

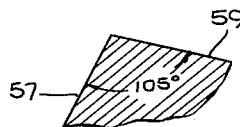
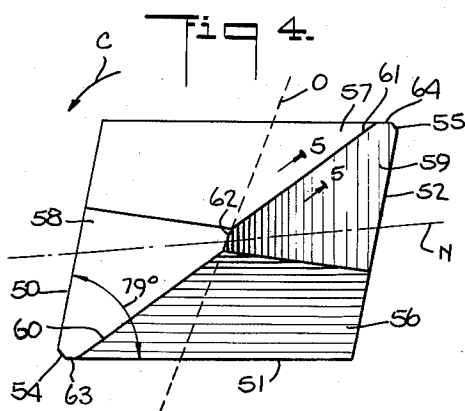
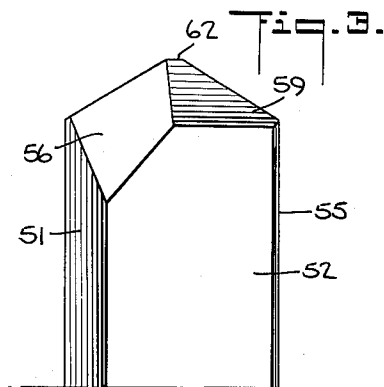
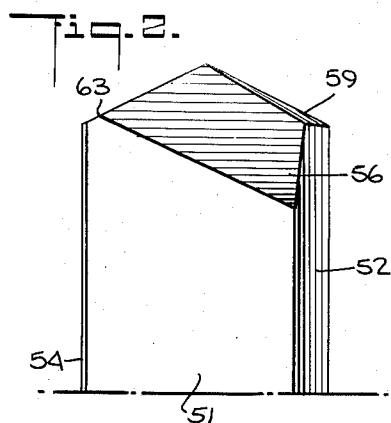
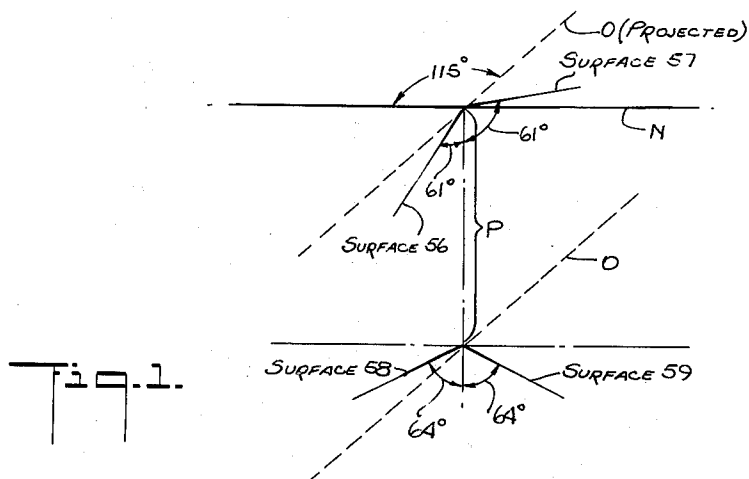
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2,977,828

CARBIDE DRILL

Original Filed May 9, 1958



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2,977,828

CARBIDE DRILL

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Original application May 9, 1958, Ser. No. 734,214, now Patent No. 2,889,725, dated June 9, 1959. Divided and this application Mar. 26, 1959, Ser. No. 802,170

The terminal portion of the term of the patent subsequent to June 9, 1976, has been disclaimed

3 Claims. (Cl. 77—67)

This invention relates to high speed drills of the carbide type.

Such a drill is required to bore a large number of holes successively and at a high rate of speed without becoming dull or breaking. In addition, the drill must be capable of being resharpened or reground to the proper surface angles without difficulty. Problems have been encountered in the repetitive boring of hard steels in the range of 50–65 Rockwell. The usual drills become dull and must be replaced after only a few holes have been bored.

An object of this invention is to provide a high speed drill that can be used repeatedly for drilling a large number of holes at high speeds in extremely hard metal and that can be easily reground to the original surface angles.

The invention set forth herein is more fully described in the United States Letters Patent No. 2,889,725, issued on June 9, 1959, to John W. Turton and Royce M. Strickland of which this patent is a division. The following description of an embodiment of the invention will be taken in connection with the accompanying drawing in which

Fig. 1 is a perspective view illustrating the relationship between the planes of the end surfaces and the sloping side surfaces;

Fig. 2 is a side view of the end of the tap;

Fig. 3 is another side view of the end of the tap;

Fig. 4 is an end view of the tap; and

Fig. 5 is a fragmentary sectional view taken along lines 5—5 of Fig. 4.

In the embodiment illustrated in the drawings the drill has side surfaces 50, 51, 52 and 53 extending longitudinally to the central axis A of the drill. The drill is rotated in the direction indicated by the arrow C and has two main cutting edges 60 and 61 formed by the end surfaces 58 and 59 intersecting with the sloping side surfaces 56 and 57 respectively. The sloping side surfaces 56 and 57 also intersect with the end surfaces 59 and 58 respectively to form the back edges 61a and 60a respectively.

The four side surfaces 50, 51, 52 and 53 preferably extend parallel to the central axis and are arranged in a parallelogram shape to form openings between the sides of the drill and the wall of the hole formed by the drill. The distance between the ends 54 and 55 determines the diameter of the drill hole.

As illustrated in the drawings, the sides 50 and 51 are at an acute angle of 79° and the sides 52 and 53 are at an acute angle of 79°. The ends 54 and 55 on the longest diagonal are ground to form end surfaces having a width of approximately .002 to .004 of an inch. The sloping side surfaces 56 and 57 extend approximately 61° to the axis and intersect beyond the end of the tip in a line N. The end surfaces 58 and 59 are at an angle of approximately 64° to the central axis and intersect along a line O forming an edge 62 which is rotated 115° with respect

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to the line of intersection N of the planes of the sloping side surfaces. As in the preferred embodiment, the intersections with the central axis are spaced a distance P to provide a proper width to the end surfaces 54 and 55. The surfaces 56 and 58 intersect to form cutting edge 60 and the surfaces 57 and 59 intersect to form cutting surface 61. The end surface 58 and the leading surface 56 are at an angle of approximately 105° in the section taken by a plane normal to the cutting edge 60, and the surface 57 is at a corresponding angle with the end surface 59. The cutting edges 60 and 61 extend to intersect with the side surfaces 51 and 53 to form short cutting surfaces 63 and 64, respectively, of approximately .004 of an inch. Thus, this embodiment is substantially the same and functions in a manner similar to the preferred embodiment described in the Patent No. 2,889,725.

The above described embodiment of the drill may be made in a range of sizes from $\frac{1}{16}$ of an inch to $\frac{3}{4}$ of an inch. The drill has many advantages and desirable characteristics which result in an improved drilling process for hard steels and a consequent reduction in the cost of manufacturing products requiring the drilling of a large number of holes by a single drill. The drill has a substantially reduced thrust for forcing the drill into the material and also provides for a substantial reduction in the amount of heat generated at the drilling point over the present drills used for penetrating hard steels. The drill also provides for a uniform hole size throughout its depth and renders an improved surface finish to the walls of the drilled hole. The drill may be used repeatedly to drill a large number of holes in hard steels without substantially impairing the above mentioned characteristics of the drill and without becoming excessively dull. An important characteristic resulting in the reduction of costs in manufacturing processes is the ease of regrounding the surfaces and edges of the drill. The drill may be resharpened a great number of times before it must be discarded. Another important characteristic is the parallelogram cross sectional shape of the tip of the drill which provides a large chip space for removing chips of steel from the cutting surfaces to reduce the wear on the tip. This increase in chip discharge space is produced without reducing the strength of the drill. The form of the tip provided by the angles of the sloping and end surfaces provides a strong tip which is resistant to breakage. Thus, these improved characteristics of the drill substantially extend its life.

I claim:

1. A high speed drill for forming cylindrical holes comprising a carbide tip having four side surfaces extending longitudinally to the central axis with diagonally opposite acute angles and diagonally opposite obtuse angles being spaced from the walls of the drilled hole for discharge of chips therethrough, sloping side surfaces on opposite sides of the central axis and with the planes of said surfaces intersecting along a line passing through said central axis and end surfaces on opposite sides of said central axis and intersecting to form an edge passing through said central axis at a distance spaced from the line of intersection of the planes of the sloping surfaces and at an angle of approximately 115° therewith to form cutting edges at the intersection of said sloping surfaces and said end surfaces.

2. A high speed drill for forming cylindrical holes comprising a carbide tip having sloping side surfaces on opposite sides of the central axis and with the planes of said surfaces intersecting along a line passing through said central axis, and end surfaces on opposite sides of said central axis and intersecting to form an edge passing through said central axis at a distance spaced from the line of intersection of the planes of the sloping surfaces and at an angle of approximately 115° therewith to form cut-

ting edges at the intersection of said sloping surfaces and said end surfaces.

3. A high speed drill as set forth in claim 1 wherein said sloping side surfaces slope forward in the direction of movement of said surface at a substantial positive angle to a plane normal to the cutting edge.

References Cited in the file of this patent

UNITED STATES PATENTS

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2,889,725

Turton et al. June 9, 1959