

THE "MAGNUM" 301 AND 401 BEARING MODIFICATIONS.

The Garrard 301 and 401 main bearings are unusual in that they were designed around a spindle with a flat end (thrust) face of generous area resulting in very low loading; this originally being allied to grease lubrication. Such a design raises problems of mutual alignment and centring of the thrust faces, and these were originally tackled by using a matching flat topped self aligning pad of sintered bronze seated in a soft plastic cup.

When the lubricant was later changed from grease to oil, the original thrust pad was initially retained, but in the 401 turntable the bronze thrust pad was inverted to show a domed upper surface and was moulded into a hard plastic holder. This, however, had the drawbacks of reducing the originally intended contact area and of compromising the centring on the spindle axis. Neither type of thrust pad was conspicuous for its sonic virtues in terms of overall information retrieval, and many are the modifications which have been tried.

All of the original bearing types have given problems in terms of lubrication maintenance; the grease bearings needing access from below to operate the grease feeders, and the oil bearings suffering from leakage from the bottom gasket below and the oil galleries above, or even from the occasional porous casting. Dry bearings are more the rule than the exception!

The "Magnum" bearing offers what we believe to be a unique design approach to the thrust pad problem, while realising the potential virtues of the flat ended spindle. This approach of minimal interference with the original concept means also that the original type of thrust pad can be reinstated if desired (not a common event!).

Production of the "Magnum" unit involves:

1. Mounting the journal bearing housing truly concentrically in the lathe.
2. Boring out the thrust pad well, removing the minimum of material consistent with producing a reproducible fit.
3. Facing off the housing absolutely square, again removing a predetermined minimum amount of material.
4. Preparing and fitting a shouldered alloy plug holding the new thrust pad.
5. Sealing the plug in place using the minimum of compound, allowing as nearly as possible direct direct metal to metal contact.
6. Sealing potential oil leaks around the oil galleries.
7. Filling with an oil initially mixed according to the basic lubrication requirements, but which has been "fine tuned" from listening tests.

Auditioning of the bearings is comparatively easy, since the whole assembly can be changed (after lifting off the platter) by removing three 2 B.A. screws with their spring washers and nuts (access from below is required). Any change in the height of the platter is likely to be very small indeed, but bearing in mind that $\frac{1}{2}$ m.m. changes can be significant for very fine line styli, do adjust the arm height as needed according to listening tests.

What differences can be anticipated?

The original bearings tend to produce a rather limited sound stage, especially at the edges. With the "Magnum" it should be possible to hear a much wider and deeper presentation; important for acoustic (especially orchestral) music, though of rather lesser importance for electric music. Along with this there should be much better retrieval of musical information with better integrity all across the frequency spectrum, though at first probably most noticeable in the bass. Overall the impression is likely to be one

of "more of the right stuff".

To complement the "Magnum", we would recommend the use of the "Spacemat" on top of the standard mat. Real devotees of the 301 and 401 models should also consider the "Maxplank" hand built plinth (please ask for details).

FITTING THE "MAGNUM" BEARING.

1. Remove the rubber mat and put it aside- well away from any oil.
2. To free the platter from the tapered spindle, lift it up slightly and tap the spindle top lightly with a light baulk of wood or the like. In the original bearing, the spindle is held captive by a circlip at the bottom end. Remove the old bearing (three 2 B.A. screws, nuts and spring washers).
3. Remove the spindle, felt oil pad and top vent screw ("filler screw") from the new bearing. To avoid including any air while filling the new bearing, hold it vertically while dropping 4 ml. of oil directly down onto the thrust pad below.
4. When refitting the spindle, take care not to break the oil seals by excessive fluid pressure. Sit the bearing base plate (not screws!) on the plain piece of wood provided; slip the drilled piece of wood over the spindle top and push the spindle slowly home. When nearly finished, oil will begin to appear at the vent screw hole and can be sucked up by the syringe. If no oil appears, try again, using a little more.
5. Refit the vent screw and felt ring, making sure that this is well damped but not running with oil. Wipe down the whole assembly (especially the groove for the mat to prevent oil from perishing it) and fit the assembly to the turntable.
6. Wash your hands and refit the platter and mat.
7. By eye initially, and then by listening, set the arm height. If at the same time you have fitted the "Spacemat" on top of the standard mat, the arm will need to be raised by about 3 m.m. ($\frac{1}{8}$ ").
8. Run up the bearing and check the speed adjustment. As with any new mechanical assembly, a certain running in period may be needed, but this is unlikely to be more than a few hours at most.

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