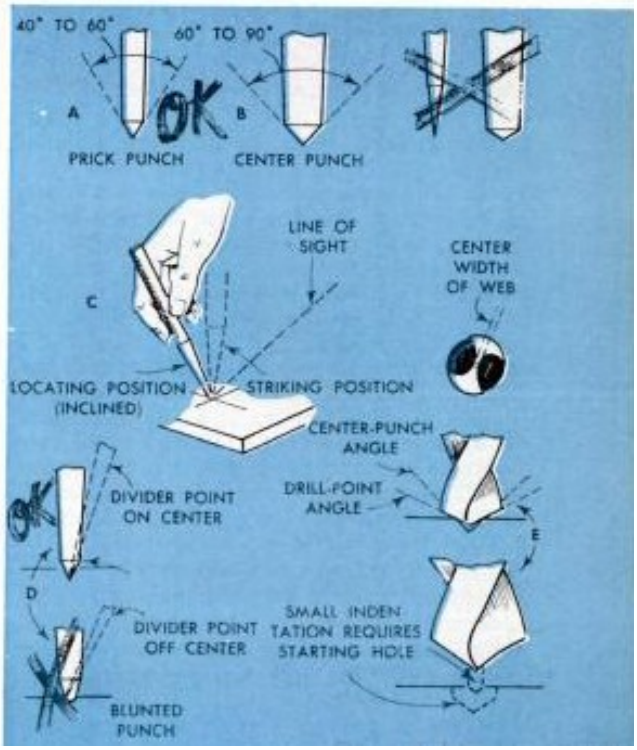
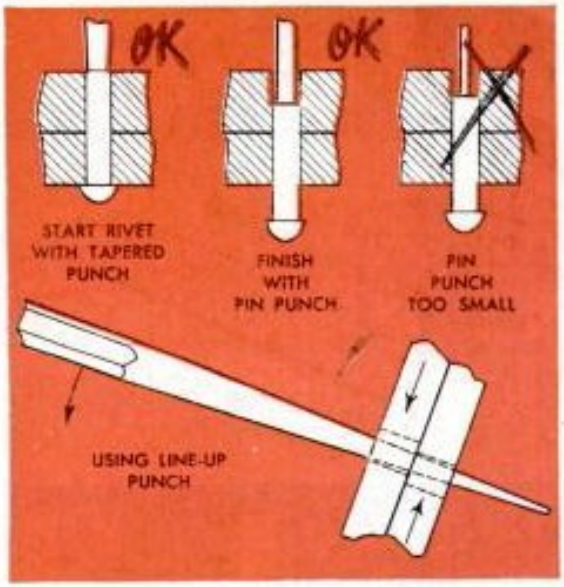
SHOP NOTES

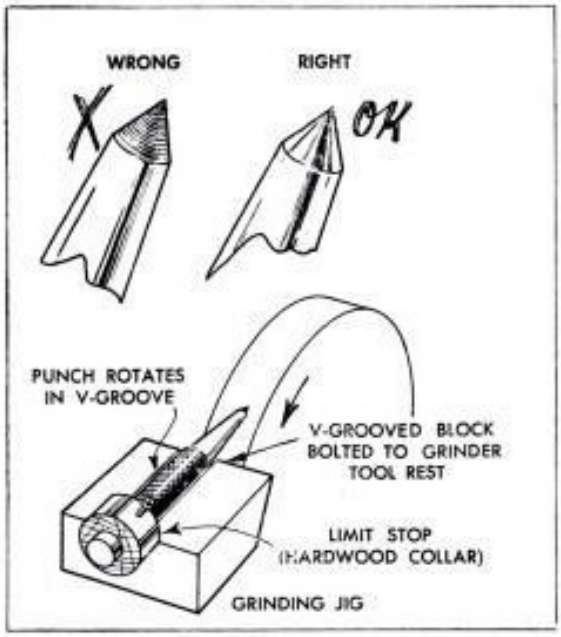
How to use
HAND PUNCHES

ACCURATE LAYOUTS on metal begin with precise punch marks made on the surface. The accuracy of the indentations determines to a certain extent the accuracy of the work, especially when starting drills and laying off with scribers and dividers from a center line or base line. That's why diemakers, machinists and others who regularly use center punches and prick punches in layout work take special care to prevent damage to the needle-sharp points. Various types of punches in common use are shown above, in details A to L inclusive. Details A, B, C, D and E show sharp-pointed punches. The others, F to L inclusive, classify as punches but are used for various types of work.

Center punches: The details at the right, A to D inclusive, show methods of using sharp-pointed punches in layout work and in making indentations in metal for starting drills. One trick in setting the point of the punch accurately is shown in detail C. The punch is inclined so that the point is seen readily, and after locating the point, the punch is returned to the vertical position

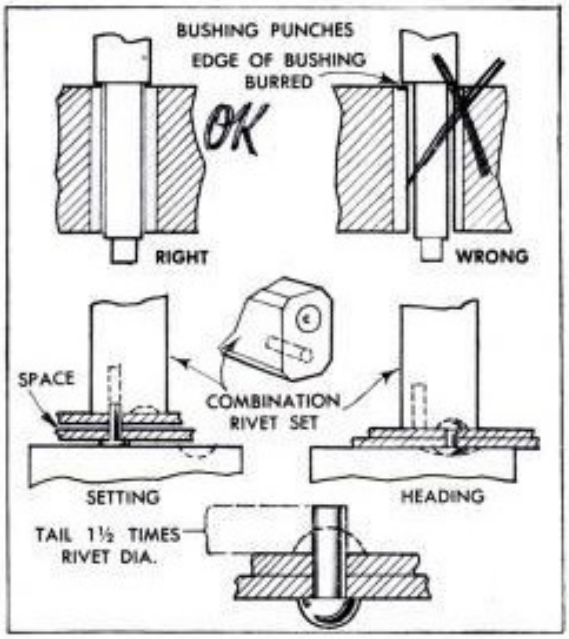






before striking with the hammer. In hole layout, the holes are located with light prick-punch marks and if large holes are to be drilled, starting holes or pilot holes are first drilled to assure concentricity. Indentations in the metal to anchor one leg of dividers should be made with a needle-sharp punch, as otherwise the dividers may shift. Sharp-pointed punches should always be ground concentrically so that the point will be located exactly on the axis. A simple grinding jig made as in the right-hand detail above will do the trick. A similar jig is pictured in use in the photo at the left. The punch is guided by a V-grooved block of hardwood and grinding depth is limited by a hardwood collar attached to the barrel, or body, of the punch by means of a setscrew. Octagon punches can be concentrically ground by slipping the body of the punch into a short length of tubing. In the upper details on the preceding page, detail B shows one type of automatic center punch which is a favorite with machinists. No hammer is required as pressure on the movable sleeve, which serves also as the handle, compresses a spring. When pressure is built up to a certain point a striker is released. The striker delivers a sharp blow on the point. This type of punch also is supplied with adjustable spacing arms, detail C, which are used to locate and punch centers equidistantly along a scribed line. The bell punch, detail D on the preceding page, is self centering and is made especially for marking centers on round stock. A similar type, detail E, is supplied in a range of shank sizes and is designed for laying out registering holes on matching pieces of stock.

Pin, machine and lineup punches: Pin punches are used for driving out pins, rivets and keys. They come in a wide range of sizes and have straight round shanks and flat faces. Machine and lineup punches are similar except that the shanks are tapered. The shanks of lineup punches are much longer than either the pin or machine punches. In starting a rivet or pin, first use the machine punch to start, or "break" the rivet. Then finish driving it out with a pin punch. The reason for this procedure is that the tapered shank of the machine punch has much greater strength than the straight shank of the pin punch. In driving out pins and rivets, select a pin punch having a shank diameter only slightly smaller than the rivet or pin, as otherwise the shank may be broken. Lineup punches are used to align parts which are to be bolted together as in machine assembly. The long tapering shank will enter holes which are out of register and by moving the punch sidewise the

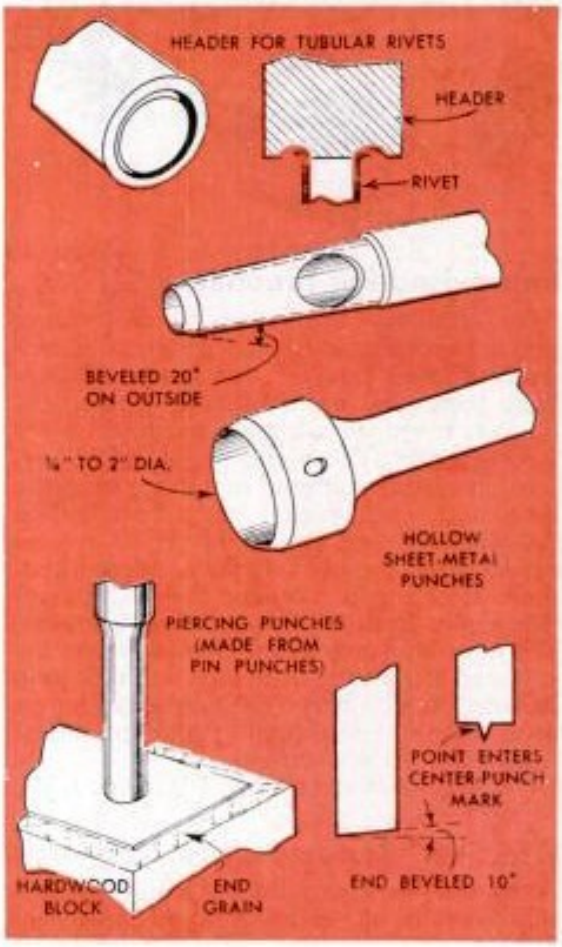


holes can be brought into line and the bolt inserted.

Bushing punches, or drivers: Small bushings usually are inserted or driven out with a bushing punch, or driver, as in the upper details above. Generally these punches have stepped shanks of two or more diameters and are supplied in a variety of sizes. The important thing in driving bushings is to use a punch of the correct size. If the punch is too small, the end of the bushing may be upset or burred.

Riveting punches, or sets: The combination setting and heading punch shown in the lower details above is widely used in hand riveting. It is rectangular in shape and has a hole drilled in the end to take the tapered point of the solid rivet in a fairly snug fit. A shallow concavity, or "dimple," ground in the same end of the punch is used to head the rivet after setting. Flat-headed solid rivets are backed with a rivet bolster or anvil. Round-headed rivets fit into dimples ground in the bolster. It is important that the tail of the rivet project only 1½ times its diameter after setting. If the tail is longer the rivet may split. If shorter, the upset end will have greatly lessened holding power.

Tubular-rivet header: Tubular rivets, and also split rivets, are headed with a tool like that shown in the upper details at the right. The header is turned with a short projection at one end which enters the hollow end of the rivet. A concave groove turned in the end of the header at the base of the projection turns, or rolls, the rivet edge down to form a clinching rim. On soft materials, such as fabrics and leather, thin washers are sometimes placed over the end of the rivet before clinching.



Hollow and piercing punches: The center and lower details above show two common types of hollow punches and the solid piercing punch. The hollow punches have beveled cutting edges and are made for both metals and fabrics. Piercing punches are used to form rivet holes and for decorative work on sheet metal. They must be sharpened often at the bevel indicated. ★ ★ ★