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WORKSHOP HINTS AND TIPS

High - speed lathe spindles

ONE way of increasing the scope of a lathe is to step up the r.p.m. of the work, so that small diameters can be run at a suitable surface speed. For it is that which counts in turning as in other machining operations.

In grinding, for instance, the diameter of the wheel governs r.p.m.; and to get the best from tiny mounted wheels, speeds of several thousand r.p.m. are needed. It is the same for drills and milling tools. Small ones should be run very fast.

Last week I suggested ways for increasing the speed of work which can be set up between centres on a lathe. Only the work has to be speeded up, and this can be done through a fast-running small driving plate on either a fixed centre or a centre which is rotating at normal speed. The edge of the driving plate is grooved like a pulley, and drive is provided from an electric drill or motor, or from the lathe itself through a countershaft.

The extra speed proves an all-round aid, tiny work turning easily to a high finish. Your first experience of this can be a revelation-but the improvement is soon taken for granted. Unfortunately, it applies only to work that can be set up between centres, until a high-speed spindle is made to mount chucks and faceplates. This can be done with either a backplate on the lathe spindle or a small auxiliary headstock on the bed.

Diagrams A and ***B*** show mountings for spindles on backplates-the easiest way of mounting a spindle, with the only disadvantage that drawbolts cannot be used. Nevertheless, the spindles can be drilled right through to take long rods. Chucks, faceplates and special fixtures can be screwed on the threads at the nose ends.

For both spindles, drive is by belt to a pulley screwed to a flange behind the nose. With an electric drill or a small motor as the source of power, drive can be direct to this pulley, without the running of the lathe spindle. If the lathe spindle is run, a groove in the body, as shown, can drive a belt to a countershaft; then a second belt from this can bring the drive back to the pulley on the spindle.

Both bodies can be made from castings obtained from simple wood patterns. The material can be cast iron or aluminium alloy; the alloy is the easier to machine. Each body has a recess to register with a spigot on the backplate, such as is used for a chuck on the lathe-or a small driving plate. Studs and nuts are the means of holding.

The spindle at ***A*** is a type intended for each construction and occasional use. It runs in a non-adjustable bronze or cast-iron plain bearing with endplay adjusted by locknuts and a washer at the tail end. The spindle at ***B*** runs in an adjustable plain bearing-the body being split and clamped-with a pair of light ball races supporting the tail end. These take the thrust each way. Their outer members are separated by a thin washer. The spindle is shouldered, and adjustment is made by locknuts and a washer. It is done so that the bearings are lightly nipped.

Machining is straightforward for both bodies. The casting is chucked rear end outwards, and is faced. Then the recess is machined to register with the spigot on the backplate. In the body at ***B,*** the ball race and bearing bores should be finished at this setting. In the body at ***A,*** the bearing bore can be finished when the body is mounted on the backplate-which ensures that the high-speed spindle is exactly concentric with the lathe spindle.

An auxiliary headstock for a high-speed spindle can be of the kind at C and ***D,*** with bearings for the spindle as at ***B,*** an adjustable plain one at the nose end, and double ball races at the tail end. The driving pulley can be on the spindle between the bearings, and drawbolts can be used through the spindle.

So that machining is straightforward, the headstock can be mounted on a raising block, machined from a casting from a simple pattern, as at ***D.*** With the block set up on the faceplate, the top can be machined flat and parallel to the base.