

Dec. 9, 1969

J. K. SAMHAT

3,482,324

COMBINED OPTICAL SIGHT AND CENTER PUNCH

Filed Dec. 11, 1967

2 Sheets-Sheet 1

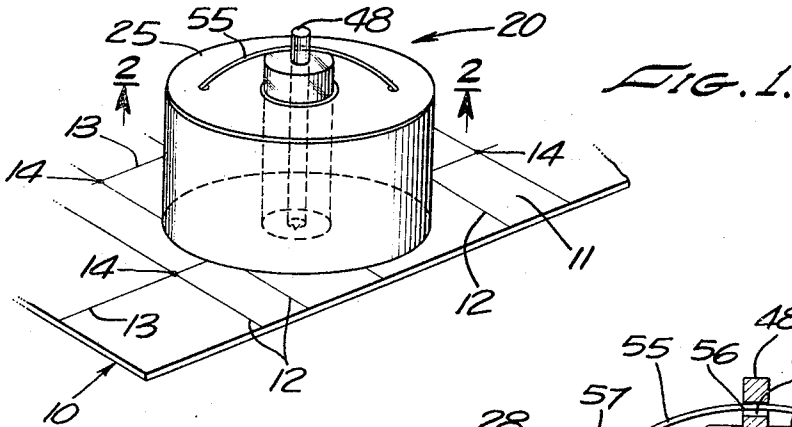


FIG. 1.

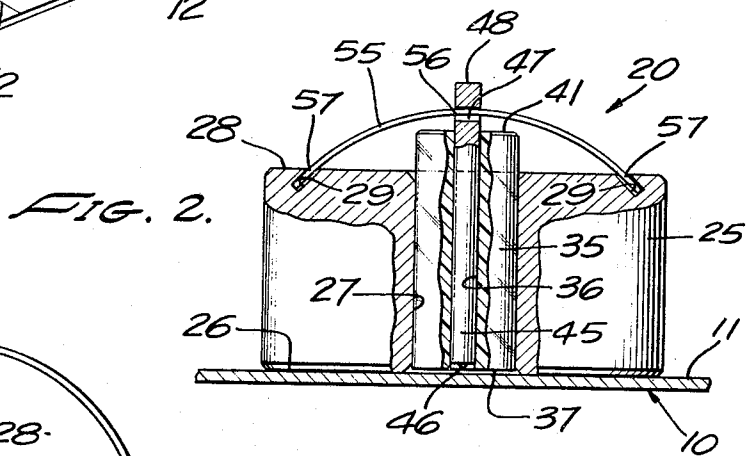


FIG. 2.

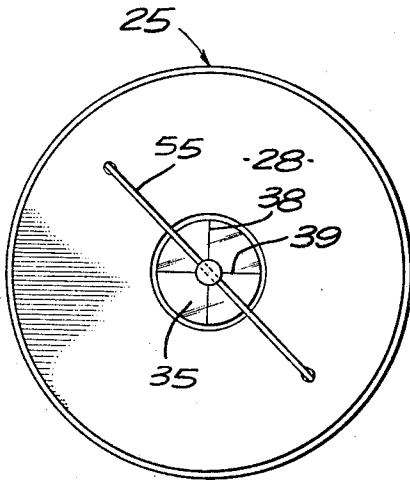


FIG. 3.

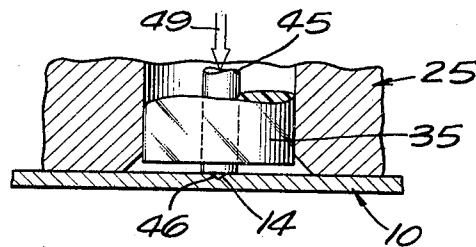


FIG. 4.

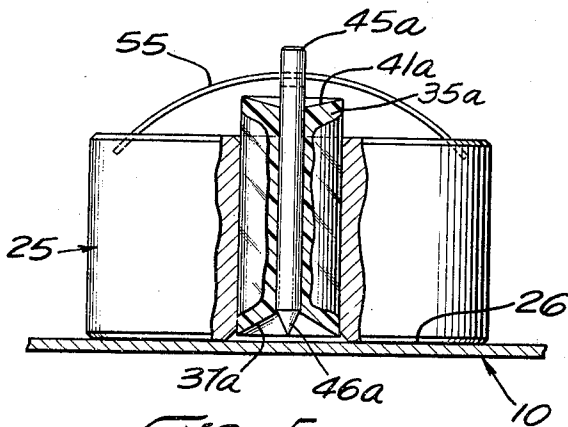


FIG. 5.

JACK K. SAMHAT
INVENTOR.

BY *Bechler & Arant*

ATTORNEYS

1

3,482,324

COMBINED OPTICAL SIGHT AND CENTER PUNCH

Jack K. Samhat, 621 E. Lomita, Glendale, Calif. 91205
Continuation-in-part of application Ser. No. 636,140,
May 4, 1967. This application Dec. 11, 1967, Ser. No.
691,113

Int. Cl. B26f 1/32; G01b 5/14
U.S. Cl. 33—189

1 Claim

ABSTRACT OF THE DISCLOSURE

A combined optical sight and center punch which includes a base member that slides about on the surface of a work piece, having a centrally located rigid transparent sighting body that permits the operator to view the surface of the work piece therethrough, a pair of locating cross-hairs marked on the lower end surface of the sighting body, a plunger which is vertically disposed in a central opening in the sighting body, and a retracting spring secured to the upper end of the plunger; the operation being such that when the upper extremity of the plunger is struck by a hammer a sharp point that is formed on the lower end of the plunger makes a punch mark on the surface of the work piece, and the spring then returns the plunger upward to its normal position in which the sharpened end of the plunger is elevated somewhat above the surface of the work piece.

RELATED APPLICATION

The present application is a continuation-in-part of my prior copending application Ser. No. 636,140 filed May 4, 1967, now abandoned.

BACKGROUND OF INVENTION

In metal layout work it is well known to scribe perpendicular lines on the surface of the metal so that the intersection of the lines defines a predetermined point, and then to make a punch mark in the metal surface at the point of intersection of the lines. The punch mark is then used to establish the center point for a punch or drill which forms an opening in the work piece whose center then coincides with the point where the punch mark had been made.

In some instances this technique is used in the precision layout of a single work piece, for forming holes and bends in the metal as are required. In the great majority of cases, however, the precision layout is applied to a single metal work piece, which is used as a template for the subsequent fabrication of other units on a mass production basis. Each punch mark location on the template is then generally translated into a standard size hole, such as $\frac{1}{8}$ inch, which is then used for the purpose of transferring the point location information to the production work pieces.

In the prior art it has been known to utilize an easily movable, hand operated center punch for the purpose of making such punch marks in the course of precision layout work. It has also been known to use optical devices for more precisely locating the position where a punch mark is to be made. However, no convenient device has been available which performs both the optical sighting function and the punch marking function.

Therefore, the object and purpose of the present invention is to provide a combined optical sight and center punch device, for use in precision metal layout work, which is economical to manufacture and convenient to use.

2

DRAWING SUMMARY

FIGURE 1 is a perspective view of a presently preferred embodiment of the invention, showing its application to a work piece;

FIGURE 2 is a vertical cross-sectional view taken on the line 2—2 of FIGURE 1;

FIGURE 3 is a top plan view of the instrument of FIGURE 1;

FIGURE 4 is an enlarged fragmentary cross-sectional view showing the punching operation of the instrument;

FIGURE 5 is a vertical cross-sectional view of an alternate form of the device; and

FIGURE 6 is a vertical cross-sectional view of still another form of the device.

PREFERRED EMBODIMENT

Reference is now made to FIGURES 1 to 4, inclusive, illustrating the preferred embodiment of the invention.

A work piece 10 which is typically a flat sheet of metal has a set of horizontal lines 12 and a set of vertical lines 13 scribed thereon, the intersections of the lines being points whose locations must be precisely determined during the course of the layout work. As best seen in FIGURE 1 the instrument 20 of the present invention has been used for making punch marks 14 at these line intersections on the work piece. The structure of the instrument 20 will first be described, and thereafter its mode of operation and usage will be described.

The instrument 20 includes, broadly speaking, a metal base member 25, a rigid transparent optical sighting body 35, a metal plunger 45, and a resilient supporting wire 55. The functions of base member 25 are to support the plunger 45 in a desired position relative to the work piece 10, and to provide a secure alignment of the plunger during the time when a punch mark is being made by the plunger. Base member 25 is provided with a smooth, precisely flat undersurface 26, which conveniently slides as desired on the upper surface 11 of work piece 10, with proper alignment being assured by the relatively heavy weight of the base member. While the base member 25 is illustrated as being of cylindrical configuration it could equally well be cubical, hexagonal, or of almost any other desired configuration. A vertical central well 27 is formed in the base member 25, which extends through the entire thickness of the member. Central well 27 is preferably cylindrical as indicated, and receives the rigid optical sighting body 35 in a press fit relationship therein, so as to firmly retain the sighting body 35 in its desired position.

The sighting body 35 in turn has a central plunger opening 36 formed therein, the plunger opening being preferably also of cylindrical configuration as shown, and extending through the entire vertical length of the sighting body 35. The fixed vertical position of sighting body 35 relative to base member 25 is such that the lower end surface 37 of sighting body 35 is preferably elevated somewhat above the undersurface 26 of the base member. A pair of cross-hairs 38, 39, shown only in FIGURE 3, are scribed on the lower end surface 37. Both the lower end surface 37 and also the upper end surface 41 of the sighting body 35 are, in the preferred embodiment of FIGURES 1 to 4, flat surfaces.

Plunger 45 is disposed within the plunger opening 36 in a vertically slidable relationship, being fitted loosely enough to have a relatively easy sliding action but tightly enough to ensure a precise vertical alignment of its longitudinal axis. A sharp point 46 is formed on the lower end of plunger 45, and since the point 46 is located at the horizontal center of the lower end of the plunger, and since the plunger opening and plunger are both concentric to the sighting body 35, it therefore follows that the point

46 is also located at the horizontal center of the lower end of the sighting body. As clearly shown in FIGURE 3 the cross-hairs 38, 39 are located so that (if extended) they intersect at the horizontal center of the sighting body, and hence, at the precise location of the plunger point 46.

Plunger 45 has its upper extremity 48 exposed and is adapted to be hit with a hammer for selectively driving it downward in order to form a punch mark 14 by means of the plunger point 46. A lateral opening 47 is formed in the plunger somewhat below its upper extremity, and a retaining wire 55 extends therethrough. The retaining wire 55 is preferably a short length of piano wire which has been bent into an arcuate configuration. The central section 56 of the wire which passes through plunger opening 47 being horizontally disposed while the two ends are progressively bent downward, with the extreme ends 57 of the wire 55 being disposed at an angle of approximately 45° to the longitudinal axis of the plunger. A pair of openings 29 are formed in the upper surface 28 of base member 25, on opposite sides of the central well 27, and these openings are relatively shallow and have a width which is significantly greater than the thickness of wire 55, so that the ends of the wire are loosely received in the openings. The openings 29, like the wire ends 57, are disposed at an angle of approximately 45° relative to the longitudinal axis of plunger 45.

In operation, the rigid sighting body 35 is firmly maintained in position within the central well 27 of base member 25, and the relative positions of those two members are not disturbed. Base member 25 is moved about wherever desired on the surface of work piece 10 so that the operator may, by looking vertically downward through the sighting body 35, see the crosshairs 38, 39 and align them with an intersecting pair of the lines 12, 13. Insertion of the ends 57 of the retaining wire 55 in the openings 29 causes the wire 55 to remain under stress, and in its fully arched position as best seen in FIGURE 2 it holds the plunger 45 at such an elevation that the plunger point 46 is somewhat elevated above the upper surface 11 of work piece 10. When the operator has aligned cross-hairs 38, 39 with intersecting lines 12, 13, he then strikes the upper extremity 48 of the plunger with a hammer, depressing the plunger downward by approximately $\frac{3}{100}$'s of an inch so as to form a punch mark 14 in the surface of work piece 10. The punching action is illustrated in FIGURE 4 wherein the arrow 49 schematically indicates the downward force exerted by the hammer. After the punch mark 14 is formed, the support wire 55, which was temporarily depressed at its lateral center portion 56, exerts an upper force so as to return the plunger to its normal position as shown in FIGURE 2.

The optical sighting body 35 could be made of glass, however, it is preferred to utilize a synthetic organic plastic material for this purpose. The cross-hairs 38, 39 are made in a conventional manner by forming shallow troughs on the undersurface 37 of the optical body and filling the shallow troughs with a coloring material.

FIRST ALTERNATE FORM

FIGURE 5 illustrates a first alternate form of the invention. In the embodiment of FIGURE 5 the base member 25 and support wire 55 are exactly the same as already described. Optical sighting body 35a is generally the same as previously described and performs generally the same function, however, its upper end surface 41a is formed with a somewhat concave configuration, and its lower end surface 37a is also formed with a somewhat concave configuration. Plunger 45a is generally the same as plunger 45 except that its sharp point 46a is an elongated cone, so that the extremity of the point is more clearly visible. The inclined curve surfaces 41a and 37a perform the function of bending the light rays in a well known manner, so that the area of vision of the viewer who is looking down from above the instrument is not limited to the surface of the work piece that lies immediately beneath

the optical sighting body 35, but also extends to the surface that lies beneath the plunger 45a. In the embodiment of FIGURE 5 the curvature of concave lower end surface 37a of sighting body 35a is made much greater than the curvature of the concave upper surface 41a. It then becomes possible for the operator to see the extremity of the punch point 46a at the intersection of the cross-hairs 38, 39.

SECOND ALTERNATE FORM

FIGURE 6 illustrates a second alternate form of the invention. The reference numbers are generally the same as in the preferred embodiment but are raised by 100. In the embodiment of FIGURE 6 there is no separate optical sighting member 35; instead the base member 125 is made of rigid transparent plastic and has a central portion 135 within which the plunger well 136 is formed. The lower flat surface 137 of the base member central portion 135 carries cross-hairs 138, 139, in the manner previously illustrated. A helical spring 155 is carried on the upper end of plunger 145 and is held between snap ring 129, secured to the plunger, and the upper surface of base member 125. The upper exterior wall surface of the base member 125 is knurled as indicated at 140 for convenience in handling.

Having described the invention, what is claimed as new in support of Letters Patent is:

1. A combined optical sight and center punch for making a punch mark on the flat surface of a workpiece at the precise point of intersection of a pair of perpendicular lines scribed thereon, comprising:

a rigid, optically transparent base member integrally formed of plastic material, having a generally cylindrical shape with its length being shorter than its diameter and with the lower end thereof providing a smooth, precisely flat undersurface adapted to slide about on the flat surface of the workpiece, said base member having a cylindrical plunger opening centrally formed therein which opening extends through the entire vertical length of said base member in precisely perpendicular relationship to said undersurface thereof, said base member also having a central bottom surface portion surrounding said central plunger opening which is recessed above said precisely flat undersurface, and having a perpendicular pair of cross-hairs carried on said central bottom surface portion and being so disposed that if extended their point of intersection would lie at the horizontal center of said plunger opening;

an elongated cylindrical plunger slidably disposed within said plunger opening, having a sharp point formed on its lower end at the horizontal center of said plunger opening, being of sufficient length to extend a significant distance above the upper end of said base member, having a flat upper end adapted to be struck by a hammer, and having a circumferential groove formed near its upper end;

a snap ring carried by said circumferential groove of said plunger;

and a helical spring concentrically disposed on the upper end portion of said plunger between said snap ring and the upper end surface of said base member, said plunger being freely removable from said base member and the length of said spring being sufficient to normally support said plunger at an elevation such that said sharp point thereof is suspended somewhat above the elevation of said base member undersurface;

the upper end of the circumferential wall surface of said base member being knurled for convenience in handling;

whereby said base member may be slidably positioned on the flat surface of the workpiece without direct contact between said cross-hairs and the workpiece surface, the alignment of said cross-hairs with the

5

pair of perpendicular lines on the workpiece may be visually determined at four separate points about the periphery of said plunger, and the upper extremity of said plunger may then be struck to cause said sharp point thereof to make an impression in the workpiece surface at the intersection of the perpendicular lines thereon.

References Cited

UNITED STATES PATENTS

2,426,480	8/1947	Wood	33—189
2,333,134	11/1943	Whitlock	33—189
2,708,972	5/1955	Park	30—367
2,730,811	1/1956	Gouldsmith	33—189

5

2,934,829
3,230,631

5/1960 Bohn 33—189
1/1966 Skidmore 33—189

FOREIGN PATENTS

2/1960 Austria.
5/1950 Great Britain.

OTHER REFERENCES

American Machinist Magazine, p. 126; Jan. 13, 1958.

10 ROBERT C. RIORDON, Primary Examiner
J. C. PETERS, Assistant Examiner
U.S. Cl. X.R.
30—368