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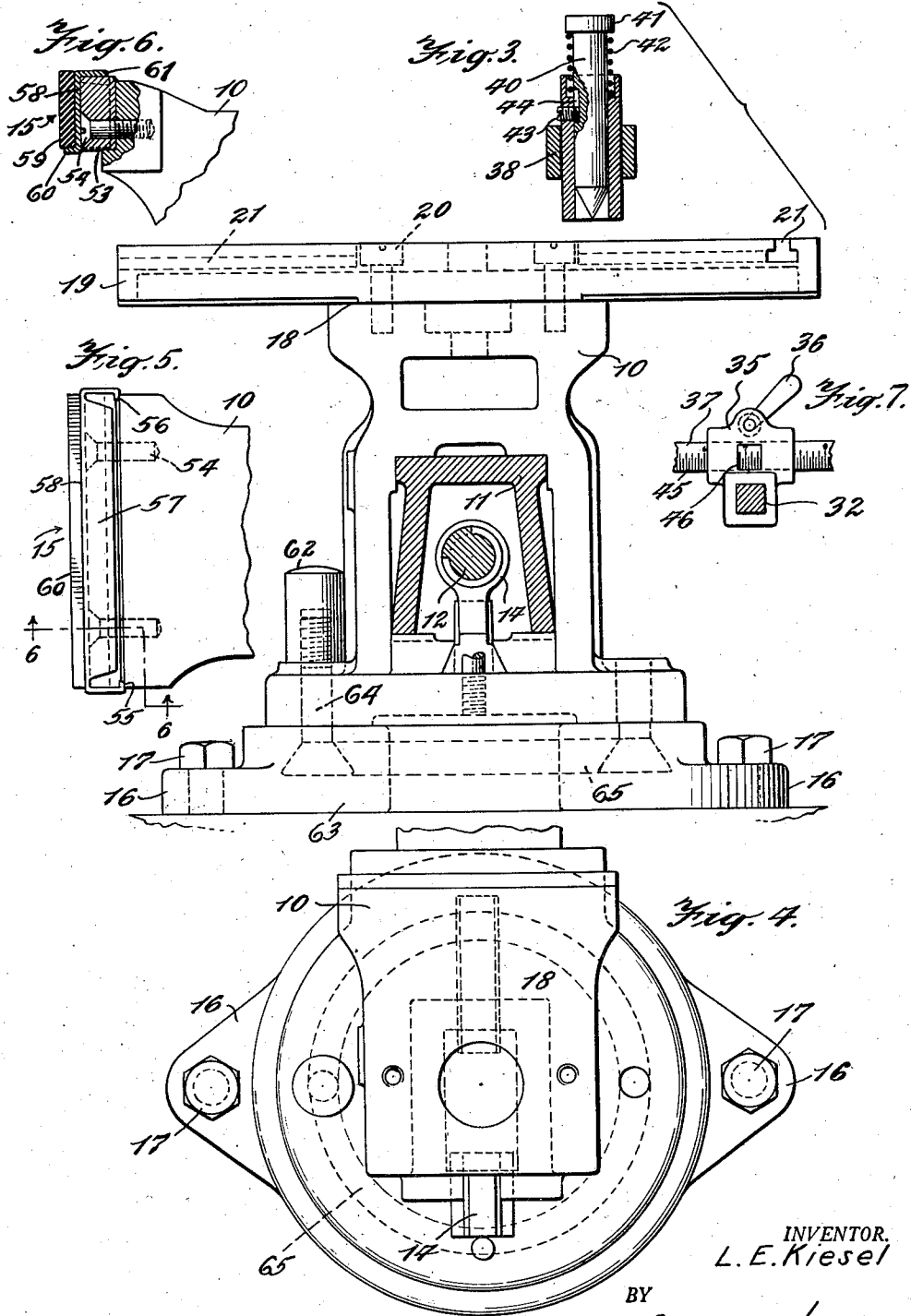
L. E. KIESEL

2,376,601

LAYOUT APPARATUS

Filed Sept. 10, 1942

2 Sheets-Sheet 2



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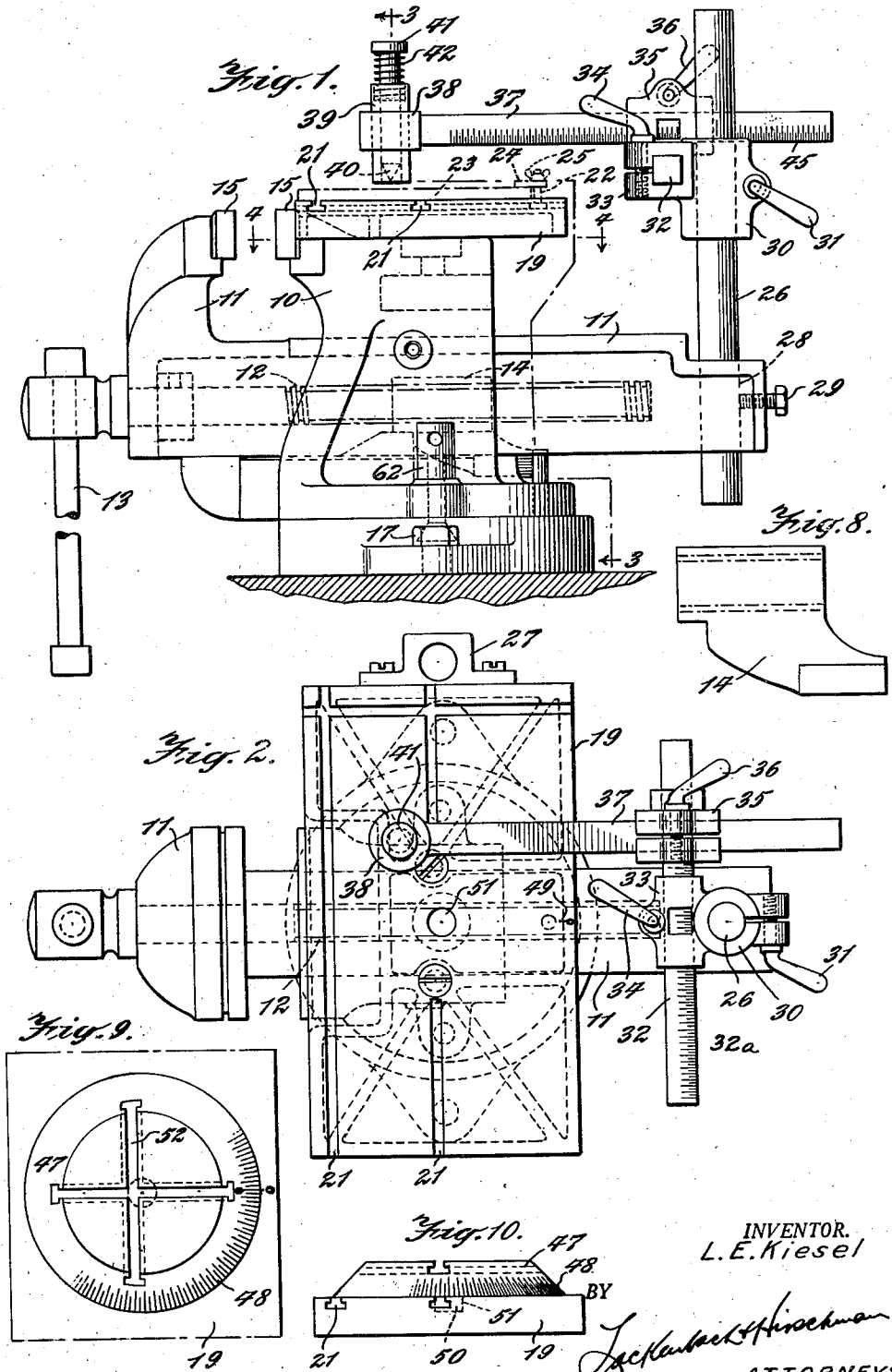
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LAYOUT APPARATUS

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2 Sheets-Sheet 1



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LAYOUT APPARATUS

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In Australia December 5, 1939

4 Claims. (Cl. 33—189)

The present invention relates to apparatus for use in the laying out of work in the machine shop preparatory to performing various mechanical operations on the work-piece. More specifically, the invention relates to an improved vise and to a novel attachment therefor whereby the vise may be used as a layout table for accurately and conveniently marking up a work-piece preliminary to performing mechanical operations thereon, such as drilling, tapping, milling, etc.

It is the general object of the invention to provide an improved layout table whereby the operations of marking up the work, and particularly the punching of centers thereon, are greatly facilitated.

It is also an object of the invention to provide a center-punching attachment for work tables and for equipment normally provided with a working surface or capable of being provided with such a surface, such as a vise, whereby the marking and punching of centers can be accurately and quickly carried out.

It is a further object of the invention to provide an attachment of the type indicated for supporting a center punch in such manner that a true hole can be punched along an axis which is precisely at 90° to the working surface so that precision work can be carried out with a minimum of effort.

A still further object of the invention is to provide an arrangement whereby a center punch can be used simultaneously as a toolmaker's button, and which is operable in a much simpler manner than the usual button.

More particularly, it is an object of the invention to provide an improved toolmaker's vise which is modified over known constructions by the provision of a special table which is detachably secured to the fixed jaw of the vise and with which is associated a center punch mounted for more or less universal movement with reference to the table.

Another object of the invention is to provide a table of the type just described which is equipped to receive a rotatable auxiliary table capable of adjustment about a vertical axis with a work-piece secured thereto for punching centers which are angularly displaced with reference to each other.

It is also an object of the invention to provide an improved type of demountable jaw for the vise.

The above and other objects of the invention whose nature will appear as the description proceeds, are accomplished by the apparatus de-

scribed more in detail hereinbelow with the aid of the accompanying drawings, which illustrate a satisfactory form of the invention. In said drawings,

Fig. 1 is an assembly view in side elevation showing my invention incorporated in a vise;

Fig. 2 represents a plan view of the structure of Fig. 1;

Fig. 3 is a view, partly in section, taken along the line 3—3 of Fig. 1, on an enlarged scale;

Fig. 4 shows a top plan view of the stationary jaw of the vise along the line 4—4 of Fig. 1;

Fig. 5 is a top plan view of the vise jaw with the jaw facing removed;

Fig. 6 represents a section along the line 6—6 of Fig. 5 with the jaw facing in place;

Fig. 7 is a detail showing the mounting of the horizontal arm on the cross-bar;

Fig. 8 shows the nut element of the stationary jaw through which the vise screw passes;

Fig. 9 illustrates a horizontal plan of an auxiliary rotatable supporting plate; and

Fig. 10 is a view in elevation of the structure shown in Fig. 9.

In the embodiment of the invention selected for illustration by way of example, my improved layout attachment is associated with a toolmaker's vise, but it will be understood that the layout mechanism can be associated with other devices, and particularly with any device or structure which provides or can be altered to provide a horizontal supporting surface.

Referring to the drawings, the numeral 10 indicates the stationary member or jaw of a vise and the numeral 11 the movable member or jaw thereof. Movement of the latter with reference to the member 10 is effected in known manner by means of a screw 12 operated by a lever 13, the screw being held against longitudinal movement with reference to the member 11 and being received in a suitably tapped nut portion 14 (see Fig. 8) which is secured in any suitable manner to the stationary member 10. Both the stationary and the movement parts of the vise are provided with detachable jaws 15 which will be described more in detail hereinbelow. The base of the vise is provided with drilled flanges 16 through which is secured to a support by means of bolts 17.

In accordance with my invention, the stationary member 10 of the vise is provided with an extended flat top surface 18 to which may be detachably secured an auxiliary layout table 19. To this end, the member 10 may be provided with tapped openings which receive the stems of screws

20 by which the table is secured to the member 10. The table 19 is provided with a number of slots 21 of inverted T-cross section for receiving the heads of clamping bolts 22 by which a work-piece 23 (Fig. 1) may be secured to the table 19 with the aid of a clamping plate 24 and wing nut 25. The table 19 thus provides an extended surface for conveniently fixing a work-piece for laying out prior to subjecting the work-piece to drilling or other operations.

In laying out a work-piece, it is common practice to employ what is called a toolmaker's button for providing a fixed point of reference on the work-piece for locating centers, center lines, and the like, on the work-piece. The use of this button involves drilling the work-piece and tapping the hole so as to secure the button to the work-piece. The diameter of the cylindrical button being known, measurements can be made from the external surface of the button on the surface of the work-piece. The use of such button involves a considerable expenditure of time and effort; moreover, the punching of the centers located with the aid of the button, is always attended by the danger that the centers will not be punched exactly at 90° to the work-piece surface, with the result that the drilling or other operation may not be exactly true. Also, there is the possibility that the mechanic will incorrectly compute the radius of the button or make errors in the measurement of lines which must pass through the center of the button.

In accordance with the present invention, there is provided a center punching attachment which, among other things, takes the place of the toolmaker's button, and while it has all the advantages of such a button, has the further advantage that it is not secured to the work-piece itself. Also, all measurements, or many of them, can be made from fixed points of reference which are extraneous to the work-piece, so that it becomes unnecessary to provide the work-piece with smooth surfaces or with squared edges to insure accuracy of measurements. Moreover, the drilling and tapping of the work-piece for supporting the known button are dispensed with.

In the form of the invention illustrated, the punching mechanism is mounted upon the vertical standard 26 which is adjustably supported in any suitable manner, as from the end of the movable jaw 11, as shown in Figs. 1 and 2, or upon the table 19, for which purpose the latter is provided with an apertured bracket 27 with suitable set screw or other fixing device (not shown). The standard 26 is shown as adjustably positioned within a vertically disposed aperture 28 in the rear end portion of the movable vise member, the standard being held in selected position by a set screw 29. A sleeve clamp 30, operable by a lever 31, is slidably mounted on the standard 26 and supports a horizontal bar 32 which extends at right angles to the direction of movement of the member 11. The bar 32, which is of non-circular, for example of square, cross-section, is within a slidable clamp 33 operable by a clamping lever 34 and integral with or fixed to the clamp 30. Fixed to the bar 32 is a clamp 35 with its operating lever 36. The clamp 35 receives a horizontally adjustable arm 37 which extends at right angles to the bar 32. At the left hand end of the arm 37, as viewed in Fig. 1, there is provided a collar 38 within which is fixed an elongated bushing 39. Within the latter, there is slidably disposed a punch 40 having a striking head 41, the punch being held in re-

tracted position within the bushing by a spring 42, the upward movement of the punch being limited by a pin or screw 43 (Fig. 3) which projects into an axially extending slot 46 in the outer surface of the punch. The length of the slot is such, and the slot is so located, that the point of the punch is normally flush with or inside of the lower edge of the bushing, in order to protect the point against injury.

It will be recognized without further explanation that, in view of the longitudinal adjustability of the arm 37 within the clamp 35, and of the adjustability of the clamps 30 and 33 upon the standard 26 and bar 32, respectively, the punch can be adjusted in both directions vertically and in two directions horizontally, the latter two directions being at right angles to each other, so that the punch has in effect a universal adjustability.

In the operation of the mechanism so far described, the work-piece 23 is secured to the table 19 by a suitable number of bolts 22. Where the centers are already marked on the work-piece, the punch can be readily positioned to punch the centers, the registry of the point of the punch with the center being aided by depressing the punch until the point lies over the center. Upon striking the head 41 with a hammer or the like, a circular notch will be formed at the center along a true vertical axis. This operation is repeated as often as the layout pattern of the work-piece requires. Where the layout of the work-piece is to be done on the table 19, the punch can be positioned at a suitable point on the work-piece in such a manner that the bottom of the sleeve 39 is in contact or nearly in contact with the surface of the work-piece. The sleeve 39 then can be treated as a fixed toolmaker's button, and measurements can be made therefrom as heretofore, or a fixed point of reference may be provided on the work-piece by punching the latter at a suitable point and measurements on the work-piece then made with reference to such point. To this end, the arm 37 may be provided with a scale 45 and for greater accuracy of adjustment, the clamp 35 may be provided with a window 46 and with a vernier scale and index (not shown), for example of the type shown in Van Nostrand's "Scientific Encyclopedia," D. Van Nostrand Company, Inc., New York, page 1182. The bar 32 and its clamp may similarly be provided with a scale 32a so that movements of the punch in each of the horizontal directions can be measured along the arm 37 and bar 32. It will be evident that the arm 37 and bar 32 provide in effect squared edges for the work-piece, so that the latter need not be machined for aiding in locating the centers.

To facilitate the location of centers or other marks on the work-piece, where such marks are angularly displaced with reference to each other, I provide an auxiliary table 47 having a suitable angular scale 48 which is read with reference to a suitable zero line 49 (Fig. 2) on the table 19. The auxiliary table 47 is provided with a pin or trunnion 50 fixed thereto, which is snugly received in an aperture 51 in the table 19. The table 47 is provided with slots 52 similar to the slots 21 for receiving clamping bolts which secure a work-piece thereto. It will be readily seen that upon suitable positioning of the punch 40, the table 47 can be rotated through the requisite angles for punching a row of centers along a circular arc.

It will be understood that a suitable index

point or mark will be associated with the respective scales 32a and 45. The index may in each case be an edge of the clamp, but I prefer, especially where a vernier scale is to be employed, to provide the index point at the right hand edge of the windows in clamp 33 and the lower edge of the window in the clamp 35.

I have provided my improved toolmaker's vise also with a novel removable face for the fixed and movable jaws. As shown in Figs. 5 and 6, the jaw includes a metallic bar 53 which is removably secured to the members 10 or 11 by means of screws 54. At the rear, the bar 53 is provided with a groove 55 at each end to receive the flanges 56 of a removable holder 57. The holder, which may be of sheet metal or the like, is provided with a front face 58 to which is adhesively secured, or otherwise, the jaw face 59 made of vulcanized fiber, hard rubber, or other material which will not injure the machined surface of a work-piece, the jaw face resting upon a lower flange 60 of the holder. An upper flange 61 of the holder rests upon the top of the bar 53 as the holder is slid vertically into position upon the bar. It will readily be seen that the holder and the relatively soft jaw face 59 can be readily removed from the bar 53 for replacement or repair.

The vise may be adjusted about a vertical axis by releasing a nut 62, whereupon the vise can be rotated upon its base 63, being suitably guided by means of a threaded pin or screw 64 whose head moves within a circular guide slot 65.

Where, as above indicated, the arm 37 and bar 32 are provided with vernier scales, very accurate measurements can be made upon the work-piece with the aid of the punch 40, and the use of depth gauges or micrometers can be to a large extent eliminated, and in certain cases, even completely.

In certain cases it may be more convenient to mount the supporting structure for the center punch at right angles to the positions shown in Figs. 1 and 2, and in such event the standard 25 is fixed within the bracket 27 of the table 19. Aside from greater convenience in certain cases, the mounting of the center punch upon the table is of advantage when, because of wear or other reason, there is play between the jaws of the vise. If desired, the center punch support may be mounted upon the fixed vise jaw, the latter being then provided with a suitable extension and with a clamp or equivalent structure as illustrated in connection with the movable jaw. The center punch support may also be constructed for attachment to any suitable work table in a machine shop or to the horizontal table surface of any machine, in which case it may be provided with a compound clamp both for securing the assembly as a whole to the table and for locking the vertical standard in selected position.

I claim:

1. A center punching attachment comprising a table adapted to have a work-piece secured thereto, a vertical standard associated with the table, a horizontal bar vertically adjustable

on said standard, means for securing said bar in adjusted position vertically on the standard, a clamping device for securing the bar in longitudinally adjusted position in the selected horizontal plane, an arm extending at right angles to the bar and supported thereby, said arm being adjustable in the direction of its length and being at right angles also to the vertical standard, said bar being shaped so as to prevent rotation of the arm on said bar, whereby the right-angular relation between arm and standard is permanently maintained, and a center punch slidably supported at one end of said arm and adapted to be operated to punch a center on the work-piece.

2. Combination as set forth in claim 1, wherein a single vertical standard is utilized and wherein the table is provided with a bracket for supporting the vertical standard.

3. A center punching attachment adapted to be associated with a horizontal support for a work-piece and comprising a vertical standard, a horizontal bar vertically adjustable on said standard, means for securing said bar in adjusted position vertically on the standard, a clamping device for securing the bar in longitudinally adjusted position in the selected horizontal plane, an arm extending at right angles to the bar and supported thereby, said arm being adjustable in the direction of its length and being at right angles also to the vertical standard, said bar being shaped so as to prevent rotation of the arm on said bar, whereby the right-angular relation between arm and standard is permanently maintained, and a center punch slidably supported at one end of said arm and adapted to be operated to punch a center on the work-piece.

4. A center punching attachment comprising a table adapted to have a work-piece secured thereto, a single vertical standard associated with a table, a support for the standard, screw means for shifting the standard in a horizontal direction relatively to the table, a horizontal bar vertically adjustable on said standard, means for securing said bar in adjusted position vertically on the standard, means for holding the bar in longitudinally adjusted position in the selected horizontal plane, an arm extending at right angles to the bar and supported thereby, said arm being adjustable in the direction of its length and being at right angles also to the vertical standard, said bar being shaped so as to prevent rotation of the arm with reference to said bar, whereby the right angular relation between arm and standard is permanently maintained, and a center punch slidably supported at one end of said arm and adapted to be operated to punch a center on the work-piece, the arm overhanging the table in cantilever fashion whereby workpieces larger than the table can be accommodated, and the standard, bar, and arm, being movable as a unit with reference to the table upon operation of the screw means for preliminary, rough adjustment of the punch in a horizontal plane.

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