July 4, 1967 E. W. FAGERBERG, SR 3,328,890

LAYOUT AND MARKING TOOL

Filed March 8, 1965 2 Sheets-Sheet 1

Fig. 1.

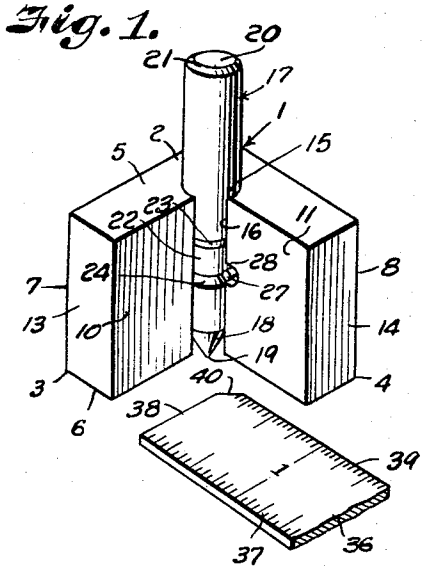


Fig. 3.

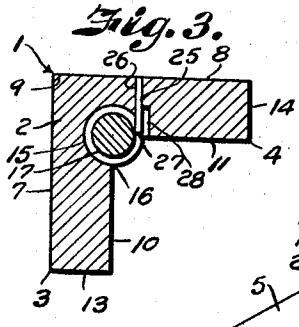


Fig. 2.

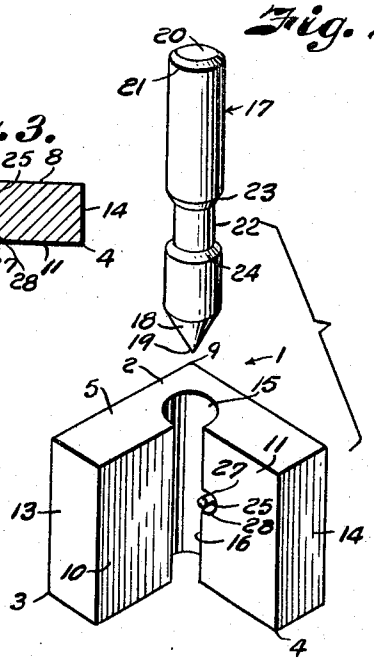


Fig. 5.

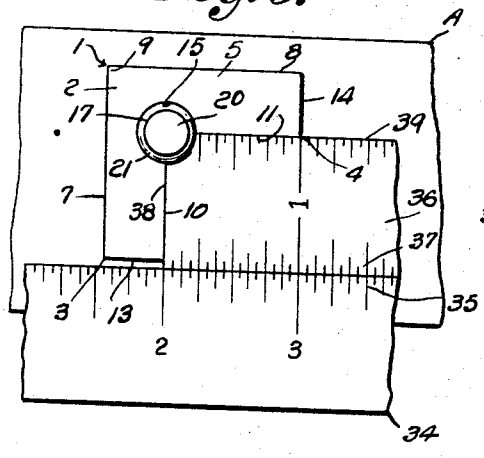


Fig. 8.

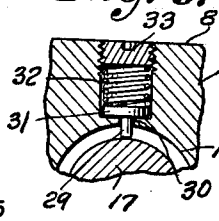


Fig. 4.

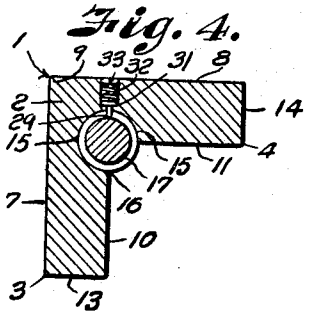


Fig. 7.

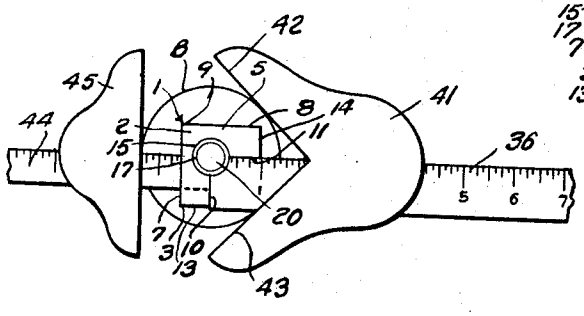
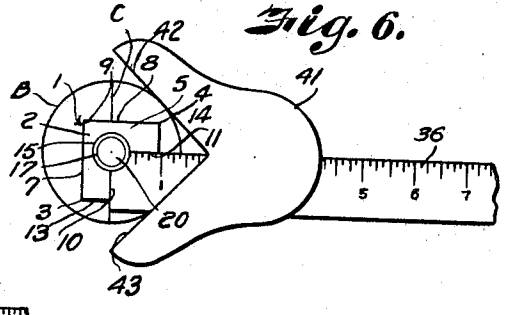


Fig. 6.



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LAYOUT AND MARKING TOOL

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Fig. 9.

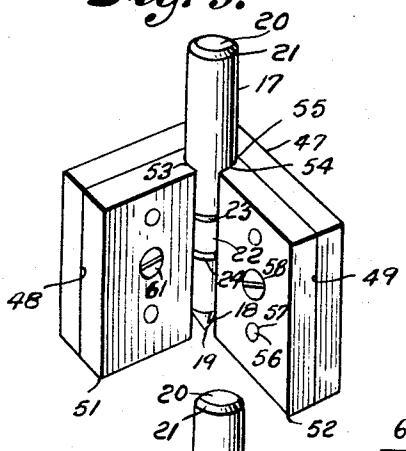


Fig. 11.

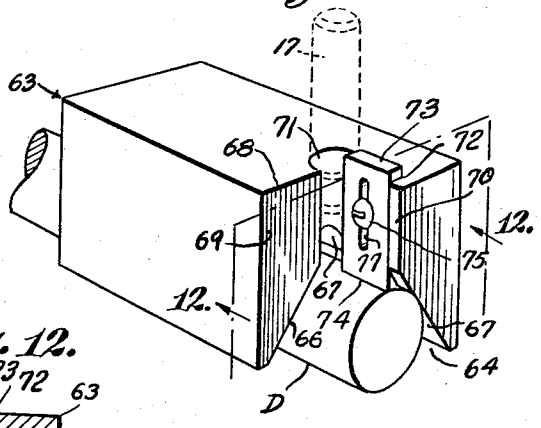


Fig. 10.

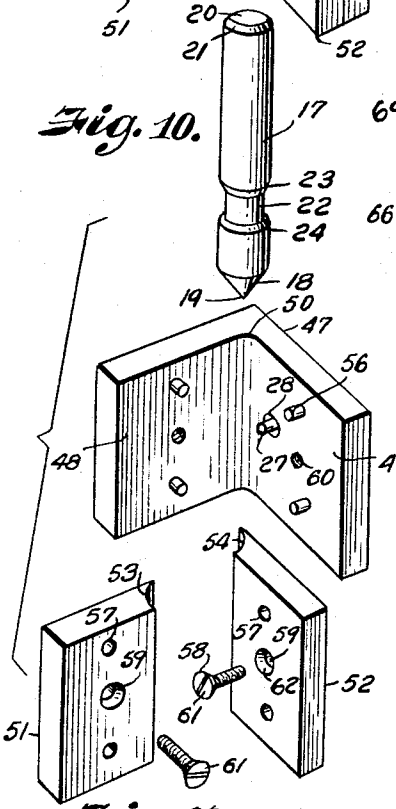


Fig. 12.

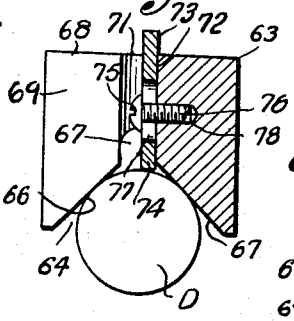


Fig. 13.

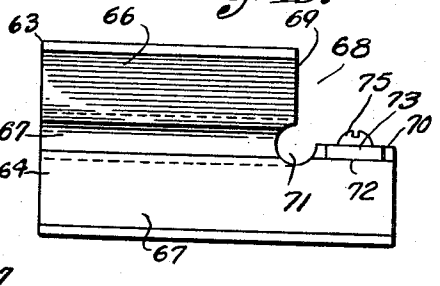


Fig. 15.

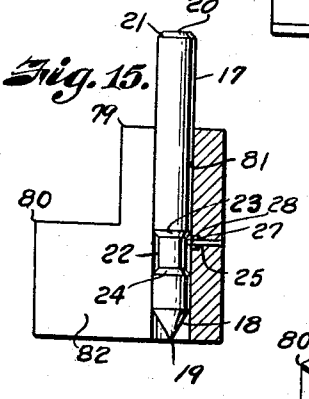


Fig. 14.

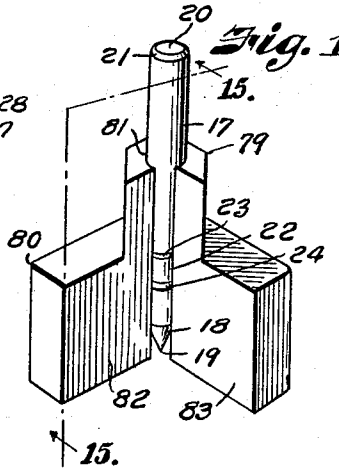


Fig. 17.

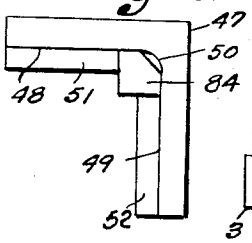


Fig. 16.

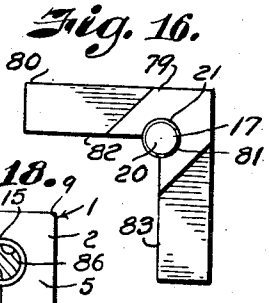
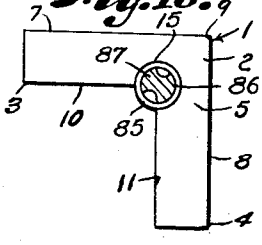


Fig. 18.



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3,328,890

LAYOUT AND MARKING TOOL

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7 Claims. (Cl. 33—189)

This invention relates to a marking tool for laying out workpieces, such as in the making of tools, dies, and the like, where accuracy is required.

For example, in making tools, dies, and the like, punch marks are required to locate start of certain drilling, boring, and other operations. Previously the site of such punch marks has been located by measuring location thereof, and drawing center lines in both right angular directions thereacross, after which a centering punch is used in making a punch mark at the intersection. Such layout of punch marks and the making thereof require the utmost skill, first in measuring where the lines are to be drawn, drawing the lines, and then making the punch marks. If such operations are not performed with extreme care, the site of the punch mark may not only be off, but it is difficult to place the point of the punch exactly on the intersection of the crosslines, and even then the punch is apt to draft off during tapping thereon.

It is, therefore, a principal object of the present invention to provide a layout and marking tool with a self contained punch, so as to locate the point of the punch with accuracy and eliminate the necessity of drawing center lines

In carrying out this object of the invention, I have provided an angular member having right-angularly arranged faces that are easily located on the work with the aid of a measuring rule or rules, and which slidably retains a punch with the axis and point thereof fixed in the intersection of the planes of the right-angular faces, so that the only operation is to locate the tool with the right-angular faces relatively to the workpiece and to tap the punch. Such a tool may be easily shifted from one punch mark to the site of the next by locating one measuring rule in fixed position on the workpiece and sliding the other rule along the graduations of the fixed rule while the right-angular faces are retained in contact with the movable rule.

It is a further object of the invention to provide a tool of this character for easily and accurately making punch marks on the ends of a cylindrical workpiece or on the cylindrical surface thereof.

Further objects of the invention are to provide a tool of this character that is easily manufactured, and in which the punch is retained in the tool or withdrawn therefrom.

It is also an object of the present invention to provide a tool that includes a stepped angular body, so that by reversing the punch the tool may be used for making punch marks on small workpieces.

Another object of the invention is to provide for removal of the punch and replacement thereof by a drill bushing, so that the angular member of the tool may be used as a drilling jig, and eliminate the necessity of a punch.

In accomplishing these and other objects of the invention as hereinafter pointed out, I have provided improved structure, the preferred forms of which are illustrated in the accompanying drawings, wherein:

FIG. 1 is a perspective view of a tool constructed in accordance with the present invention and showing a portion of a measuring rule used in conjunction therewith.

FIG. 2 is a perspective view of the parts of the tool shown in disassembled, spaced relation.

FIG. 3 is a cross sectional view showing the spring retainer for retaining the punch in the angular body member of the tool.

FIG. 4 is a similar cross section showing a modified form of retainer.

FIG. 5 is a plan view of the tool positioned on a workpiece and showing the measuring rules associated therewith by which the tool is located on the workpiece for making one or a series of punch marks in a face of the workpiece.

FIG. 6 is a similar view showing use of the tool for making a center mark in the axis of a cylindrical workpiece.

FIG. 7 shows a similar use of the tool by which the tool may be adjusted without the necessity of scribing a diametrical line on the end of the workpiece.

FIG. 8 is in an enlarged portion of the section shown in FIG. 4, to better illustrate the punch retention means.

FIG. 9 is a perspective view of a tool constructed in accordance with the present invention, showing a composite construction of the angular member of the tool.

FIG. 10 is a perspective view of the parts of the tool illustrated in FIG. 9, and shown in spaced relation to better illustrate the construction thereof.

FIG. 11 is a perspective view of a modified form of tool, particularly adapted for making punch marks on the rounding surface of a cylindrical workpiece and showing the punch in dotted lines.

FIG. 12 is a cross section through the tool of FIG. 11, taken on the line **12—12** of FIG. 11.

FIG. 13 is a bottom plan view of the tool illustrated in FIG. 11.

FIG. 14 is a perspective view of a further modified form of the invention, having a stepped angular body.

FIG. 15 is a section on the line **15—15** of FIG. 14.

FIG. 16 is a plan view of the tool illustrated in FIGS. 14 and 15.

FIG. 17 is a plan view of a further modified form of tool equipped with a center punch of different cross sectional shape.

FIG. 18 is a plan view of the view of the tool showing insertion of a drill guide bushing, for a drill which is illustrated in section.

Referring more in detail to the drawings, and first to the form of the invention illustrated in FIGS. 1 to 3, inclusive:

1 designates a layout and marking tool constructed in accordance with the present invention, and which includes an angular shaped member **2** having right-angularly extending wings **3** and **4**. The upper and lower faces **5** and **6** of the angular shaped member **2** are flat and parallel with each other, so that either the upper or lower face **5** or **6** can be used to contact a workpiece when using the tool as later described. The outer faces **7** and **8** are in planes extending at right angles to each other and meeting at the corner **9**. The inner faces **10** and **11** are formed in planes also extending at right angles to each other and parallel with the faces **7** and **8** to intersect on an axis. The terminal faces **13** and **14** of the wings are located at right angles to the inner and outer faces **7–10** and **8–11**, so that all vertical and horizontal edges of the body member **2** are at right angles to each other.

Formed in the body member **2** on the intersecting axis of the inner faces **10** and **11** is a bore **15**. The bore **15** intersects the faces **10** and **11** to provide a vertical opening **16** to slidably and snugly pass a punch member **17**.

The punch member **17** is best illustrated in FIG. 2, and is of a cross section corresponding to the cross section of the bore. The punch is somewhat longer than the height of the angular body member and has a cone-shaped end **18** terminating in a point **19** exactly in registry with the axis of the punch member. The opposite end **20** is substantially flat and the periphery thereof is beveled as at **21**. An intermediate portion of the punch member

has an encircling recess or groove 22 and tapering annular shoulders 23 and 24, to define therebetween the limit of movement of the punch member 17 within the angular body member of the tool. The punch member 17 is retained for such movement by means of a resilient latch 25 that is anchored in an opening 26 (FIG. 3) extending through the wing 4 tangentially with the cylindrical bottom of the recess 22, as best shown in FIG. 3. The inner end 27 of the resilient latch projects into the annular recess 22 and the wing 4 is notched on the inner face thereof as at 28 to accommodate yielding movement of the latch to release the punch member 17 when the punch member is shifted beyond the limiting movement thereof, so that one or the other of the beveled shoulders 23–24 cams the latch into the notch 29 and permits complete withdrawal of the punch member when desired.

In FIGS. 4 and 8 is illustrated a modified form of latching member which includes a pin 29 slidable in an opening 30 located in the extended plane of the inner face 10 of the wing 3. The opening 30 is counter-bored to accommodate a head 31 on the pin and a coil spring 32 that resiliently retains the pin in projecting relation with the annular recess 22 for limiting movement of the punch member and which serves the same purpose as the latch 25 previously described. The coil spring 32 is backed within the counterbore by a plug 33 closing the outer end thereof, as shown in FIG. 8.

In using the tool, for example, in making punch marks in a workpiece A, a measuring rule 34 having a measuring scale 35 along one marginal edge thereof is placed upon the face of the workpiece A in which punch marks are to be formed. Another rule 36 is placed along the edge portion of the rule 34 having the graduations 37 and the layout and marking tool 1 of the present invention is supported with the lower face 6 thereof resting upon the face of the workpiece, with the inner face 10 abutting the end 38 of the rule 36 and the side edge 39 engaging the face 11 as shown in FIG. 5. A corner of the rule 36 is cut off at an angle, as indicated at 40 (FIG. 1), to avoid interference with actuation of the punch. Then by sliding the rule 36 along the edge of the rule 34 a distance corresponding to the required location of the center mark, for example, two inches from the end of the rule 34, a punch mark is made by tapping upon the end 20 of the punch 17. A series of punch marks may be made in desired location along the length of the workpiece by making corresponding measurements from the site of the first punch mark.

In FIG. 6 the tool is used for making a punch mark in the center of a cylindrical workpiece B. In this instance, a head 41 is used on the rule 36. The head has right-angular edges 42 and 43 to tangentially engage spaced side portions of the cylindrical workpiece B. The point 19 of the punch 17 is brought into registry with a diametrical line C drawn across the end of the cylindrical workpiece, so that when the face 10 of the angle member registers with the diametrical line C, the point of the punch will be in the exact axis of the workpiece and a center mark may be made without drawing further lines.

In FIG. 7, a measuring rule 44 equipped with a cross-head 45 is used in conjunction with the measuring tool of FIG. 6, so that the point of the centering punch may be located in exact registry with the axis of the cylindrical workpiece without the necessity of drawing even the diametrical line shown in FIG. 6.

In the form of the invention shown in FIGS. 9 and 10, the angular body member is of composite construction in that it includes an outer angle member 47 having inner faces 48 and 49 joining in an arcuate groove 50 conforming to the radius of the centering punch 17. Fixed to the faces 48 and 49 are face plates 51 and 52 conforming in size and shape to the faces 48 and 49 and having arcuately grooved edges 53 and 54 and also conforming to the curvature of the groove 50, whereby when the face plates are applied, the grooves 50, 53 and 54 define a bore 55 for accommodating the center punch 17. The face plates 51 and 52 are securely anchored in position by means of dowel pins 56 extending into openings 57 in the face plates, and by fastening devices such as screws 58 having threaded shanks extending through openings 59 in the face plates and into threaded sockets 60 (FIG. 10) that are provided in the angle member 47. The fastening devices have heads 61 that draw the face plates tightly against the faces of the angle member and which are seated in counterbores 62, so that the heads 61 are inset. The tool of modified construction is operated in the same manner as the tool previously described.

The tool illustrated in FIGS. 11 to 13, inclusive, is particularly for making punch marks on the curved surface of cylindrical workpieces. The body member in this form of the invention comprises a generally rectangular block 63 having a groove 64 extending longitudinally of one of the faces thereof, so that side faces 65 and 66 of the groove diverge outwardly to form right-angular planes which, when extended, intersect at the axis of a longitudinal bore 67. The block is cut away at one corner thereof, as indicated at 68, to provide faces 69 and 70 located in right-angular planes intersecting at the axis of a bore 71 that extends at right angles to the bore 67, to accommodate therein a centering punch 17 indicated by the dotted lines in FIG. 11.

In order to provide a depth gauge for contacting the workpiece in the plane of the face 70 of the tool, the face 70 is recessed as at 72 parallel with the bore 71, to accommodate therein a gauge 73 having an end 74 adapted to engage the cylindrical face of the workpiece D. The gauge is adjustably retained in the recess with the outer face thereof in plane with the face 70 by a fastening device 75 having a threaded shank 76 extending through a slot 77 in the gauge and into a threaded socket 78 of the block. The depth gauge is to align the point of the punch with a diameter mark on the end of the workpiece D.

In using this form of the invention, the tool is applied as a saddle over the cylindrical workpiece D, and the gauge 73 is adjusted so that the edge 74 thereof seats upon the cylindrical surface and align the site of the punch mark with the diameter of the workpiece. The location of the point of the punch may then be adjusted relatively to the end of the workpiece by means of a measuring rule which is positioned with the end and side edges abutting the faces 66 and 67 and the edge of the rule abutting against the gauge (as in the case of the rule in FIG. 5). When the site for the punch mark is located, the punch mark may be made by tapping on the end of the punch member.

The form of the invention illustrated in FIGS. 14 to 16, inclusive, is similar to the first described form of the invention, with the exception that the angle member has stepped portions 79 and 80 so as to provide angle portions of different size. The punch member 17 is carried in a bore 81 having the axis thereof located in the extended plane of the side faces 82 and 83, in the same manner as the punch member of FIG. 1. The bore 81 and punch member are of a length to extend completely through the stepped portions 79 and 80 and to project from one or the other ends of the tool. If a relatively large workpiece is to be marked, the stepped portion 80 may be used, or if a small workpiece is to be marked, the punch may be withdrawn from the bore 81 and reinserted in the opposite direction, so that the tool may be turned over to use the small stepped portion 79 in making the punch marks in the workpiece.

FIG. 17 shows a plan view of a tool similar to FIG. 9, but showing that the invention may be constructed with a centering punch 84 of different cross section.

FIG. 18 illustrates a plan view of a tool of the type shown in FIG. 1, with the punch member withdrawn

and replaced by a bushing 85 having a bore 86 to guide a drill bit 87, so that holes may be drilled in a workpiece without the necessity of making punch marks.

What I claim and desire to secure by Letters Patent is:

1. A tool of the character described for laying out punch marks on a workpiece, including

(a) a body member having adjacent faces located in planes at right angles to each other with the planes of said faces intersecting on the axis of a bore extending through the body member in parallel relation with said faces, said body member also having a flat face at right angles to said adjacent faces for seating directly on the workpiece,

(b) a marking punch having a sliding fit within said bore and having a point on one end located in said axis at the intersection of the planes of said faces, wherein said punch has spaced apart shoulders for providing therebetween the sliding movement of the marking punch, and

(c) means for limiting sliding movement of the punch within said bore comprising a resilient member carried by the body member and having a terminal of less diameter than the spacing between the shoulders to project freely into the space between said shoulders to be alternately engaged by said shoulders, and said terminal being yieldable to permit withdrawal of the punch from the body member.

2. A tool as described in claim 1,

(a) wherein the punch has an annular groove providing said spaced apart shoulders, and

(b) wherein said resilient member has a terminal of less width than the space between said shoulders to project freely into said groove.

3. A tool of the character described for laying out punch marks on a workpiece, including

(a) a body member having adjacent faces located in planes at right angles to each other with the planes of said faces intersecting on the axis of a bore extending through the body member in parallel relation with said faces, said body member also having a flat face at right angles to said adjacent faces for seating directly on the workpiece.

(b) a marking punch having a sliding fit within said bore and having a point on one end located in said axis at the intersection of the planes of said faces, and wherein the punch has spaced apart stop shoulders.

(c) means for limiting sliding movement of the punch within said bore comprising a member slidable in the body member and having a terminal projecting into the space between said shoulders to be engaged alternately by said shoulders, and

(d) a spring carried by the body member and pressing against said slidable member to yieldingly retain the terminal in position to be engaged by the respective shoulders.

4. A tool of the character described for laying out punch marks in a workpiece, including

(a) a body member having adjacent faces located in planes at right angles to each other and at a tangent with sides of a groove of arcuate cross section,

(b) face plates for said faces of the body member and each face plate having an adjacent edge cooperating with the arcuate groove of the body member to provide a cylindrical bore having an axis in plane with working faces of said face plates,

(c) means securing the face plates to the faces of the body member,

(d) a marking punch having a sliding fit within said bore and having a point on one end located in said axis, and

(e) means for limiting sliding movement of the punch within said bore.

5. A tool for making punch marks in the sides of a cylindrical workpiece, including

(a) a body member having faces diverging from an axis of a through bore in the body member and with the faces diverging at an angle of 90°, and wherein one of said faces has a recessed portion,

(b) a punch axially movable in said bore to mark the workpiece in alignment with a diameter mark on the end of the workpiece,

(c) a depth gauge in said recessed portion to align the point of a punch with a diameter mark on the end of the cylindrical workpiece, and

(d) means for adjustably retaining the depth gauge in said recessed portion.

6. A tool for making punch marks in a cylindrical workpiece, including

(a) a body member having faces diverging from an axis of a through bore in the body member and with the faces diverging at an angle of 90°, and having a flat bottom face for support on the end of the cylindrical workpiece,

(b) a punch axially movable in said bore to mark the center of the end of the workpiece, and

(c) wherein said body member has a second set of diverging faces diverging from the axis of a second bore at right angles to the first named bore for interchange of said punch in one and the other of said bores.

7. A tool for making punch marks as described in claim 6, wherein

(a) one of said second set of faces has a recessed portion and a depth gauge in said recessed portion provided with a face registering with the said one face to align the point of the punch with a diameter mark on the end of the workpiece, and

(b) means for adjustably retaining the depth gauge in said recess.

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