socket Coupling 7 with the Bolt in Gear 6 and, at the same time, moving Socket Coupling 9 away from Gear 11. Socket Coupling 9 and Gear 10, of course, are free to turn on Rod 4 (the output shaft) and can therefore be temporarily discounted as they do not impart any movement to the Rod. However, because Gear 6 is fixed on Rod 3 (the input shaft), its rotary movement when the shaft is turned is transferred through Socket Coupling 7 to Pinion 8. This Pinion meshes with fixed Gear 11 on Rod 4, therefore a ratio of 2 : 1 results.

When the gear-change lever is pushed forward, Socket Coupling 9 engages with the Bolt in the boss of Gear 11, while Socket Coupling 7 disengages with the Bolts in Gear 6. Socket Coupling 7 and Pinion 8, are now free on the Rod and so can, in their turn, be temporarily forgotten. However, fixed Gear 6 meshes with similar Gear 10 and, as the latter Gear is connected by Socket Coupling 9 to fixed Gear 11, drive is transmitted to the output shaft at a ratio of 1 : 1. Neutral occurs where both Socket Couplings are disengaged from their respective fixed Gears. It sounds complicated on paper, but it's easier to follow with the completed Gearbox in front of you!



A top view of the Gearbox showing the layout of the input and output shafts.

PARTS REQUIRED

3—16b	1—27	1—51	1—96a
1—17	2—31	9—59	1—115
1—18a	9—37a	3—63	2—147b
2—18b	11—37b	2—63c	1—165
1—25	10—38	3—74	2—171