The object of my invention is to provide a hand-operated keyway cutting tool for cutting keyways in round shafts at the ends thereof, which tool is of simple, durable and inexpensive construction.

More specifically, it is my object to provide a tool of this class in which shafts of different diameters may be readily, quickly and easily clamped and firmly held with the longitudinal axes of the shaft exactly in line with the path of travel of the cutting tool, whereby the keyway formed by the tool will be exactly parallel with the longitudinal axis of the shaft, and further to provide a tool of this class in which the manual power applied in the operation of the tool will necessarily be applied in such manner as to form the side walls of the keyway exactly parallel to the longitudinal axis of the shaft being cut, to thereby avoid distortion of said side walls as is commonly done with keyway cutters now in common use, in which the manual power applied for operating the tool is frequently applied in such manner as to laterally deflect the cutting tool during its stroke and thereby forming side walls of the keyway along lines divergent from true parallelism with the longitudinal axis of the shaft.

In the accompanying drawings:

Figure 1 shows a side elevation of my improved keyway cutter applied to a shaft, parts being broken away to show certain structural details;

Figure 2 shows a vertical sectional view on the line 2—2 of Figure 1;

Figure 3 shows an end elevation looking toward the end at which the cutting tool is located;

Figure 4 shows a horizontal sectional view on the line 4—4 of Figure 1;

Figure 5 shows a detail perspective view of the cutter blade and a part of the blade holder in which the blade is slidingly mounted;

Figure 6 shows a detail sectional view on the line 5—5 of Figure 1.

The reference numeral 16 indicates the body portion of the tool which serves as a support for the entire tool. This body portion is formed with a centrally arranged longitudinal opening 11 at its lower portion, of a size to freely receive the largest shafts for which the tool is adapted; the upper wall forming this opening has its sides tapered inwardly and upwardly at 12 along lines parallel with the longitudinal axis of the body. Set screws 13 are extended through the lower portion of the body 16 into the opening 11 to engage the under central portion of a shaft in the opening. When these set screws are forced firmly against a shaft 14 the shaft is thereby forced against the tapered walls 12 and thereby moved to position exactly parallel with the longitudinal axis of the body, and there firmly held.

Directly above the opening 11 is a longitudinal opening 15 centered relative to the shaft opening and of rectangular formation. Sidely mounted within the opening is the cutting tool supporting bar 18, capable of longitudinal movement only and so accurately fitted as to prevent lateral movement. At one end of the bar 18 is an integral upward extension 17.

The tool-carrying frame comprises two side members 19 overlapping the side of the extension 17 and pivotally connected therewith by the pivot pin 18 at its top portion. The body portion 19 of this frame is extended across the front of the extension 17, and is formed with a tapered groove 20 at its front central portion, in line longitudinally with the longitudinal center of the bar 16. In this groove 20 there is slantly mounted a tool holder 21 tapered to fit the groove and having an opening 10 receive the cutting tool 22. The side edges of the tool and holder are tapered to prevent forward movement of the tool relative to the holder.

A tool guiding plate 23 is secured to the front of the body portion 19 by bolts 24. At the upper end of the plate 23 is a rearward extension 25 in which is mounted a feed screw 26 to engage the upper end of the tool 22. A winged set screw 27 is mounted in the central portion of the body 19 for clamping the tool in various positions of its adjustment.

At the rear end of the bar 16 there is a rectangular extension 28, of reduced size, extended through an upright 29 which has a rectangular opening accurately fitting the extension. This upright is fixed to the bar 16 by a nut 30 on the rear of the extension.

Furnished to the body 10 is a lever 31 accurately centered vertically above the longitudinal center of the shaft opening and movable forwardly and rearwardly. A link 32 connects the lever 31 with the upright 29. Resting on top of the bar 16 within the opening in the body 10 are two bearing plates 31, and set screws 32 are extended through the top of the body 16 to engage said bearing plates. In practice, I adjust said screws 32 to firmly engage the bar 16, but not firmly enough to prevent longitudinal movement of the bar 16, thereby avoiding a chattering action which would occur if the bars 16 were permitted to move up and down in the body 10.
In practical use a shaft of any desired diameter is placed in the opening 14, and the set screws 13 are drawn up to firmly press the shaft against the tapered upper walls of the opening. This operation will automatically center the shaft and firmly hold it against both longitudinal and lateral movement. It is not necessary for the operator to exercise any skill in operating these set screws because they cannot function in any way to avoid the desired accurate centering of the shaft. Then a keyway cutting tool of the proper size for cutting the desired keyway is applied and firmly clamped, and then all that the operator need do is to reciprocate the lever 31. Due to the fact that the tool-carrying guide bar is close to and parallel with the shaft being operated on, the cutter tool will not chatter during the cutting stroke as is sometimes the case when the tool-carrying bar is widely spaced apart from the shaft, and due to the fact that the operating lever is centered directly above the longitudinal center of the shaft being operated on and movable only in a direction parallel with the shaft, all motion applied to the lever operates to move the cutter tool in a straight line, hence, all lateral distortion of the keyway is avoided.

I claim as my invention:

1. A keyway cutting tool, comprising a body portion formed with two longitudinal openings, one being close to and directly above the other with their longitudinal centers in vertical alignment, the upper wall of the body at the lower opening being inclined from its side edges upwardly and inwardly, and the upper opening being rectangular in outline, set screws extended through the bottom of the body to engage a shaft in the lower opening and force it to centered position against said inclined wall, a tool-carrying bar in said upper opening, rectangular in section and slidingly mounted thereon, a cutting tool pivoted to one end of said bar in line vertically with the longitudinal center of the said lower opening, an upright fixed to the other end of said bar, a link pivoted thereto, a lever fulcrumed to the upper part of said body in line vertically with the longitudinal centers of said openings and pivoted to said link and movable longitudinally of said bar.

2. A keyway cutting tool, comprising a body portion formed with two longitudinal openings, one being close to and directly above the other with their longitudinal centers in vertical alignment, the upper wall of the body at the lower opening being inclined from its side edges upwardly and inwardly, and the upper opening being rectangular in outline, set screws extended through the bottom of the body to engage a shaft in the lower opening and force it to centered position against said inclined wall, a tool-carrying bar in said upper opening, rectangular in section and slidingly mounted thereon, an upright fixed to one end of the bar, a tool-carrying member pivoted thereto above the longitudinal center of the bar, a keyway cutter tool adjustable fixed to said tool-carrying member, an upright fixed to the other end of said bar, a link pivoted thereto, a lever fulcrumed to the upper part of said body in line vertically with the longitudinal centers of said openings and pivoted to said link and movable longitudinally of said bar.

3. A keyway cutting tool, comprising a rigid body portion formed with a longitudinally arranged opening to receive a shaft, the wall of said opening at the top being inclined inwardly and upwardly toward a longitudinal central line, means carried by the body portion for engaging a shaft in said opening and for forcing it upwardly against said inclined wall and thereby moving it to longitudinally centered position and fixing it in said position, said rigid body having a second longitudinal opening above the first, a tool-carrying bar slidingly mounted in the second opening and centered above the center of the shaft opening, the tool carrying bar and its opening being of irregular outline and closely fitted to thereby prevent rotary movement of the tool-carrying bar, a lever fulcrumed to the body in line vertically with the longitudinal centers of the said openings, and a link pivoted to the lever and to the tool-carrying bar.

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