# United States Patent [19]

**Grieco**

[11] **3,852,922**

[45] **Dec. 10, 1974**


[54] **FIXTURES FOR HOLDING A TOOL SUBJECT TO GRINDING**


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[52] **U.S. Cl.** ..... **51/218 A**
[51] **Int. Cl.** ..... **B24b 3/34**
[58] **Field of Search** ..... 51/216, 218, 220; 269/67



[56] **References Cited**

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*Primary Examiner*—Harold D. Whitehead
*Attorney, Agent, or Firm*—Lerner, David, Littenberg & Samuel



[57] **ABSTRACT**

A fixture for holding a tool for grinding wherein the holder is mounted for adjustment about at least one axis and is set up for grinding several distinct and different types of tool steel to achieve grinding of steel for different standard screw threads. The concepts may be utilized in a simple form for hobbyists or in a more variable form for experienced machinists.


**2 Claims, 12 Drawing Figures**

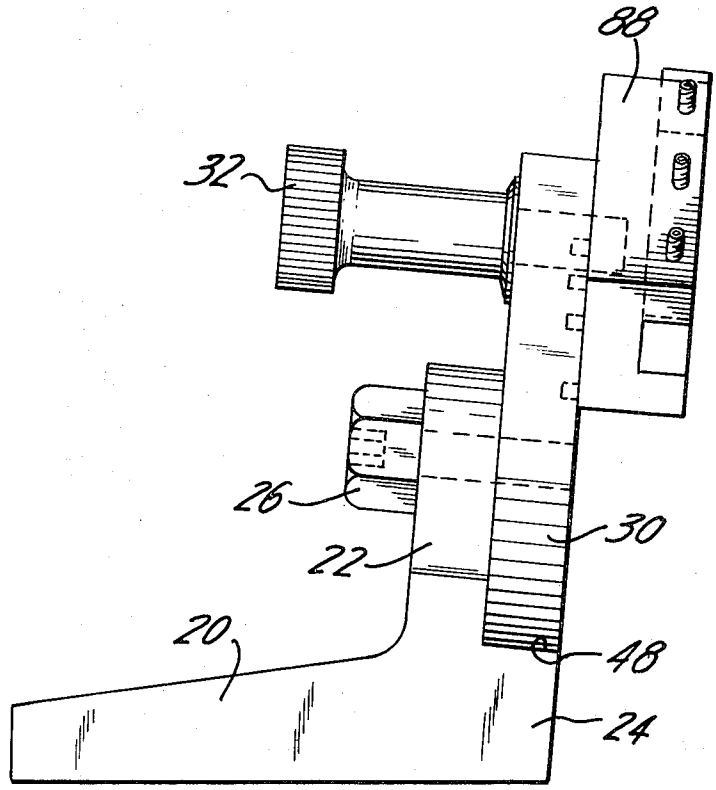


FIG. 1
PRIOR ART

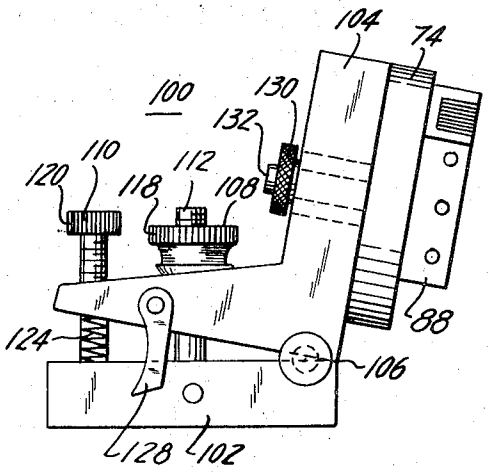



FIG. 2

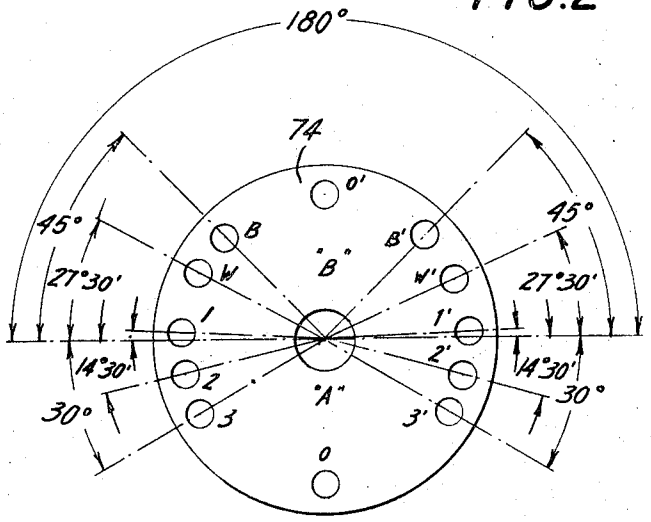



FIG. 3

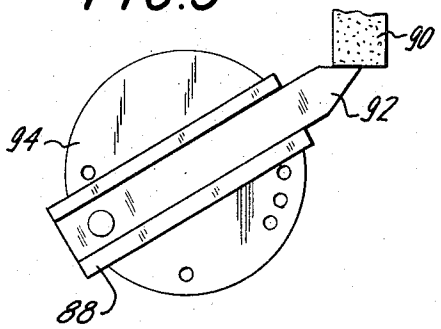



FIG. 4

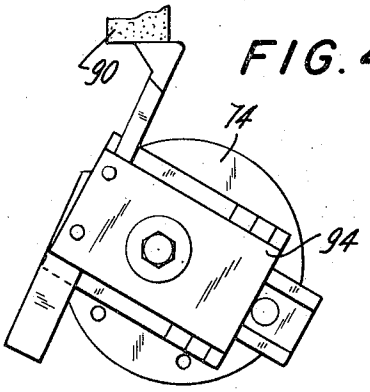



FIG. 5

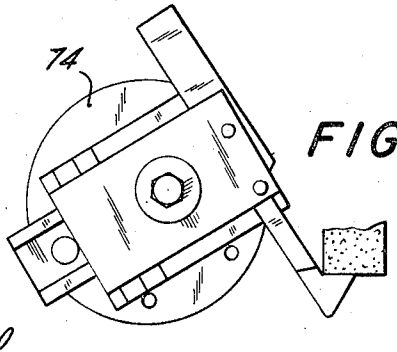



FIG. 6

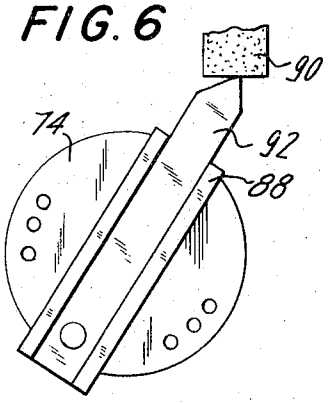



FIG. 7

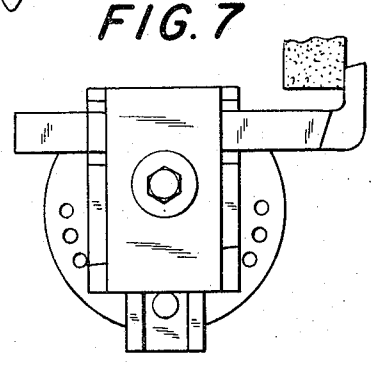


FIG. 8

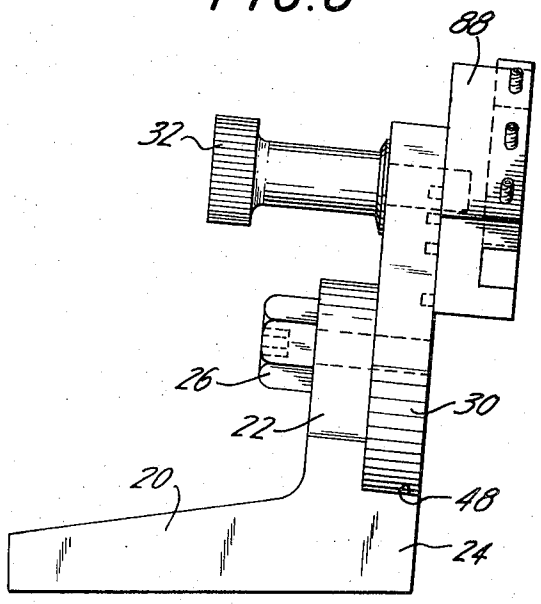



FIG. 9

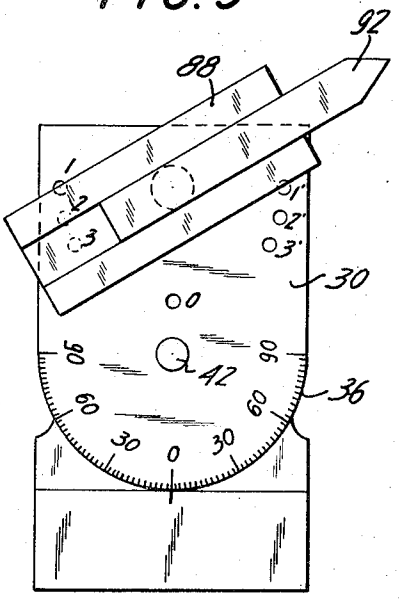



FIG. 10

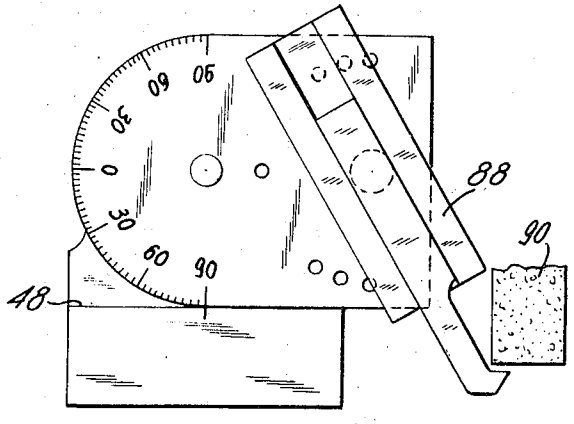
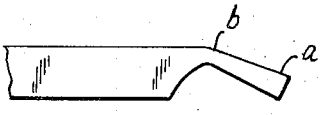



FIG. 11




FIG. 12



# FIXTURES FOR HOLDING A TOOL SUBJECT TO GRINDING

## BACKGROUND OF THE INVENTION

Fixtures for supporting machine tools and tools subject to grinding have been developed in the past for accurately holding a tool for cutting; for example, U.S. Pat. Nos. 2,432,058; 2,480,618; 2,390,428; 2,351,246; 2,607,274; 2,700,854; 1,889,248; 2,448,309; 2,452,089 and 3,512,309.

However, none of the prior art devices has developed a single universal tool holder for holding tool steel which will be ground to achieve a straight square thread cutter; an off-set square thread cutter; an acme thread cutter; a U.S. thread cutter; a buttress thread cutter; or a British Whitworth thread cutter, all of which has accomplished without any need for changing the tool holder.

## SUMMARY OF THE INVENTION

Thus, the present invention contemplates the provision of a multi-purpose tool holding fixture having a carrier block either fixedly or rotatably secured to a base. For the more accomplished machinist, the carrier block is tilted about an axis parallel to the front edge of the base. The angle of tilt to the carrier block determines the degree of clearance or relief angles which the shaped cutting edge of a tool supported by the carrier block is provided during a grinding operation. For hobbyists or the like, this refinement need not be used, and one embodyment of the present invention calls for a fixed carrier block mounted on the base. These are provided for supporting the tool to be ground for rotation on the carrier block about an axis running perpendicular to the front face of the carrier block. Accordingly, the tools supported in the tool holding means can be inclined at select angles so as to grind opposite faces of the cutting edge of the tool steel so as to achieve an accurate thread cutting tool.

A tool holding means can be especially designed blocks with supports thereon for assuring right angle support of the tool steel during the grinding operation or, in the alternative, with respect to the rod type tool steel, the rod type tool steel can be positioned in a special tool holder which indexes the steel for cutting in more than one angular position without requiring any changes in the setting of the fixture.

Additionally, the present invention contemplates a means for grinding a straight square thread cutter; an offset square thread cutter; an acme thread cutter; a U.S. thread cutter; a buttress thread cutter; or a British Whitworth thread cutter, utilizing the same single tool holder. Additionally, the grinding utilizing the present fixture can be achieved utilizing the front face of the grinder without placing any axial pressures on the grinder while enabling the grinder to achieve internal thread cutting faces on the tool steel.

The present invention may be embodied in other specific forms without departing from the spirit or central attributes thereof, and accordingly, reference should be made to the appended claims rather than to the foregoing specification as indicated in the scope of the invention.



## DETAILED DESCRIPTION OF THE INVENTION

FIG. **1** is a side elevational view of a fixture built in accordance with the prior art.

FIG. **2** is a front plan view of the positioning block utilized in FIG. **1.**

FIG. **3** shows the fixture of FIG. **1** utilizing grinding a U.S.S. external thread cutter on locations **3—3** of the carrier block of FIG. **2.**

FIGS. **4** and **5** show the grinding of a U.S.S. internal thread cutter on locations **3—3** by means of an auxiliary tool holder utilized with the fixture shown in FIG. **1.**

FIG. **6** shows the means by which a tool holder, when in position on **0** can grind a tool steel at any angle.

FIG. **7** shows the grinding of a boring tool by means of the auxiliary tool holder shown in FIGS. **4** and **5,** when said auxiliary tool holder is positioned at **0** on the carrier block of the fixture of FIG. **1.**

FIG. **8** shows a second form of the present invention in which a fixed angularly positioned carrier block is utilized.

In FIGS. **9** and **10,** there is shown the simple manner in which the tool holder utilizing the fixture of FIG. **8** utilized to grind U.S. threads.

FIGS. **11** and **12** show a straight square thread cutter and an offset square thread cutter which have been ground in accordance with the fixtures of the present invention.

The fixture **100** shown in FIG. **1** comprises a base **102** and a carrier block **104.** The carrier block **104** supports many types of tool holders and is shown supporting a positioning block **74** and a channel member **88.** The carrier block **104** is pivotally mounted on a suitable open pivotal connection **106** adjacent and parallel to the front edge of the base **102** and the carrier block **104.** Thus, the carrier block **104** is adapted to be rotated about the pivot **106** and held in place by an upper limit screw threaded member **108** and a lower limit screw threaded member **110.** The upper limit screw thread **108** comprises a bolt **112** connected to the base **102** by a screw thread receiving means (not shown). The carrier block **104** is slidable on the bolt **112** and has an opening through which the bolt **112** passes which is larger than the bolt **112.** However, the carrier block **104** cannot move upwardly any further than is allowed by the nut **118** threaded on the upper end of the bolt **112.** To prevent the carrier block from going below a lower limit, the second bolt **120** is provided, screw threaded into the carrier block **104** and adapted to have its end received within a notch formed on the upper surface of the base **102.** Two springs **124** on opposite sides of the bolt **120** spring bias the carrier bar **104** upwardly. Accordingly, the spring biased springs **124** force the carrier block **104** upwardly until limited by the nut **118.** The nut **188,** its screw threaded downwardly, causes the carrier block **104** to move downwardly until limited by the bolt **120** touching the notch in the base **102.** A given angular position is determined by a suitable pointer **128** which reads directly on a scale formed on the side surface of the base **102** to tell the operator exactly the angle of the carrier block **104** with respect to the base **102.**

This fixture has been more completely described in U.S. Pat. No. 3,512,309 and the disclosure therein is hereby incorporated by reference.

The positioning block **74** is rotatably positioned relative to the carrier block **104** by a screw threaded securement **130** to hold the positioning block **74** in position. A tool holder **88** is screw threaded into the center of positioning block **74** and has its end **132** extending through the carrier block **104.** Member **88** has suitable indexing means for fitting into holes bored into positioning block **74** in a manner to be showed in FIG. **2.** The positioning block **74,** as shown in FIG. **2,** allows the tool holder **88** to be positioned thereon to grind square thread, U.S. thread, buttress thread, or British Whitworth threads. The index or positioning block **74** utilizes the index holes **1, 2, 3, 1', 2', 3',** B, W, B', and W'. For example, for a square thread, one would first use the three positions **1-1'-0** with three cutting operations. For acme thread **2-2'-0;** and **3-3'-0** for U.S. threads. It should be noted that the index holes **1-1'** are slightly above the center line of the tool holder **74** in order to grind a tool cutter, as shown in FIG. **11,** larger at *a* and at *b*. To grind an offset square thread cutter, as shown in FIG. **12,** the indexing block **74** is rotated about its axis to the required angle and then the square thread cutter is ground as before. As will be noted, the offset square cutter thus ground as shown in FIG. **12** is larger at *a* and smaller at *b*. No previous positioning block has been able to achieve this type of desirable result.

By rotating the positioning or indexing block **74** 180° to section B, the index holes B-B'-O may be used to achieve a buttress thread (45°) cutter and W-W'-O can be used for British Whitworth threads (47', 30') cutters. When grinding any other angular cutter, the tool holder **88** is fastened to index block **74** by means of the nut **130** at the **0.** Then, tool holder **88** and index block **74** are rotated as one unit to any angle and tightened by the member **130.**

In FIG. **3,** there is shown the indexing or positioning block **74** utilized with holder **88** to grind on a grinding wheel **90** a U.S. external thread at locations **3-3.** It will be understood that both sides of the tool steel **92** can be ground by merely shifting from location **3** to location **3'**. The same positions **3-3'** can be utilized to grind a U.S. internal thread cutter by means of an auxiliary tool holder **94** as shown in FIG. **4.** The auxiliary tool holder **94** is substituted for the tool holder **88** and is of the type shown in my U.S. Pat. No. 3,512,309. The indexing block **74** enables one to simply grind the tool steel as shown in FIGS. **4** and **5.** That is, in FIGS. **4** and **5,** one sees the tool holder first in position **3'** and then in position **3** to achieve the U.S. internal thread cutter.

As shown in FIG. **6,** by merely fastening a tool holder on at position **0** and rotating the plate **74,** a cutter can be ground at any angle. Initially, by substituting the tool holder **94** for the tool holder **88** in FIG. **6,** it is possible to grind other tools such as a boring tool by means of the auxiliary tool holder.

It should be noted that in all of these operations, the grinding wheel is maintained in a manner whereby it grinds only on its outer surface so that there is little or no axial pressure thereon. It should be noted that holes **3-3** are 30° from the center line, holes **2-2** are 14°, **30'** from the center line, holes B-B' are 45° from the center line, holes W-W' are 27°, **30'** from the center line, and holes **1-1'** are slightly above the center line (i.e., approximately 1°).

In FIG. **8,** there is shown another embodiment of the present invention in which a fixture **20** is shown having a base **24** and a upright carrier block **22** integral with the base **24** and slightly tilted. A positioning block **30** is rotatably secured to the carrier block **22** by a nut **26.** A tool holder **88** is shown secured to the positioning block **30** by way of bolt **32.** As in the previous embodiment, tool holder **88** has a pin at one end thereof which fits within holes **1, 2, 3, 1', 2',** and **3',** similar in position to the holes on carrier block **74.** That is, holes **1-1, 1'** are slightly above the center line of the tool holder **88** and holes **2-2'** are 14°, **30'** below the center line and holes **3-3'** are 30° below the center line. It should be noted the if the fixture **20** were to be made to grind British Whitworth and buttress threads, then suitable holes could be placed on the back of the plate **30** and the plate reversed for utilization of such indexing holes.

The positioning block **30** has square side walls ending in a semi-circular bottom face **36** graduated from 90° to 0° and thence to 90° again. A **0** hole is also provided on the face of the positioning block **30.** When the tool holder **88** is placed with its pin in the **0** hole, then the tool holder can be rotated, in a manner similar to that shown in FIGS. **6** and **7** about the axis **42** to a desired angle of cutting. To grind a U.S. thread cutter, as shown in FIG. **9,** the holder **88** is positioned with its end in hole **3** with the index plate in the vertical position as shown. The base **24** has a substantially horizontal lip **48** at the lowermost point of the positioning block **30** when the positioning block **30** is in the vertical position. When the positioning block **30** is rotated 90°, its flat side surfaces abut the horizontal abutment **48.** Then, as shown in FIG. **10,** it is possible to grind an internal U.S. thread cutter with the index plate horizontally on the positions **3-3.** Thus, utilizing the single tool holder **88,** and without the need for changing tool holders as was required in the embodiment shown in FIGS. **1–7,** it is possible to do both internal and external U.S. thread cutting utilizing the same tool holder and the same positioning holes **3-3'**. This type of simple tool can be utilized by obvious or apprentice machinists to achieve the grinding of machine tools without the necessity of substantial investments in experience and parts. It will be understood that, as was described with respect to FIGS. **1–7,** the other types of thread cutting can also be achieved with the positioning plate **30.**

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims rather than to the foregoing specification as indicating the scope of the invention.

I claim:

**1.** A fixture to support a cutting tool for grinding comprising a base and a carrier block extending upwardly therefrom, a positioning block mounted on said carrier block, said positioning block having a flat tool holder receiving surface with a hole through said tool holder receiving surface for rotatably supporting a tool holder, indexing holes on opposite sides of said tool holder hole, a first zeroing hole positioned at a point spaced from said tool holder hole, said tool holder having a center line being formed perpendicular to a line between said zeroing hole and said tool holder hole, said positioning holes including a pair of holes positioned slightly above the center line to utilize in grind-

ing square thread cutters, tool holder means for holding tool steel subject to grinding rotatably positioned in said tool holder hole and adapted to be removably positioned with one end of said tool holder in one of said positioning holes said base and carrier block being integral with one another, said carrier block tilting slightly from the vertical and said base extending outward under said positioning block and forming a horizontal ledge, said positioning block lowermost portion, when in a vertical position, touching said horizontal ledge, said positioning block having along the bottom thereof, when in said vertical position, a semicircular portion with a measuring scale thereon, the other portion of said positioning block having flat side surfaces, said tool holder hole being in said other portion of said positioning block, said positioning block being rotatably mounted to said carrier block at the center of said semicircular portion to a position wherein one of said flat side surfaces abut said horizontal ledge.

**2.** The fixture to support a cutting tool for grinding of claim **1** wherein said positioning holders include a second pair of positioning holes positioned 14°, 30′ below the center line and a third pair of positioning holes 30° below the center line.

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