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2,587,516

PUNCH

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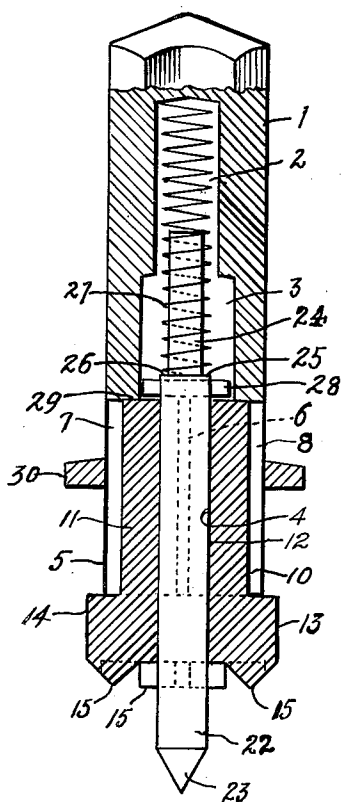


Fig. 1

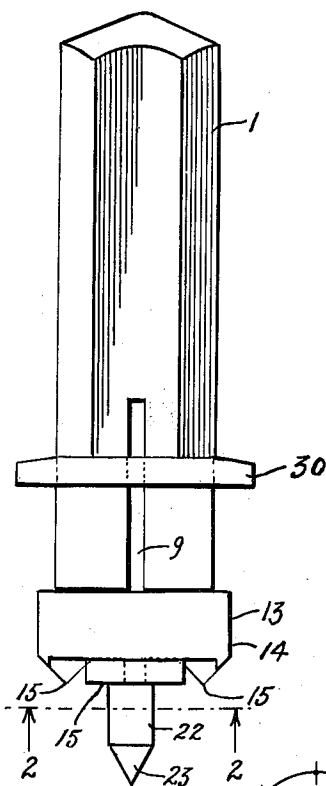


Fig. 2.

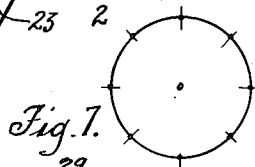


Fig. 3.

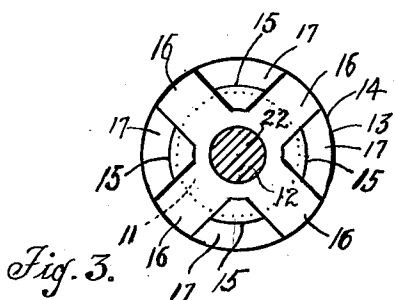


Fig. 4.

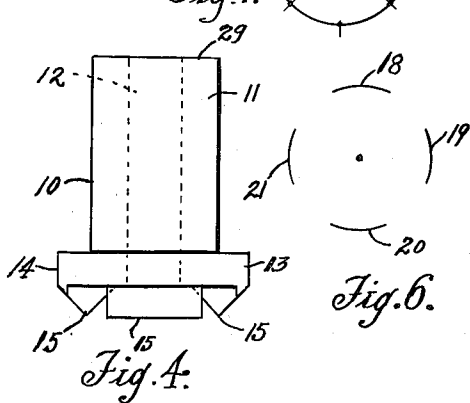


Fig. 5.

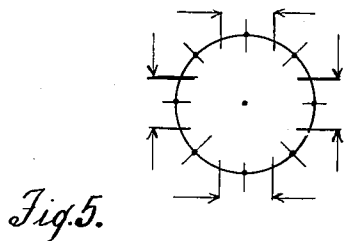


Fig. 6.

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UNITED STATES PATENT OFFICE

2,587,516

PUNCH

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1 Claim. (Cl. 33—191)

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This invention relates to improvements in a punch and has for its primary object to provide a punch which is particularly adapted to be used in layout work by toolmakers, machinists, layout men and the like where a high standard of accuracy is required.

An object of the invention is to provide a punch that is strongly-built, free from mechanical deficiencies, and is provided with means for quick, accurate and sure marking of a hole to be drilled.

In laying out a hole or holes to be drilled in tools, jigs, fixtures, machine parts, plates, machine parts for automobiles, airplanes, and other mechanical devices, it is customary, first to prepare the surface, then locate the center of the hole to be drilled, then fix the center with a fine punch. A circle is then drawn with a very fine divider or compass, the exact size of the hole. In the circumference of the circle there are then placed several punch marks to act as guides in the drilling operation.

The above procedure requires time to place the center punch marks in the circle, and in doing so sometimes errors occur, because the circle may be under or over the exact size required, with the result that the work must be gone over again, which results in the loss of time, besides the eye strain imposed upon the layout man in making the check.

Of course, it is to be understood that the drill is properly ground because full 95 per cent of the difficulties encountered in drilling arise from faulty grinding of either of the "point" or the "lip clearance" of the drill.

An embodiment of the invention by way of example is illustrated in the annexed drawing, in which like reference numerals designate like parts throughout the same.

Figure 1 is a view partly in elevation and partly in section of a punch embodying the invention.

Figure 2 is a view in elevation of a punch and illustrating the collet like holder, adapted to removably mount the punch therein.

Figure 3 is a bottom of the punch looking in the direction of the arrows 2—2 in Figure 2.

Figure 4 is a view in elevation of the punch member removed from the holder.

In Figure 5 there is a diagrammatically shown, by way of example, how the sectors produced by the punch read with the circle now employed in the layout. The sectors produced by the punch are indicated by the arrows facing one another.

Figure 6 is a plan view illustrating the sectors formed by the punch, illustrated in Figure 2.

Figure 7 is a plan view showing the inscribed

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circle and the center punch marks therein, as now generally used by layout men.

Referring more particularly to the drawing by characters of reference, reference numeral 1 designates a holder or handle provided with collet like means for removably mounting a punch therein.

In the handle or holder there are provided three concentric longitudinally extending bores, an upper bore 2, a middle bore 3 and a lower bore 4. The wall 5 of the lower bore is provided with a plurality of elongated through slots 6, 7, 8 and 9 radially extending and circumferentially spaced therein, adapted to provide a collet like hold on the removably mounted punch when mounted in the holder.

The punch 10 is provided with a cylindrical portion 11, adapted to be removably held in the lower bore 4 by the collet like structure of the holder. The punch is provided with a smooth longitudinally extending through bore 12 adapted to receive a centering means hereinafter described. The punch is provided with a head portion 13 machined to a predetermined diameter as at 14 in the respective figures of the drawing, to produce a marking edge 15. The edge is produced by machining the head portion to a predetermined obtuse or acute angular configuration.

The surface of the punch is interrupted by milling a plurality of grooves across its face as shown at 16 in Figure 3, to produce a plurality of segments 17 as shown in Figure 3. The sectors which are limited by the arrowed lines illustrated in Figure 5 are a replica of the marking edge 15 on the segmental section of the punch, a bottom view of which is illustrated in Figure 3. In instance where the hole to be laid out is of very small diameter, the marking edge of the punch may be left intact because of the difficulty of milling grooves to interrupt it.

In Figure 6, the sectors 18, 19, 20 and 21, illustrates the sectors produced by the punch illustrated in Figure 2.

In Figure 7 the system now used is illustrated. It is obvious that a toolmaker, machinist or layout man will appreciate the fact when Figures 6 and 7 are carefully studied, that the punch has a great time-saving advantage and that the precision of the machined marking edge produces more easily, surely and rapidly, accurate marking for a drilling operation than the present system now used.

In the holder there is provided a centering means 22 scientifically hardened and ground. Its

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conical end 23 is precision ground so that it is adequate for maintaining the high standard of accuracy in vogue today in the layout field. The centering means is slidably and rotatably mounted in the bore in the punch, so that wear in the bore in the punch is retarded and its movement therein is firm and steady.

The upper end portion 24 of the centering means is reduced to form a shoulder 25 on which the lower end 26 of the helical spring 27, of the 10 expansible type may bear, and normally holds the centering element in the position shown in Figures 1 and 2. In the centering element there is provided a transverse pin 28 that prevents it from being forced out of the holder by engaging 15 the top end 29 of the punch.

The flange 30 which tightly cooperates with a portion of the periphery of the wall of the handle, serves to prevent the portions from being dissymmetrically forced outwardly in a radial direction when the punch is mounted in the collet like portion of the handle. The flange also serves to position the fingers on the punch while in use to give ease in handling.

The operation of the punch is as follows:

After the center has been located for the hole to be drilled, the pointed end of the centering element is placed in the punch mark made to indicate its center, the holder is then pushed down on the centering element until the marking edges are brought into contact with the surface of the material to be drilled, the marking edge being 30 machined assures a firm contact therewith so that it will not tilt or topple over, the holder is then struck with a hammer on its top end, with the result that the sectors are indented on the surface to indicate the proper position of the hole to be drilled.

I am aware that my invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof; and I therefore desire that the present embodiment be 40 considered in all respects as illustrative and not

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restrictive, reference being had to the appended claim rather than to the foregoing description to indicate the scope of the invention.

Having thus described my invention, what I claim is:

A tool of the class described, comprising, in combination, a holder having three bores therein concentrically positioned with the axis thereof consisting of an upper bore, a middle bore and a 10 lower bore, the wall of the lower bore being provided with diametrically aligned slots adapted to provide a collet like structure, a removably mounted punch mounted in the collet like structure, a centering element slidably mounted in the 15 punch and provided with a reduced upper portion to provide a shoulder, and being transversely apertured adjacent said shoulder to permit insertion of a pin therethrough, the pin adapted to prevent the centering element from being 20 forced out of the punch, an expansible spring mounted on and surrounding the reduced upper portion of the centering means and in the upper bore, the pin adapted to slide friction free in the middle bore, a flange mounted externally on the 25 punch and cooperating with the collet portions formed by the diametrically aligned slots to prevent the punch from forcing the collet portions dissymmetrically when the punch is mounted in the collet like portion of the holder.

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