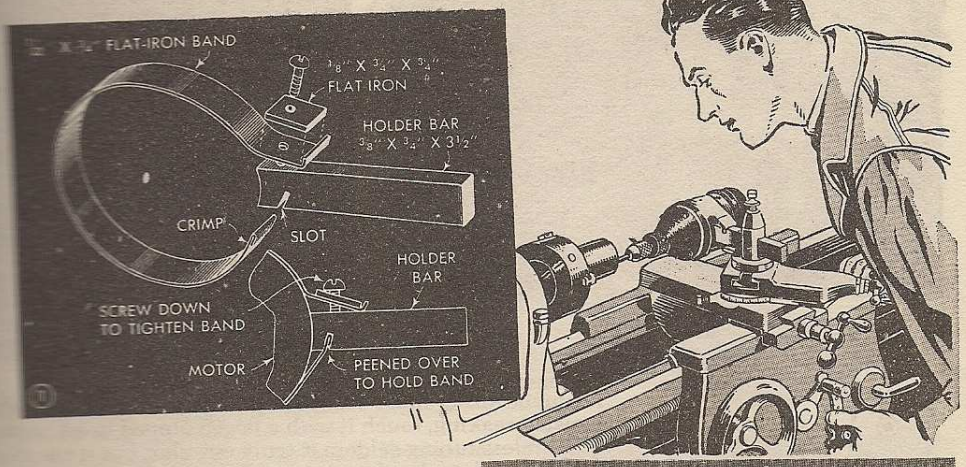
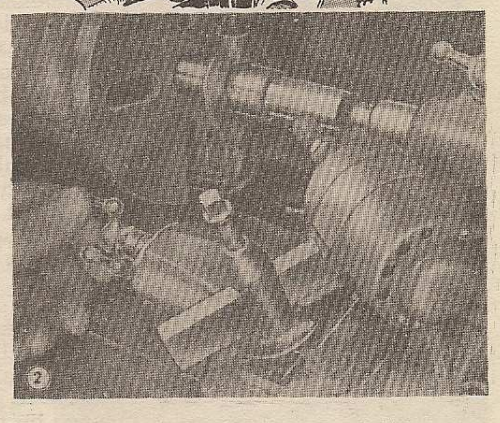
Improvised TOOL-POST GRINDER



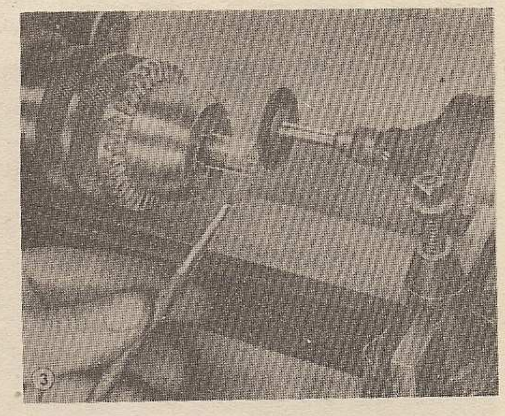
WHERE surface smoothness is more important than accuracy on small parts, high-speed grinding is often the answer. Most small grinders of the type ordinarily held in the hand are equipped either with a conventional drill chuck or with a collet-type chuck and make excellent tool-post grinders when fitted into a suitable holder. Many of these tiny motors are designed for speeds up to 20,000 r.p.m., which makes them especially suited to light grinding operations where a mirror finish on round work is the thing. A holder is made as detailed in Fig. 1, the trick being to get the compression band just the right length.

An example of work on which these improvised grinders do a first-class job is making a mandrel, Fig. 2. Select a length of steel rod and turn it until the working diameter is .001 in. greater than the hole it is to fit. Set the compound rest to about 5 deg., Fig. 2, and feed the grinder along the work cutting a taper of about .01 in. per foot. Make another pass of the grinding wheel at the same carriage setting and then lap the surface of the work with a hard slipstone and oil. On a mandrel, smoothness is more important than hardness, but if it is to be used for production runs, caseharden the center bearing surfaces of both ends. The mandrel can be pressed in and out of the work with an arbor press and being highly polished it will not freeze in the work.

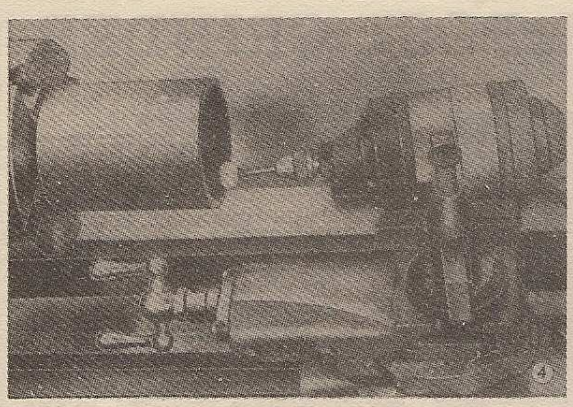
Slicing glass tubing into spacer rings, Fig. 3, is a simple and rapid operation. An abrasive disk scores the glass and the heat snaps it off. Certain types of glass are a bit more involved. A diamond disk is used and the tube is cut all the way through.



Glass-smooth finish on a lathe mandrel is possible with a small high-speed grinder set up like this. Speeds up to 20,000 r.p.m. are common



Spacers are cut from glass tubing in a jiffy with this setup. The wheel scores the glass and a brush dipped in ice water snaps off the ring



How to Select Grinding Wheels

Use aluminum-oxide wheels for high tensile strength materials

Carbon Steels	Malleable Iron
Alloy Steels	Wrought Iron
High-Speed Steels	Tough Bronze

Use silicon-carbide wheels for low tensile strength materials

Gray Iron	Aluminum
Chilled Iron	Copper
Brass	Rubber
Bronze	Leather

Use soft wheels on hard materials

Use hard wheels on soft materials

Use coarse wheels for rapid removal of stock

Use fine-grained wheels for a smooth finish

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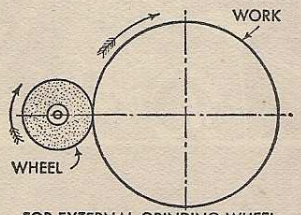
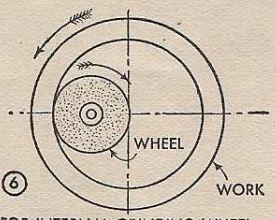


FOR EXTERNAL GRINDING, WHEEL ROTATES IN SAME DIRECTION AS THE WORK



(6)

FOR INTERNAL GRINDING, WHEEL ROTATES IN DIRECTION OPPOSITE THAT OF THE WORK

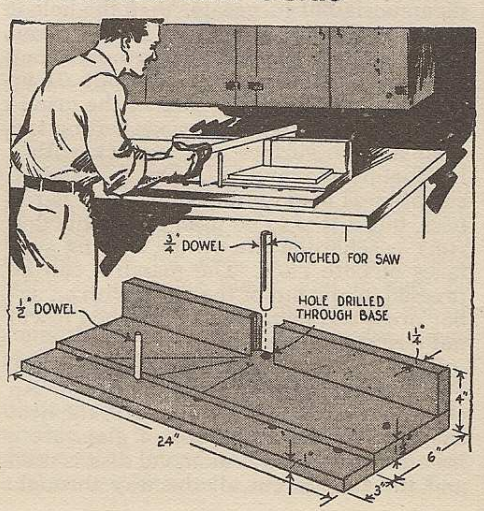
Diamond disks must run in thick soapsuds. If the tube resists breaking, touch it with a brush dipped in ice water.

Seamless tubing seldom is truly circular, but it can easily be trued up by dressing lightly with the wheel as in Fig. 4. For much of this work it is important to select a wheel that cuts without clogging or heating unduly, Fig. 5. Shellac-bonded wheels are generally used, but fine rubber wheels will do almost as well. The diamond disk is a wafer of soft iron or copper in which diamond dust has been embedded.

Work is rotated in the direction opposite to wheel travel for internal grinding, Fig. 6. Correct cutting speed is about 5000 surface ft. per min. with most wheels. Hence speed of the grinder should be about 15,200 r.p.m. with a 1-in. wheel. As most grinders turn 20,000 r.p.m. they are designed to run with a smaller wheel on stationary work. When the work rotates, Fig. 6, an allowance must be made. Small wheels require faster work rotation and large wheels slower. Before using a large wheel in a constant-speed grinder, check with the wheel speed recommended by the manufacturer.

Inexpensive Miter Box of Wood Has Pivoted Saw Guide

With this homemade miter box, the saw is swung either left or right to get the different angles. The base of the box is made of 1½-in. stock and the back is made of 1¼-in. wood. A ¾-in. dowel notched to take the saw is pivoted into a hole at the back. The notch should be of a depth to permit the saw teeth to just barely touch the base. Holes are drilled near the front edge of the base at various angles from the notched dowel to take a ½-in. dowel, which serves as a stop for the side of the saw. In use, the stop is set in the hole representing the angle at which the work is to be cut and the saw is placed in the notched pivot pin, after which the saw is held against the stop while making the cut.



Punches and chisels for modelmakers can be had by grinding ice picks to shape.