ADJUSTABLE LOCKING MEANS FOR LOCKING CUTTING TOOLS INTO TOOL HOLDERS

Filed June 1, 1926

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The object of this invention is to provide an improved means for adjustably locking one or more individual cutting tools into tool holders.

This and other objects of this invention will be fully illustrated in the drawing, described in the specification and pointed out in the claims at the end thereof.

In accompanying drawing:

Figure 1 is a side elevation of an end mill in which the facing tools are locked into the tool holder by means of my invention.

Figure 2 is a vertical sectional view of the end mill, the section being taken on the line 2—2' of Figure 1.

Figure 3 is a side elevation of the front portion of the end mill with the facing tools removed from it.

Figure 4 is a detail perspective view of one of the facing tools used in the end mill.

Figure 5 is a detail perspective view of one of the eccentric lock washers used for locking the facing tools into the tool holder.

In the several figures of the drawing like reference numerals indicate like parts.

The means for locking the cutting tools in end mills, facing tools, reamers, etc., forming the subject matter of my present invention is an improvement over similar locking means now used for this purpose in which the locking or set screw and other members of the locking mechanism are exposed and form a constant danger to the operator as such exposed parts are liable to injure the portion of the hand that may come in contact with them or these parts are liable to catch the clothing and indirectly cause an injury to the workman.

The locking mechanism is illustrated in connection with an end mill but is understood that this locking means can be equally well applied to other tools having removable and adjustable cutters such as other types of milling tools, reamers etc. The end mill illustrated in the figures comprises the tapered shank 1 having the enlarged cylindrical body 2 formed on the outer end thereof. The rear end of this cylindrical body portion is threaded to allow the adjusting ring 3 to be threaded back and forth thereon. Into the cylindrical body are cut the grooves 4, 4. These grooves are angular to the central axis of the tool and in each of them is located a cutting tool 5.

In the forward end of the cylindrical body which is slightly larger in diameter than the threaded rear portion, are provided the pockets 6, 6 one adjacent to each of the grooves 4, 4. A threaded hole 7 is provided in the bottom of each of the pockets 6. This hole is eccentric to the wall of the pocket. An eccentric clamping washer 8 is placed into each of the pockets 6 with its hole in line with the threaded hole 7 in the pocket. In this way the washers 8 are made to overhang the pockets and project into the grooves 4, 4 and are held in this position because of their eccentric mounting in the pockets.

Each of the cutting tools 5 is provided with horizontal groove 9 which extends from the inner end of the cutting tool about two-thirds of the length thereof. The overhanging portion of the eccentric locking or clamping washer engages into this groove. A set screw 10 passes thru the eccentric washer and is threaded into the hole 7 and when this set screw is tightened the washer is forced down into the pocket 6 so that the overhanging portion of it forces the cutting tool into its groove and firmly locks it in place therein.

As above pointed out the eccentric mounting of the clamping washers in the pockets 6 prevents a rotation of them so that when the set screw is tightened against the washer the friction between the head of the set screw and the washer cannot rotate the washer and in turn shift the cutting tool after it has once been set in the correct position within the groove 6.

This is important because the cutting edges of the cutting tools must all be in the same plane in the tool holder in order to function properly, otherwise one of the cutting tools will take a heavier cut than the other cutting tools resulting in an irregular finish produced by the tool.

This novel construction makes it also possible to place the head of the set screws into a pocket so that they will not project from the periphery of the tool holder. This is important because in tools where the set screw projects out from the holder the work...
man using the tool is exposed to the danger of being injured by the set screw heads as they rotate with the tool holder. Furthermore such exposed set screws may catch the clothing of the workman and wind it up on the tool so that the workman is drawn into the machinery as a consequence thereof.

The adjusting ring threaded on the rear portion of the tool holder serves as an adjustable stop against which the rear end of each of the cutting tools rests. When therefore the rear ends of the cutting tools are placed against this ring the cutting edges at the front end are properly lined up with one another. This adjustment is not destroyed by the clamping or releasing of the cutting tools within the grooves because of the novel clamping means and the adjustment of the tools is, therefore, done much quicker than has heretofore been possible. After the adjusting ring has been adjusted it is locked in this position on the tool holder by means of the set screw 11.

I claim:

1. In a tool holder, the combination of a tool body, a groove provided in said tool body, a cutting tool located in said grooves, a pocket adjacent to said groove, an eccentric washer mounted eccentrically in said pocket, said eccentric washer projecting into said groove from said pocket and engaging said cutting tool and means for clamping said eccentric washer against said cutting tool and locking said cutting tool into said groove.

2. In a tool holder, the combination of a tool body, a groove provided in said tool body, a cutting tool located in said groove, a pocket adjacent to said groove, an eccentric washer mounted eccentrically in said pocket, a groove in the side of said cutting tool, said eccentric washer projecting into said groove and means for clamping said eccentric washer into the groove in said cutting tool and locking said cutting tool in place in said groove in said tool body.

3. In a tool holder, the combination of a tool body, a groove provided in said tool body, a cutting tool located in said groove, a washer engaging said cutting tool, a set screw passing thru said washer and means for holding said washer against rotation, said set screw being adapted to force said washer against said cutting tool to lock said cutting tool in place in said groove.

4. In a tool holder, the combination of a tool body, a cutting tool supported on said tool body and having a groove in one side thereof, a set screw countersunk into said tool body, a circular clamping washer surrounding said set screw, said clamping washer engaging the groove in said cutting tool below the periphery of said tool body to clamp said cutting tool in place on said tool body.

5. In a tool holder, the combination of a tool body having a groove provided therein with a cylindrical pocket adjacent thereto and open into the groove, a cutting tool having a groove in the side thereof adapted to rest in the groove in the tool body, a set screw threaded eccentrically into the pocket of said tool body, an eccentric washer surrounding said set screw and projecting out of the pocket into the groove in the side of said cutting tool, said set screw being adapted to clamp the overhanging edge of said eccentric washer into the groove in the side of said cutting tool and lock said cutting tool in place in the groove in said tool body.

In testimony whereof I affix my signature.

ALEXANDER L. GEITNER.