M. R. KRONERT.

COMBINATION TOOL.

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1,406,262. Patented Feb. 14, 1922.

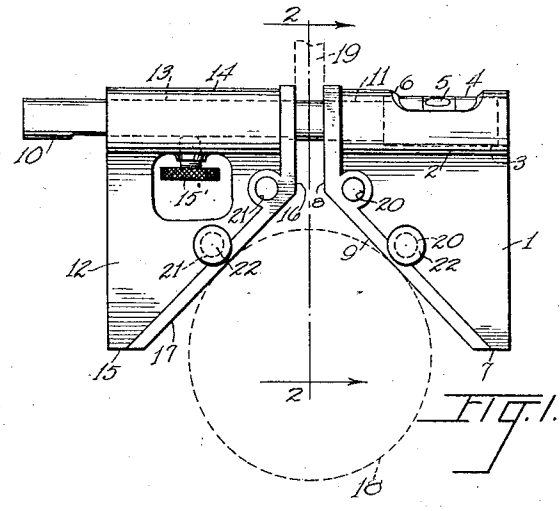


FIG. 1.

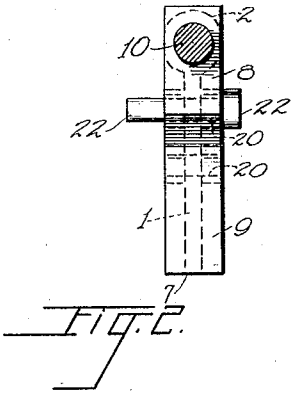


FIG. 2.

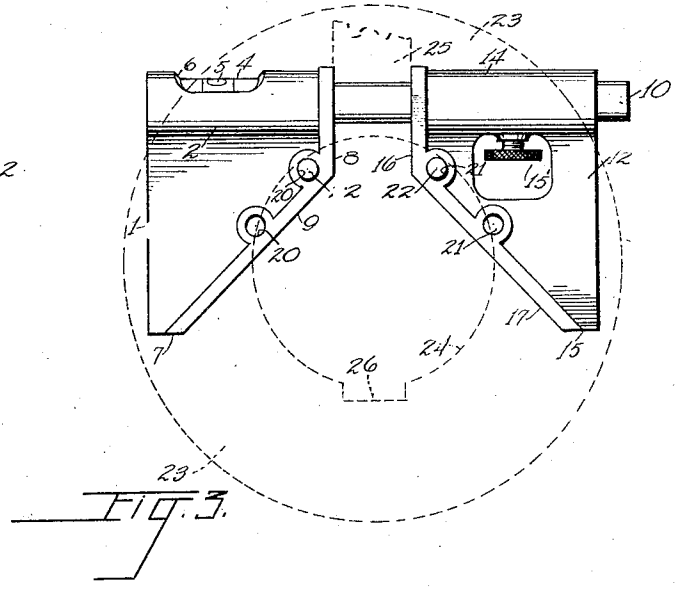


FIG. 3.

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COMBINATION TOOL.

1,406,262. Specification of Letters Patent. Patented Feb. 14, 1922.

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To all whom it may concern:

Be it known that I, MAX R. KRONERT, a citizen of the Republic of Germany, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Combination Tools, of which the following is a full, clear, and exact description.

My invention relates to a combination square, level, and device for indicating the position of a piece of work having a circular wall relative a milling cutter or the like in order to properly mill a key-seat or the like in the work.

An object of my invention is to provide a novel form of a device of the type described that comprises in one tool a plurality of tools ordinarily manufactured separately.

A further object of my invention is to provide in a combination tool of the type described a novel measuring device for indicating the correct position of a cutting tool relative a piece of work to insure the proper engagement of the cutting tool with the work to mill a slot, key-seat, or the like of a given size in the work.

A further object of my invention is to provide in a combination tool of the type described a measuring device for indicating the position of a cutting tool relative to a disk or the like having a circular inner wall to insure the proper engagement of the cutting tool with the inner wall to cut a slot, key-seat, or the like therein.

A further object of my invention is to provide a device of the type described that can be adjusted quickly and easily to indicate in the manner described the limits of key-seats, slots, and the like, of varying widths.

A further object of my invention is to provide a device of the type described that is simple in construction and operation, effective for the purpose intended, not likely to get out of order easily, and thoroughly practical commercially.

Other objects and advantages will appear in the following specification, and the novel features of the invention will be particularly pointed out in the appended claims.

My invention is illustrated in the accompanying drawings, forming part of this application, in which—

Figure 1 is an elevation of the device, showing an application thereof,

Figure 2 is a section along the line 2—2 of Figure 1,

Figure 3 is an elevation showing another application of the device.

In carrying out my invention, I provide a substantially flat jaw member 1 having an enlarged upper portion 2, formed with a horizontally extending recess 3 adapted to receive a spirit level tube 4 containing a suitable liquid and provided with the usual bubble 5. The enlarged portion 2 is cut away at 6 to present the upper portion of the spirit level tube to view. The latter is provided with the customary graduations by means of which the position of the spirit tube relative a horizontal plane is indicated.

The spirit tube 4 is positioned parallel with the lower edge 7 of the member 1 and at right angles to the plane edge surface 8 of the upper portion of a side wall of the member 1, which is enlarged laterally in opposite directions as shown. The plane edge surface 9 of the remaining portion of the side wall, mentioned above extends diagonally to the spirit level tube 4 and to the lower edge 7 at an angle which in the form of the device shown is 45°.

The member 1 is provided with a shaft 10 that is axially alined with the spirit tube 4 and therefore extends at right angles to the plane surface 8. The shaft 10 may be formed integrally with the member 1 or have a portion of its length secured within a bore 11 in the enlarged portion 2 thereof as shown.

A second jaw member 12 that is similar to the member 1, has a bore 13 extending horizontally through its enlarged upper portion 14, and adapted to receive the shaft 10 which is slidable therein. A set screw 15′ provided as shown permits the member 12, to be secured in adjusted position along the shaft 10.

The member 12 is formed to have its lower edge 15 positioned in the same horizontal plane as the lower edge 7 of the member 1 when the member 12 is mounted on the shaft 10 and to have the plane edge surface 16 of the upper portion of a side wall parallel with the plane surface 8 and adjacent thereto while the diagonally extending plane edge surface 17 of the remaining portion of the side wall mentioned extends at an angle of 45° to the lower edge 15 and at right angles to the plane sur-

face 9. Consequently, the plane surfaces 9 and 17 form the sides of a square when the plane surface 16 contacts with the plane surface 8.

From the foregoing description of the various parts of the device, the operation thereof may be readily understood. Obviously the device may be used as a square in performing, so far as the length of the plane surfaces 9 and 17 will permit, the operations for which an ordinary square is employed. The device may be used as a level when it is positioned upon the work to rest upon its lower edge surfaces 7 and 15 or the member 1 may be used alone in performing the fuctions of a level.

When the device is used in positioning a piece of work having a cylindrical peripheral wall as indicated at 18 in Figure 1 relative to a cutting tool denoted by 19 in order to insure a key-seat or other slot being properly provided in the work, the device is positioned relative to the cutting tool 19 in such a manner that the plane surfaces 8 and 16 contact with the latter at diametrically opposed points and the cutting tool 19 is positioned in a vertical plane. This may be determined by the position of the bubble 5 in the sipirit tube 4. The work is then moved until the cylindrical peripheral surface thereof contacts with the plane surfaces 9 and 17 and is rigidly secured in that position. It will be understood that the work in practice will be placed on a supporting table (not shown) which is ordinarily provided in a milling machine or the like to move vertically or horizontally relative the cutting tool. The cutting tool 19 may be moved relative the work if the supporting table is not movable. When the work and the cutting tool are positioned relative to each other as described, the device is moved out of engagement with the cutting tool by turning the set screw 15′ and moving the member 12 along the shaft 10. It is apparent that operation of the cutting tool 19 in an ordinary manner will result in a correctly positioned key-seat, slot, or the like (not shown) being milled in the work since the extended median or axial line of the cutting tool would bisect the angle between the plane surfaces 9 and 17 and would coincide with a line running longitudinally through the exact center of the key-seat or slot milled in the work. While the cutting tool 19 has been illustrated and described as being vertically disposed since the spirit level portion of the device can then be utilized to best advantage and a key-seat or the like of a given size milled in the work with absolute accuracy, yet it is apparent that the device may be utilized with satisfactory results when the cutting tool occupies an oblique or horizontal plane. This is true because the axis of the cutting tool 19 will always coincide with a line bisecting the angle between the plane surfaces 9 and 17 when the cutting tool 19 is clamped between the surfaces 8 and 16. Furthermore, the angle between the equal plane surfaces 9 and 17 need not be a right angle to insure satisfactory results being obtained when the device is used in the manner last described.

A plurality of openings 20 spaced equidistant from the plane surface 9 extends transversely through the member 1 as shown. A like number of openings 21 extending transversely through the member 12 occupies the same relative positions in the latter as the openings 20 in the member 1. Pins 22 may be inserted through corresponding openings in the two members and the work moved into contact with projecting portions of the pins when it is not feasible to move the work into contact with the plane surfaces 9 and 17.

The scope of application of the device is, therefore, enlarged to embrace all work having a circular cross section of any diameter and work such as denoted by 23 in Figure 3, which is shown as being formed with a circular bore or opening 24. The work is moved relative to the cutting tool 25 until the inner wall thereof contacts with the pins 22 which are positioned in corresponding openings 20 and 21 as shown. The work is then secured in the position shown. Operation of the cutting tool 25 will result in a properly placed slot, key-seat, or the like, indicated at 26, being milled in the inner wall of the work, since the axis of a straight member clamped between the surfaces 8 and 16 will, if extended, coincide with the diameter of a circular piece of work to which the surfaces 9 and 17 are tangent.

The device may also be used as a center gauge in determining the location of the center of a circular piece of work.

I am aware that measuring devices have been provided prior to my invention for setting work relative a cutting tool for the purpose of milling a key-seat in the peripheral or outer cylindrical wall thereof. I am aware of none, however, having slidable jaw members movable relative to each other to contact with a selected cutting tool at diametrically opposite points to thereby determine with an accuracy heretofore unattainable the limits of a key-seat or slot to be milled selectively in either an inner cylindrical wall, or an outer cylindrical wall of work set relative the cutting tool as described herein.

It is obvious that the device may be used in "laying out" work in which key-seats or the like are to be milled subsequently. For example, when the device is positioned relative to the work as illustrated in Figure 3, parallel marks made in the work by draw-

ing a sharp pointed instrument along the plane surfaces 8 and 16 will permanently indicate the location of a keyseat or the like of a given size that is to be milled in the work.

I claim.

1. The combination with a cutting tool of a measuring device comprising a pair of similar separate jaw members, each having its upper and lower edges parallel, said lower edge being shorter than said upper edge, and having one side edge formed with an upper portion thereof extending at right angles to the upper edge and the remaining portion of its side edge extending at an angle to said upper portion, said jaw members being each formed with a plurality of spaced apart openings positioned along the lower portion of its said side edge, each opening through one of said jaw members being arranged to correspond with a like opening through the other of said jaw members, means connecting said jaw members to permit movement of one relative the other and to position said jaw members with the said corresponding side edges thereof arranged to face each other, means cooperating with said means for clamping said jaw members to said cutting tool to cause the upper portions of said corresponding side edges to contact with diametrically opposed portions of said cutting tool, and removable pins inserted through corresponding selected openings through said jaw members to project laterally thereof.

2. A device of the character described comprising a pair of similar jaw members formed with the upper portions of their adjacent faces parallel and with the lower portions of their adjacent faces extending at right angles to each other, said jaw members being formed with corresponding openings extending transversely therethrough and positioned adjacent to the lower portions of the adjacent faces thereof, and means connecting said jaw members to permit movement of one relative to the other.

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