

# HOW TO USE Meccano Parts

## V.—NUTS & BOLTS, etc. (CLASS E)

*For the purpose of this series of articles we have grouped all the Meccano parts into two main sections, termed the Structural and Mechanical Sections, and these sections have been further divided into a number of separate classes. The complete grouping is as follows. Structural Section: Class A, Strips; Class B, Girders; Class C, Brackets, Trunnions, etc.; Class D, Plates, Bolters, etc.; Class E, Nuts and Bolts, Tools and Literature. Mechanical Section: Class M, Rods, Cranks and Couplings; Class N, Wheels, Pulleys, Bearings, etc.; Class O, Gears and Toothed Parts; Class P, Special Accessories; Class Q, Miscellaneous Mechanical Parts; Class T, Electrical Parts; Class X, Motors, Accumulators, etc.*

IN the preceding articles in this series we have dealt with all those Meccano parts that are ordinarily used for simple structural work. Before proceeding with the Mechanical Section it will be advisable to refer to certain Meccano accessories that are indispensable for all kinds of Meccano model-building, namely, Nuts and Bolts, Screwdrivers, and Spanners. For convenience these parts have been grouped, together with the Meccano literature and other miscellaneous items, under Class E in the Structural Section.

### Nuts and Bolts

Nuts and bolts are naturally amongst the most important of the Meccano accessories. When it is remembered that those that fall into the hands of the really industrious Meccano boy must withstand the strain of being screwed up tightly and unscrewed literally hundreds of times, it is not surprising that they should be carefully turned—not stamped—from the finest steel.

Quite a number of Meccano boys have written to enquire which is the best method of securing nuts and bolts—whether with the nuts or the bolt heads towards the outer side of the model. By far the greater majority of Meccano boys place the bolts with the heads outside, and this, in our opinion, is the better plan, for the Screwdriver forms a speedier method of tightening the nuts and bolts than the Spanner. Also, a model having all the bolt heads on the outer side will have a much neater appearance than one in which the nuts and shanks are all exposed.

For ordinary model building, sufficient rigidity can be obtained by using the Screwdriver only, merely steadying the nut with the fingers, but wherever excessive strain is expected, both Spanner and Screwdriver should be used simultaneously, the nut being held immovable by the Spanner in one hand while the bolt is turned by the Screwdriver in the other hand.

Until quite recently the heads of Meccano bolts were cylindrical in shape, but they are now rounded. This is a great improvement, for not only is a much neater appearance obtained in a model constructed with the new bolts, but the improved shape increases their adaptability to an important extent.

For example, Fig. 1 shows a Meccano gear changing lever in which a single bolt plays a novel and important part. The lever 5 is spaced by Washers 8 from the end of the Double Angle Strip that forms its bearing so that the bolt 9 presses firmly against a  $2\frac{1}{2}$ " small radius Curved Strip 10, which forms the quadrant. The head of the bolt tends to slip into the holes in the Strip 10 and thus retain the lever 5 firmly in any one of three different positions. The gearing on the shaft 3, which is controlled by the lever, should be arranged so that the different engagements are brought about in these three positions of the lever 5; then the gears will not easily ride out of engagement once the lever has been moved. A similar result could not be obtained, of course, with an old-style bolt.

A very important use of the nut and bolt is found in the making of pivotal connections between various Meccano parts. Typical pivots so formed are described

under Standard Mechanisms Nos. 262 and 263. S.M. 262 is reproduced herewith (Fig. 2). In this case the bolt 1 passes through the Strip 2 and is securely held to Strip 3 by means of two nuts 4 and 5, which are screwed tight against opposite sides of the Strip. If possible two Spanners should be used so that the nuts can be turned simultaneously and in opposite directions. Sufficient space is left between the nut 5 and the bolt head to allow free movement of the Strip 2.

S.M. 263 is a similar arrangement except that both Strips 2 and 3 are allowed freedom of movement about the bolt instead of Strip 2 only. Both Strips are first placed on the bolt 1 and the nuts 4 and 5 are then placed together on its shank. The nuts are turned in opposite directions until they securely grip each other in position on the bolt. S.M. 262 is to be preferred wherever it is required to move only one Strip about the bolt, for this method affords a minimum amount of "play" or slackness in the joint.

Another kind of pivot formed from a bolt and nut is included in Fig. 1. Bolt 1 in this illustration passes through the end hole of a Crank 6 and enters the threaded bore of a Collar 2, without touching the Rod 3. It is secured rigidly in this position by locking a nut 4 against the Collar. Sufficient freedom is allowed for the Crank 6 to turn easily about the bolt, and the Collar 2, which is free on the shaft 3, is held in position by two further Collars. By means of this pivotal connection, easy longitudinal movement of the Rod 3 is obtained on operation of the Crank 6.

There are four different sizes of Meccano bolts, i.e.,  $\frac{3}{8}$ ",  $\frac{1}{2}$ ",  $\frac{3}{4}$ ", and  $\frac{7}{32}$ " (parts Nos. 111, 111a, 111c, and 37b respectively) but the pitch of the thread is the same in every case (32 threads to the inch). This pitch is, of course, standard throughout the Meccano system, with the exception of the 6 B.A. Bolts and other special electrical accessories which will be dealt with under Class T.

The  $\frac{7}{32}$ " Bolt may be obtained separately (under part No. 37b) or complete with nut (under part No. 37). It is this size of bolt that is supplied in considerable quantities, complete with nuts in all the Meccano Outfits. The other three kinds of bolts are for use in special cases where an extra long shank is required.

In addition to these bolts there are the Set-screws (part No. 69). These are of similar shape to the bolts but are only  $\frac{3}{16}$ " in length, and are, of course, designed primarily for securing the various Meccano wheels to the Axle Rods. The Grub Screws (parts Nos. 69a and 69b) have no head at all, a slot merely being cut across one end to receive the Screwdriver. These are employed for securing the smaller Meccano parts, such as Collars, Couplings, etc., to the Rods, and are much neater than the Set-screws. It will sometimes be found that the Set-screw of a Meccano Pulley or Gear Wheel fouls some other part of the model, in which case it may be substituted by a Grub Screw, which will fit almost flush with the boss.

The Pivot Bolt (part No. 147b) is of a quite different design to the ordinary bolts. The greater portion of its shank is smooth and the part is particularly suitable for use as a small pivot or fixed pin about which a small pulley or lever may rotate. It is

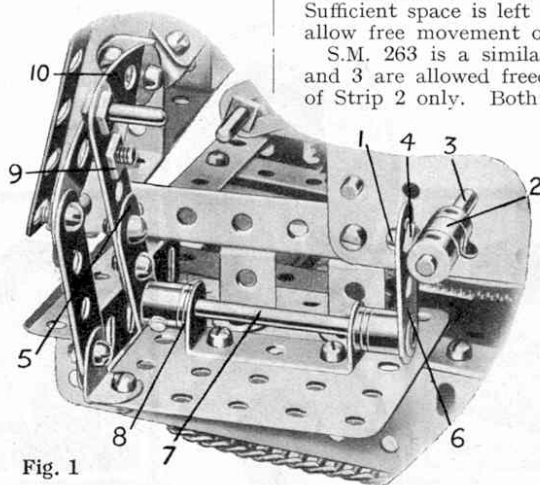


Fig. 1

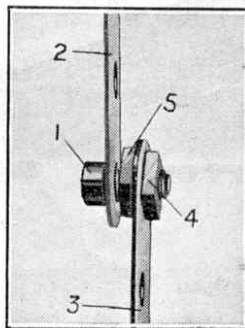


Fig. 2