This invention relates to a fixture for holding a thread chasing tool bit in proper position, for grinding of the tool bit to proper angles during the formation thereof.

The invention has for an important object a provision of a fixture of the character described that will result in precision grinding of the bit.

Another important object is to provide a fixture of the type stated wherein the several angular faces of the tool bit can be ground at one setting of the grinding wheel, with each of said faces being ground accurately and centrally, thereby to make the center line of the point of the tool bit parallel to the center line of the tool bit proper, even though there may be minute variations in the thickness of the tool bit body, with said variations sometimes being no more than a thousandth of an inch.

Another important object is to provide a fixture of the type stated which is adapted in detail, for the grinding of the helix angle upon the bit, the construction being such as to cause said helix angle to be ground with absolute accuracy, and this without changing the setting of the grinding wheel.

Another important object is to provide a construction in a fixture of the type described which will permit the grinding of the tool bit with a lip, and which is so formed that the grinding of the lip will not alter the angle of the thread.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claim, it being understood that changes may be made in the construction and arrangement of parts without departing from the spirit of the invention as claimed.

Receiving the drawings

Figure 1 is a top plan view of a fixture constructed in accordance with the invention. Fig. 2 is a longitudinal section therethrough. Fig. 3 is an end elevation. Fig. 4 is an enlarged longitudinal section through a collet embodied in the construction. Fig. 5 is a perspective view of the fixture in position for grinding of a sixty-degree thread.

Fig. 6 is a view of the fixture positioned for grinding of the point or forward edge of the bit.

Fig. 7 is a view similar to Fig. 3, the bit being adjusted for grinding of the helix angle thereon.

Fig. 8 is a view showing the fixture position for grinding of a lip upon the tool bit.

Referring to the drawings in detail, in Figs. 1 to 8 I have illustrated a tool bit grinding fixture including a body generally designated and formed with the parallel, flat horizontal upper and lower faces 6 and 7 respectively. A recess 8 can be formed in the underside of the body if desired, but this is not essential. The front portion of the lower face 7 is cut away angularly as at 7′.

Formed in the upper face 6 of the body 5 is the threaded opening 9 communicating with the recess 8, and threaded in said opening 9 is the set screw 10 adapted to be threaded against a flat surface on the tubular body 11 of a bit holder generally designated 12. Said bit holder is removably, slidably and rotatably positioned in the aligned openings 13, 14 of the body 5, said openings defining a longitudinal bore within the fixture. When adjusted to a selected position, it will be understood that the bit holder 12 is capable of being immovably retained in said position by threading of the set screw 10 against a flat surface on the holder. Set screws 16′ threadable in the side walls of body 5 are also provided, for a purpose to be described.

I believe it will be apparent that the holder having a precision fit within the longitudinal bore of the body 5, and being retained in adjusted position by threading of the set screw against a flat surface formed on the holder, said holder will remain in center in any position to which it is adjusted prior to being clamped against further movement by the set screw.

Formed in one end of the tubular body portion 11 of the holder 12 is the non-circular socket 15 extending through the split tapered collet 16, said non-circular bore being adapted to receive a tool bit A to be ground to proper angles. The tool bit A, when inserted in the socket 15, is held against movement in said socket by means of the collet or nut 17 threaded upon the collet 16. It will be noted that the tool bit, when inserted in the centrally disposed non-circular socket 15, and tightened therein, will be automatically placed on dead center, and there will not exist the deviation of a few thousandths of an inch which has existed in prior devices of the same general type not embodying the collet arrangement illustrated.

The opposite sides of the body 5 are formed with a plurality of angular faces, for the purpose of positioning the body 5 in various positions upon a magnetic chuck table T.

Formed on the opposite sides of the body 5 are the medial side faces 18, these converging upwardly but having parallel top and bottom edges, and comprising faces on which the body 5 can be positioned for the grinding of "square" faces upon a tool bit. Also formed on the opposite sides of the body 5 are the front side faces 19 converging upwardly and defining between them an included angle of 29 degrees,
for the grinding of acme or 29 degree threads. Also formed on opposite sides of the body 5 are the opposed upwardly converging lower rear faces 20 defining between them an included angle of 61 degrees, the lower rear faces merging into the upper rear faces 21 (see Fig. 3) that also converge upwardly and define between them an included angle of 60 degrees. I also form the body 5 with the angular end faces 22, either of which is adapted for positioning of the body 5 or as in Fig. 6, for grinding of the point or forward edge of a tool bit.

In use of the fixture as illustrated in Figs. 1 to 8 inclusive, it will be understood that a tool bit A to be ground is first inserted in the socket 15 of the collet or holder, and the collar 17 is then threaded tightly upon said collet for the purpose of securely holding the tool bit A in a central position therein. Then, assuming that no helix angle is to be ground upon the tool bit A, the set screw 10 is threaded against the flat surface thereof, holding the collet or bit holder against movement from proper position relative to the body 5. It may be noted at this point, that the use of the flat surface and the set screw, with said collet having a tight working fit within said bore, will have the effect of retaining the collet in an exact central position within said bore, so that the tool bit A will be ground without deviations which have existed in similar devices heretofore.

Assuming that the bit has been properly inserted, the block or body 5 is positioned as desired, upon the several faces thereof, for grinding of the tool bit to proper angles. In this connection, it may be noted that the grinding wheel W is first set, and once set need no longer be moved from the position in which it has been adjusted to a proper setting. Nor, throughout the grinding of the tool bit A, need the tool bit be loosened, removed, or moved in any way relative to the body 5 supporting the same.

Referring to Fig. 5, the body 5 is positioned upon one of the faces 21, for the purpose of grinding one of the side faces 23 of the tool bit A. Said side faces 23 of the tool bit A, as will be understood, define between them an included angle of 60 degrees, so that said tool bit A is formed for subsequent use in grinding 60 degree or standard threads. In any event, after one face 23 of the bit has been ground, the body 5 is reversed side for side, wherein it is positioned upon the opposed face 21 for grinding of the opposite side face of the tool bit A.

In Fig. 6 the body 5 is positioned on one of its end faces 22, thus to grind the point or forward edge 24 of the tool bit, the tool bit illustrated in Fig. 6 being one having 29 degree side faces 25, which would have been ground by placing the body upon the faces 19. When the body 5 is positioned for grinding of a lip 26 upon the tool bit A, and to this end, it will be understood that a sine bar or similar device would be used for the purpose of making angle measurements for proper location of the body upon the table T relative to which W. The position of the body is positioned upon its surface 17 and the lip is ground.

In the grinding of lips upon tool bits, a loss of the true 60 degree included angle defined between the side faces of the bit often results. This is by reason of the fact that the lip cuts downwardly, cutting away a portion of the top surface of the tool bit as clearly shown in Fig. 8. Since the side faces 23 of the tool bit not only define an angle of 60 degrees between them, but also, converge downwardly from top to bottom of the tool bit, it will be understood that the lip 26 would result in a destruction of the true 60 degree angle defined between said side faces 23.

Accordingly, I provide the lower rear faces 20 upon the body 5, these faces being used in place of the faces 21 whenever the tool bit to be ground is to be provided with a lip 26. In other words, if the tool bit is to be provided with a lip 26, the body 5 is positioned upon the respective faces 20 during the grinding of the side faces of the tool bits, said faces 20 defining between them an angle of 61 degrees. Subsequently, when the lip 26 is ground upon the tool bit, the resultant angle between the side faces of the tool bit is reduced to 60 degrees for precision formation of said tool bit.

Referring back to the first figure of the invention, it may be noted that the use of the collet formed and illustrated as described is especially adapted for the grinding of the proper helix angle upon the tool bit. This is readily noted by comparing the Figures 5 and 1, the showing of Fig. 5 showing a tool bit positioned for grinding without the helix angle, while the showing of Fig. 7 shows the bit positioned for grinding of said angle. It is necessary simply that the user loosen the screw 10, after which the collet is bodily adjusted rotatably within the longitudinal bore, to a selected position. The collet can be degree marked with proper calibrations 44 for this purpose, and the body 5 can be equipped with a hairline 45 for the purpose of movement thereof to proper position.

In any event, for adjustment of the collet to a position for the grinding of the helix angle, the angle can be set by use of a conventional bevel protractor, which is set at the desired angle for the purpose of proper location of the collet to cause the grinding of a proper helix angle upon the tool bit.

Said bevel protractor, as will be appreciated, is set to the desired angle, after which set screws 10' are turned home for the purpose of holding the collet against further movement. The set screw 10 would be left loose, since threading thereof against the flat-surfaced part of the tubular body 11 would have the effect of turning said body back into a position in which the bit is in a state of perpendicularity, which would of course be undesirable where a helix angle is to be ground. Conversely, where no helix angle is being ground, screws 10' can be left loose, with screw 10 being used to hold the tubular member 11.

What is claimed is:

A tool bit grinding fixture comprising an elongated body having a plane top and a bottom which lies parallel thereto, said body having an axial bore of circular cross section extending longitudinally therethrough midway between the top and bottom, opposite sides of the body converging as they recede from the bottom and having internally screw threaded openings extending therethrough which communicate with the bore and lie along a common axis which intersects the axis of said bore, said body having inclined faces adjacent the convergent sides thereof which faces lie between the sides and one end of the body and converge as they recede from the aforesaid sides, ridges extending diagonally across the faces and separating the face into two surface plate engaging surfaces which lie at obtuse angles to one another, a tool holder
mounted in the axial bore, and set screws extending through and threadedly engaging the internally screw threaded openings for engaging the tool holder and retaining it in the bore.

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