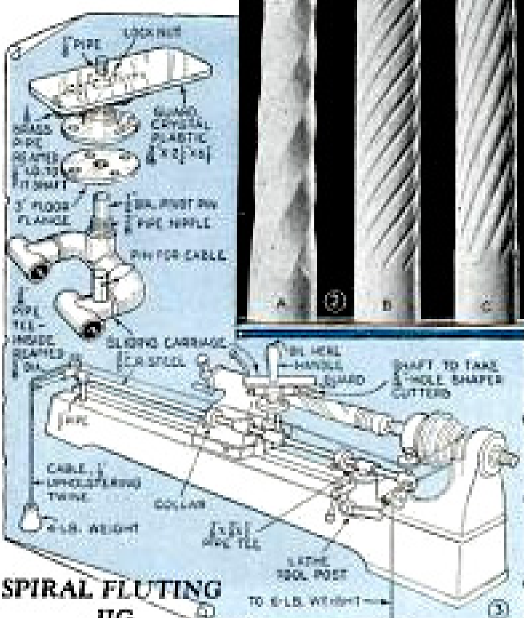
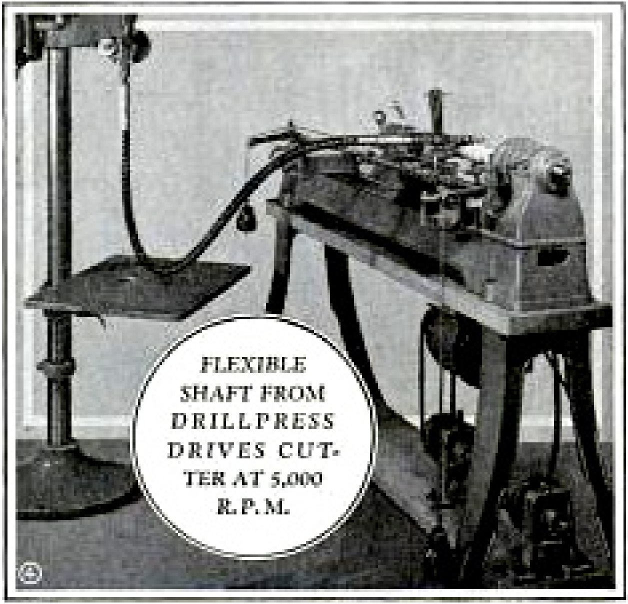
SPIRALS—

SPIRAL twists and rope moldings of all kinds, as well as straight fluting and reeding, can be done with this lathe jig. The unit, Fig. 1, is assembled from standard pipe fittings and consists of a track mounted behind the lathe to support a sliding carriage which carries a shaft, the latter being machined to fit 5/16-in. hole shaper cutters. A cable attached to the sliding carriage works over the lathe pulley to furnish the spiral feed, the work being rotated by the cable as the carriage is pulled along the track.



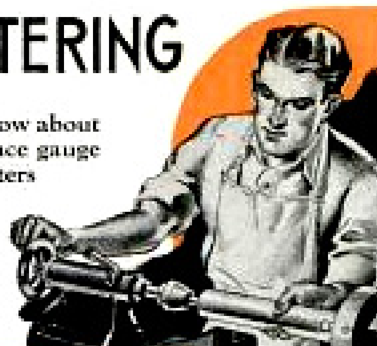
SPIRAL FLUTING JIG

Fig. 3 shows the essential points in construction. The track is ⅝-in. diameter cold-rolled steel, which is fitted into two pipe tees. These are provided with short lengths of ½-in. pipe to fit inside two regular lathe tool posts. The track is adjusted in or out, and up and down as required, in this manner. The sliding carriage is made from flangeless pipe fittings, held together with short nipples. Two 3-in. floor flanges are machined to make the turntable, the upper one of these being fitted to a ¾-in. pipe tee which supports the shaft bearing. The shaft is machined to ½-in. diameter to fit the bearing and to make connections with a flexible shaft. The latter can be driven with a motor or from your drill press as indicated in Fig. 4. The working end of the shaft is machined and threaded to take standard shaper cutters. Spirals of various pitches can be obtained



by working the cable over any of the four steps of the lathe pulley, the lead of the spiral being equal to the circumference of the pulley over which the cable is run. Various shaper cutters can be used to obtain different effects. In Fig. 2, example A is cut with a straight cutter; B with a round-nose cutter, and C is made with a concave shaped cutter. Combining B and C would give the familiar spiral twist. A depth collar is used to control the depth of cut. Straight fluting and reeding can be done by turning the shaft at right angles to the work and disengaging the cable.

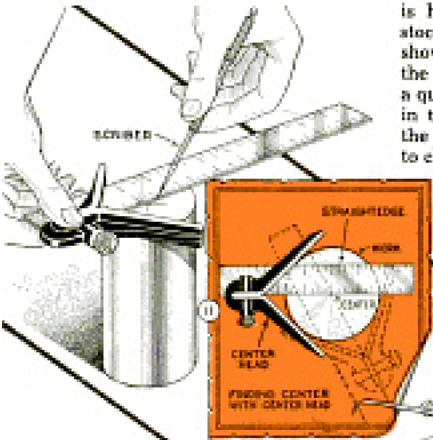
CORRECT CENTERING

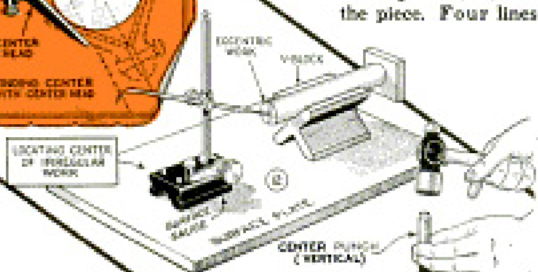


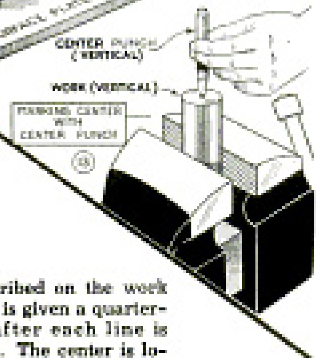
What every lathe owner should know about using calipers, center square, surface gauge and bell punch to locate centers

ACCURATE turning of both round and square work begins with proper centering. Tool steel and cast iron in particular must be centered accurately, the former to assure that the decarbonized surface layer is removed completely so that the steel can be hardened properly, and the latter so the tool will cut through the scale and not be dulled by this hard surface layer.

Methods of Locating Centers: While a centering machine is generally used in large shops, small shops must use hand methods. Where great accuracy is not required







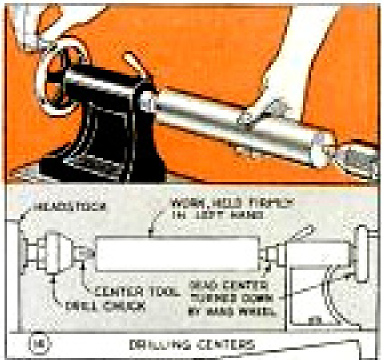
and rapid work is essential, short pieces of stock can be mounted in a universal 3-jaw chuck, and a drill chuck with a small drill installed in the tailstock, as in Fig. 1. While revolving the work, the drill is slowly fed into it with the hand wheel. In this job as in all lathe work, it is necessary that the lathe centers be in alinement. Figs. 2 to 5 inclusive show what happens when centering is improperly done.

Round work can be centered with a hermaphrodite caliper, Fig. 10. The caliper is adjusted to a slightly greater radius than that of the stock and four arcs are struck about the center as in Fig. 7. The center of the stock is then located by drawing two diagonals cutting the intersections of the arcs, Fig. 7. In order that fine scribed lines can be seen clearly, a solution of copper sulphate in water is applied to the steel with a wad of cotton or a rag, as shown in Fig. 9, until a copper coating forms. Clear lines can be scribed on this surface with very little pressure. Another method is to coat the end of the stock with chalk. The center of rectangular stock is located by drawing two diagonals across the end, as shown in Fig. 8. The intersection of these lines is the center of the piece.

The center head of a combination square is handy for locating centers on round stock. Place the head against the stock as shown in Fig. 11 and scribe a line along the straightedge. The work is then moved a quarter-turn and a second line is scribed in the same manner. The intersection is the center of the piece. It usually is wise to check by scribing a third line. On some irregular work the method illustrated in Fig. 12 is very helpful. The piece to be centered is laid in a V-block on a surface plate and the surface gauge is adjusted to approximately the center of the piece. Four lines are scribed on the work which is given a quarter-turn after each line is drawn. The center is located by the diagonal-line method, and the center of the other end is found in the same way.

Center Punching: After the center has been located, the work is clamped in a vise and the center is marked with a center punch and a hammer, as shown in Fig. 13. After both centers have been center-punched, the work is placed in the lathe and turned by hand, marking any high spots at either end with chalk, as shown in Fig. 17. The piece is replaced in the vise and tapped again with the center punch, which is driven toward the high spot to "drift" the mark to the central point, as shown in Fig. 16. Finish the indentation by driving the punch vertically. Test again between centers and repeat if necessary until tests show that the indentation is truly centered. Unless extreme accuracy is required, use a bell center punch, Fig. 18. This tool will locate centers on round stock in one operation with sufficient accuracy for ordinary work. Simply place it over the end of the stock and strike the plunger lightly with a hammer.

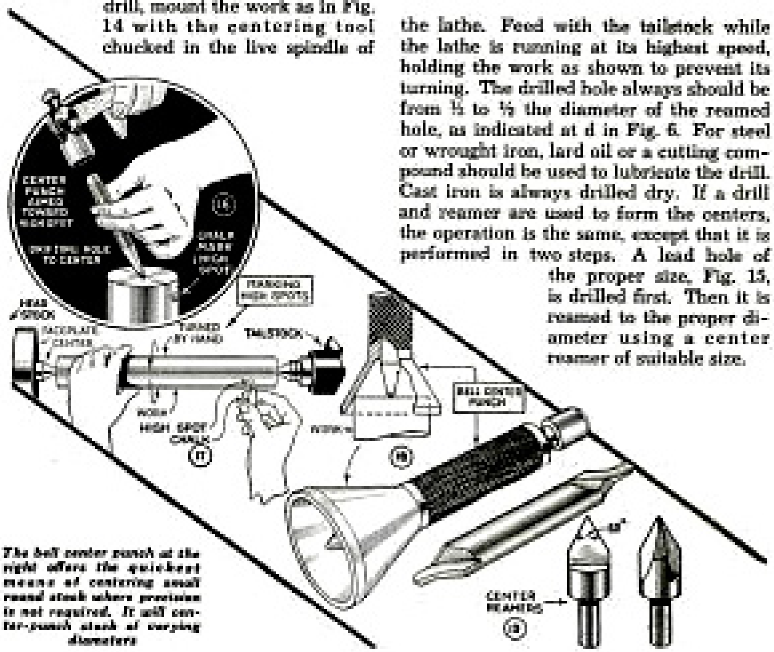
Drilling the Centers: The center can be formed in one operation with the center drill shown in Fig. 14, or in two steps with a drill and reamer. Three types of centering tools are shown in Fig. 19. The upper detail shows the combination center drill while the lower-right detail shows two types of center reamers. Drill and reamer sizes for work of various sizes are given in Fig. 15. The centering tool or reamer should match the center being used, that is, a 60° reamer for the regular 60° lathe center. To use the combination center drill, mount the work as in Fig. 14 with the centering tool chucked in the live spindle of the lathe. Feed with the tailstock while the lathe is running at its highest speed, holding the work as shown to prevent its turning. The drilled hole always should be from ⅓ to ½ the diameter of the reamed hole, as indicated at d in Fig. 6. For steel or wrought iron, lard oil or a cutting compound should be used to lubricate the drill. Cast iron is always drilled dry. If a drill and reamer are used to form the centers, the operation is the same, except that it is performed in two steps. A lead hole of the proper size, Fig. 15, is drilled first. Then it is reamed to the proper diameter using a center reamer of suitable size.



SIZES OF CENTERS

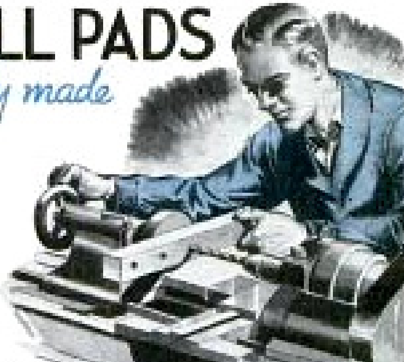
Diameter of Work in Inches	[illegible] in Inches	[illegible] in Inches
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]

(15)



The bell center punch at the right offers the quickest means of centering small round stock where precision is not required. It will center-punch stock of varying diameters

Set of Lathe DRILL PADS *easily made*

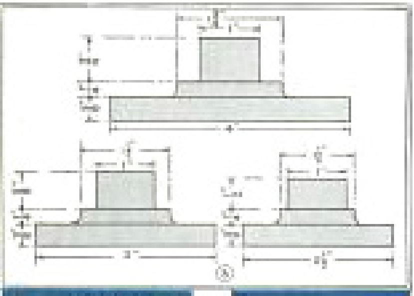


Fitted in a lathe tailstock spindle these accurately turned pads enable you to do precision drilling on a variety of work

By CHESTER W. WOODSON

THERE'S a definite advantage in making drill pads in sets for you are then able to handle a greater range of work. For example, if the object to be drilled is of fairly large size, Fig. 1, you can select a pad which will give sufficient brazing surface for adequate support of the material or part being drilled, and where you make the pads yourself it's an easy matter to adapt their range to your own work. Fig. 6 gives the general dimensions for a set of four pads adapted for use with a 9-in. lathe. Of course, if you should have special requirements, these sizes need not be followed closely. But whether made larger or smaller than the sizes given, it's a good idea to keep the proportions very nearly the same.

First of all, you will need to turn wood patterns as in Fig. 2. These should be turned from a close-grained wood such as maple, sanded smooth and given at least two coats of shellac. Allow ⅛ in. all over for shrinkage of the casting and for machining. Also, it is necessary to bevel the edge and the center hub slightly



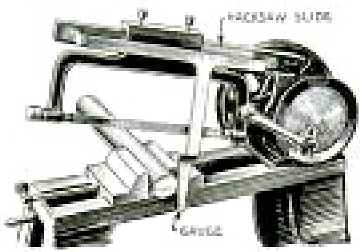
so that the pattern will draw from the mold. You can see this bevel on each of the three patterns in Fig. 2. When you take your patterns to the foundry, specify gray iron castings, for this material machines easily.

Center the castings in the lathe chuck with the hub out as in Figs. 3 and 7. Finish all over and bore for the No. 2 Morse taper shank. The latter can be made easily from a discarded drill bit by shouldering the shank to a force fit as indicated in Figs. 3 and 4, the latter showing how the Morse taper shank is forced into the hub of the pad with an arbor press. Of course, you have to be very particular about measurements on the taper shank to get a proper force fit.

Finally, the chuck is removed from the lathe and the tapered shank of the pad inserted in the headstock spindle. Then you turn down the rim to the required diameter and true the face of the pad, finishing with a light, slow cut to give a smooth surface. Finish all four pads the same way.

Gauge Locates Work on Hacksaw

Cut from heavy sheet metal and screwed to the saw guide, this gauge enables you to locate work in the right position on a power hacksaw without lowering the blade. The lower end of the pointer must be bent so that it is directly in line with the blade, and the pointer must be located so it will not interfere with the full stroke of the saw.



Giant 280-Ton Lathe Turns 120-Ton Castings

For machining and turning heavy castings or forgings weighing up to 120 tons, a giant lathe produced in Germany weighs 280 tons. Its centers are high enough to handle a casting nearly twelve feet in diameter if needed, and the distance between centers is twenty-six and one-half feet. Two large tool holders or carriages on opposite sides make it possible to take two cuts at one time; these can consist of the rough and finish cut, or both may be finish cuts of different diameters.

Photo shows giant lathe undergoing tests at factory. Having centers more than seventy-eight inches high, machine handles castings close to twelve feet in diameter and weighing 120 tons. Two cutting tools work at one time