My invention relates to an improved holding means for metal working machines, such as lathes and the like, adapted to eliminate some of the difficulties and defects encountered with the tool holding devices at present in use; my invention contemplating the provision of a construction whereby a proper support at the cutting edge of the tool is provided which permits the use of a small high speed tool without sacrificing the efficiency obtained with a heavier tool steel.

The invention has for its object the provision of a structure whereby a direct and greater pressure on the tool or tool holder may be obtained than is the case with tool posts at present in use; vibration with the resultant wear eliminated and the possibility to undercut prevented; the invention involving a structure whereby greater accuracy in tool setting may be obtained.

The objects and advantages of my invention, as well as other advantages inherent in the invention, will be more fully comprehended from the following detailed description of the accompanying drawing, wherein:

Figure 1 is a perspective view of my improved tool post and holder, with only a portion of the slide block or bed-plate being shown.

Figure 2 is a vertical sectional view, partly in elevation.

Figure 3 is a vertical sectional view taken substantially at right angles to Figure 2 with parts in elevation.

Figure 4 is a perspective view of my improved tool holder.

Figure 5 is a view similar to Figure 2 with the tool holder omitted and illustrating the use of my improved shim in connection with a solid tool.

Figure 6 is a perspective view of the shim employed in Figure 5.

In the particular exemplification of the invention, a portion of the lathe compound or bed-plate is shown at 15 which is provided with an inverted T-slot 16 to receive the lower flanged end of the cylindrical center post 17 which is slidable and nonlifting held in the slot by the post block 18 centrally apertured for passage of the post 17 and the apertured undercut, as shown in Figures 2 and 3 to receive the flange portion 19 of the post 17.

The vertically disposed cylindrical post 17 is vertically slotted from its upper end to a predetermined point above the bed-plate 15; the slot 20 being provided with parallel walls or sides arranged equal distances from the vertical center of the post, as shown in Figures 1 and 2.

The upper end of the post 17 is provided with a transverse hole arranged at right angles to slot 20 to receive a pin 21 whereby a rocker arm 22 is fulcrummed in place. The rocker arm 22 is of comparative thickness and reduced in width intermediate its ends so as to fit into the upper end of the slot 20 in the upright post 17; and the ends of the arm are provided with vertically disposed tapped holes to receive the set-screws 23, 24; the screws 23 being of length greater than the vertical thickness of the ends of the rocker block or arm 22 so as to extend entirely therethrough and permit them to function as hereinafter defined.

Resting on the lathe compound or bed-plate 15 is a foundation washer 24 provided with a central hole for passage of the post 17 therethrough; the hole being perpendicular to the lower face of the washer, while the upper face of the washer tapers toward one side of the washer, as more clearly shown in Figure 2. This washer is geometrically divided by a diametrical line and the divisions on opposite sides of the line termed the right plane and the left plane, with the right plane having graduations arranged clockwise equal distances apart from low to high, namely from 1 to 5; some of the graduations being shown in Figure 1. The upper surface of the washer 24, as can be seen in Figure 2, is disposed in a plane above the lower end of the vertical slot in the post 17.

Disposed through the slot 20 in the post 17 is an elongated tool holder 25 which rests on the foundation washer 24. This holder is tapered transversely to correspond with the top tapered surface of the foundation washer 24, so that the top of the tool holder is always level longitudinally while it is being elevated through proper rotation of the foundation washer 24. The holder 25, adjacent its forward end and at opposite sides, is provided with the upstanding side walls 28, 29 which provide a channel or slot for receiving a small cutting tool as shown at 27; the forward end of the holder acting as a guide for tool setting and affording suitable support for the cutting end of the tool. The side walls 28, 29 of the holder 25 require the tool holder 25 to be endwise inserted in the vertical slot 20, with the side walls 28, 29 in abutting relation with the side of the post 17, thereby properly positioning the holder.

As shown in Figures 1 and 3, the reduced intermediate portion of the rocker arm 22 is of length somewhat greater than the diameter of the post 17 so as to provide a proper clearance between the enlarged ends of the rocker arm and the sides of the post to permit the rocker arm to tilt vertically during regulation of the set.
screws 23, 23, which, it will be noted in Figure 1, are arranged at different distances from the vertical center of the post 17; the set screw at the right in Figure 1 being arranged closer to the fulcrum of rocker arm 22 than is the case with the set-screw on the left, thereby enabling a proportionately greater leverage pressure to be applied on the tool and tool holder by the right hand set-screw, Figure 1, when the set-screw at the left is screwed downwardly by a suitable wrench.

In operation, when a small tool is to be employed, it is properly positioned in the small tool holder 25 and the latter, with the tool, is inserted in the vertical slot in post 17 on top of the foundation washer 24; the latter having been rotated so as to initially position the holder on the right plane at graduation 1. The foundation washer is then rotated in an anti-clockwise direction until the tool is at the desired height, at which time the forward set-screw 23 (namely the one at the right in Figure 1) is screwed down by hand until it engages the tool and then the rearward set-screw 23 (at the left in Figure 1) is screwed down tightly with the usual tool post wrench. In order to release the tool, it is merely necessary to release or unscrew the rear set-screw 23. As is apparent, the screwing down of the set-screw to the left in Figure 1 (which may be termed the rear set-screw) causes rocker arm 22 to tilt on its fulcrum pin 21 thereby providing a greatly increased leverage pressure on the small tool forward of the tool post, in proximity to the forward cutting end of the tool. The multiplied or added pressure which is exerted on the flat surfaces of the tool and its holder ensures a rigid holding condition which prevents possibility of undercutting, either with a down pull, a creeping or side movement of the device; the tool holder with the tool being held in place with a greater pressure than is possible to be obtained with a direct pressure screw; while the holder provides support for the forward end of the tool and greatly adds to its strength and capacity.

My improved small tool holder eliminates the excessive overhang required with small tool holders having the usual tool holder screw, at present employed; my improved small tool holder and associated elements efficiently performing the operations which would require a complete set of the screw type holders at present employed; my device enabling the blade of a parting tool to be supported to the depth of the cut; while a boring tool or inside threading tool having the square cross-section like the tool shown may be adjusted to the depth of the cut to be made.

In Figure 5 I disclose an improved leveling shim 22 to be used with solid or large tools or any of the present day tools, namely when the small tool 27 and small tool holder 25 are not employed. The shim 22 is tapered transversely as shown, consisting of a flat surfaced piece of steel, preferably with arcuate ends and reduced in width as shown at 29 to fit into the vertical slot in the post 17, while the shoulders 30, 30 formed by the enlarged ends 31, 31 engage the opposite sides of the post 17 and prevent shifting movement of the shim. The shim 22 is properly placed in the slot of the post and rests on the foundation washer 24 with the taper of the shim disposed in a direction opposite to that of the foundation washer so as to maintain the tool 32 level as shown in Figure 5; the tool being securely held in place by the screw-bolts 23, 23 carried by the rocker block 22 whereby the pressure on the tool is greatly increased by reason of the difference in distance of the two screw-bolts from the vertical center of the post; the pressure being exercised on all the surfaces at opposite sides of the post and being of greater magnitude than can be obtained with a direct pressure screw; the structure permitting a tool to be inserted and adjusted to cutting position and then tightened with the operation of one screw-bolt.

With my improved structure, a short piece of steel can be used as efficiently as a long piece by backing the short piece with another piece of steel; tool dressing, except for special tools, is practically eliminated, as the steel can be used or ground to half its thickness and then turned over and reground. This not only results in a material saving but also enables the use of scientifically tempered factory steel; and the graduated foundation washer eliminates guess work in tool setting and provides a proving guide for the proper height of the tool in working different materials left in as the high side of the washer arranged opposite the direction of the cut to be made the washer acts as a wedge and prevents side turning.

My structure reduces maintenance expense; provides a great saving in tool steel and the cutting edge of the tool has longer life due to the elimination of vibration which also prevents chipping of the T-slot in the lathe compound, as well as unnecessary wear on the lathe carriage.

The exemplification of the invention has been described in terms employed for purposes of description and not as terms of limitation, as structural modifications are possible and may be made without, however, departing from the spirit of my invention.

What I claim is:

1. In a tool post and holder for metal working machines, a slide block provided with an inverted T-slot; a-post provided with a flanged lower end mounted in the T-slot, and having a vertical slot extending from the upper end to a predetermined distance from the lower end of the post; a centrally apertured block in said slot having an inner holder and associated elements efficiently performing the operations of said post; and a rocker block pivotally mounted in the upper end of the slot in the post with its ends disposed to opposite sides of the post and each end provided with a pressure providing screw-bolt, the screw-bolts being arranged at different distances from the vertical axis of the post.

2. In a tool post and holder for lathes and the like, a slide block; an upstanding tool post mounted at its lower end in said slide block and vertically slotted from its upper end to a predetermined distance from its lower end; and a rocker block pivotally mounted in the upper end of the post slot with its ends enlarged and disposed beyond opposite sides of the post and said enlarged ends provided with tapped openings having vertically disposed screw-bolts, the tapped opening with its screw-bolt in one end of the rocker block being in a greater distance from the vertical median line of the post than the opening and screw-bolt in the other end of said rocker block.

3. In a tool post and holder of the character described, a tool post vertically slotted from its upper end to a predetermined distance from its lower end and provided with a transverse aper-
ture adjacent its upper end arranged at right angles to the slot; a rocker block of reduced transverse dimension intermediate its end to loosely fit into the post-slot and having a transverse aperture adapted to register with the aperture in the post; a combination of registering apertures for tiltably holding the rocker block in place, the ends of the rocker block being disposed beyond opposite sides of the post and each provided with a vertically disposed hole with the hole of one end arranged closer to the vertical median line of the post than the center of the hole of the other end and a screw-bolt arranged in each hole of the rocker block.

4. In a metal working machine of the character described, the combination of a slide block provided with a vertically disposed inverted T-shape slot; a tool post with a flanged lower end arranged in said slot and provided with a vertical slot extending from the upper end to a point removed from the slide block and having a transverse aperture adjacent the upper end disposed at right angles to said slot; an apertured block undercut at the lower end of the aperture to receive the flanged end of the post provided with a flat side adjacent the slot, flat bearing between the top of the post-flange and said slide block; and a foundation washer centrally apertured for passage of the post therethrough, the lower face of the washer being flat and adapted to rest on the slide block while the upper face is tapered toward one side and provided with equally spaced graduations.

5. The combination of a slide block; a vertically disposed tool post mounted in said slide block and slotted at its vertical median line from its upper end to a point above the slide block; a rocker block pivotally mounted in the upper end of the post with its ends disposed beyond opposite sides of the post and provided with vertically arranged screw-bolts arranged at different distances from the vertical median line of the post; and a centrally apertured foundation washer encircling the post, the lower face of the washer being flat and resting on the slide block while the upper face tapers toward one side and is provided with clockwise arranged graduations.

6. The combination of a slide block; a vertically disposed tool post mounted in said block and vertically slotted from its upper end to a point above the slide block; a rocker block pivotally mounted in the upper end of the post with each provided with a screw-bolt; and an apertured foundation washer encircling the post and resting on the slide block with its upper face tapering toward one side and one-half of its upper face provided with equally spaced graduations of increasing denominations in clockwise direction.

7. The combination of a tool post slotted from its upper end at its vertical median line to a point removed from its lower end; a centrally apertured foundation washer, encircling the tool post, provided with a flat lower face and a top face tapered toward one side of the post and having a bottom face tapered toward one side; and an elongated tool holder disposed through the tool post slot and having a bottom face tapered transversely to match the tapered upper face of the foundation washer on which it rests, the forward end of the holder being provided with uprising side walls adapted to abut the side of the tool post and prevent rearward movement of the holder.

9. The combination of a tool post slotted from its upper end along its vertical median line; a rocker block pivotally mounted in the tool post slot with its ends disposed to opposite sides of the post and each provided with a centrally apertured foundation washer encircling said post and provided with an upper face tapering toward one side; and an elongated tool holder disposed through the slot in the tool post with its ends disposed in the vertical planes of the screw-bolts while the forward end of the holder has uprising side walls adapted to prevent transverse movement of the holder in one direction.

10. In a device of the character described, provided with a vertically slotted upstanding tool post, a foundation washer, centrally apertured to encircle the tool post, provided with a flat side adjacent the slot, flat bearing between the top of the post-flange and said slide block; and a foundation washer centrally apertured for passage of the post therethrough, the lower face of the washer being flat and adapted to rest on the slide block while the upper face is tapered toward one side and provided with equally spaced graduations.

11. In a device of the character described provided with an upstanding tool post slotted longitudinally; a screw-bolt carrying member tiltably mounted in the tool post slot with its screw-bolt carrying ends disposed to opposite sides of the post; a foundation washer encircling the post and provided with an upper face tapered toward one side of the washer and having annularly spaced indicia; and an elongated element adapted to fit into the post-slot and having a surface tapering toward one longitudinal side to match the tapered surface of said foundation washer.

12. In a device of the character described, an upstanding tool post slotted longitudinally; an elongated screw-bolt carrying member tiltably mounted in the upper end of the tool post slot so as to tilt vertically with its ends disposed to opposite sides of the post and having vertically disposed openings at different distances from the post; and screw-bolts disposed vertically through the ends of said member and the screw-bolt in one end arranged a shorter distance from the vertical median line of the post than the screw-bolt in the other end of said member.

13. In a device of the character described, an upstanding longitudinally slotted tool post; a rocker block pivotally mounted in the upper end of the tool post slot with its ends disposed beyond opposite sides of the post and each provided with a screw-bolt and the screw-bolt at one end arranged closer to the vertical plane of the block than the screw-bolt in the other end thereof; and a pair of members provided with matching tapered faces on their contacting surfaces, one of said members being elongated and adapted to extend through the slot in the tool post while the other member is apertured to encircle the tool post.

14. In a device of the character described provided with an upstanding vertically slotted tool
post and pressure bolts carrying member tilt-
ably mounted in the upper end of the tool post
slot; an elongated tool holder adapted to extend
through the lower end of said slot with its ends
disposed to opposite sides of the tool post and
into the vertical planes of the pressure bolts, said
holder adjacent the forward end being provided
with upstanding side walls arranged to receive
the tool therebetween and to engage the side of
the tool post and prevent longitudinal movement
of the holder through the post-slot in one direc-
tion.

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