

Description

Title of Invention: CUTTER FOR CHAMFERING

Technical Field

- [1] The present invention relates to a cutter for chamfering, more particularly to a chamfering cutter for mounting on a chamfering tool that utilizes rotational force.

Background Art

- [2] Chamfering (or beveling) refers to a processing operation of milling an edge or an angle of a tool or carving into a sloping or rounded shape, and a device used for chamfering is known as a chamfering tool.
- [3] While there are various types of chamfering tools that perform chamfering in various ways, a representative method is to proceed with the processing by rotating a chamfering cutter mounted on the end of a rotating shaft.
- [4] When using such a chamfering tool that uses rotational force, the chips (shavings) created by the chamfering work can pose a problem. If the chips created by the chamfering are long, the chips may be wound around the chamfering tool that rotates at high speeds, to create difficulties in proceeding with the chamfering work. Even when the chips are small, if the chips are not quickly removed, they may increase cutting load, to not only make it difficult to proceed with the chamfering work but also lower the durability of the chamfering cutter.
- [5] As such, there have been various efforts aimed at resolving these problems related to chips created during chamfering, for example by forming discharge indentations in the chamfering cutter, but these efforts have not yet been particularly effective.

[6]

Disclosure of Invention

Technical Problem

- [7] The present invention, which has been developed in an attempt to resolve the problems described above, aims to provide a cutter for chamfering that improves the ability to deal with the chips created during the chamfering work and thus reduces cutting load.

Solution to Problem

- [8] A cutter for chamfering, according to an aspect of the present invention, may be connected to a rotating shaft so as to rotate and trim an edge of an object, where the cutter may have a through-hole formed in its center, so that a fastening bolt inserted through the through-hole may connect the cutter to one end of the rotating shaft; the cutter may be shaped as a cogwheel having a multiple number of cutting blades that are positioned radially about the through-hole and formed as an integrated body; the

cutting blades may be shaped to generally protrude towards the center, with each of the blades including a blade portion, which is formed in an end part of the cutting blade in a direction of rotation, and an arc portion, which forms a concave arced surface; and the cutting blades may include finish-grinding blades and rough-grinding blades that are positioned alternately, the finish-grinding blades having smooth surfaces on the arc portions, and the rough-grinding blades having rough surfaces on the arc portions. Here, it can be advantageous to include a chip breaker, which has a doubly angled shape, formed at an end of the arc portion connected with the blade portion of a finish-grinding blade.

- [9] Furthermore, in the through-hole, a securing portion can be formed on which the head of the fastening bolt may be caught. The securing portion may desirably have a tapered shape.

Advantageous Effects of Invention

- [10] According to an aspect of the present invention, the ability of the chamfering cutter to handle chips can be improved, and thus the cutting load can be lowered, so that the chamfering work can be facilitated, the work speed can be increased, and the durability of the chamfering cutter can be prolonged.

[11]

Brief Description of Drawings

- [12] Figure 1 is a perspective view of a cutter for chamfering according to an embodiment of the present invention.
- [13] Figure 2 is a front view of the cutter for chamfering illustrated in Figure 1.
- [14] Figure 3 is a cross-sectional view of the cutter for chamfering illustrated in Figure 2 along the line A-A'.
- [15] Figure 4 is a rear view of the cutter for chamfering illustrated in Figure 2.
- [16] Figure 5 is a cross-sectional view of the cutter for chamfering illustrated in Figure 2 along the line B-B'.
- [17] Figure 6 illustrates various possible shapes for the cross section of the arc portion on a rough-grinding blade indicated as "C" in Figure 3.

[18] < Description of Key Numerals >

- [19] 10: through-hole 12: securing portion
- [20] 20: cutting blade 30: finish-grinding blade
- [21] 40: rough-grinding blade 32, 42: blade portion
- [22] 34, 44: arc portion 36: chip breaker

[23]

Mode for the Invention

- [24] Certain aspects of the present invention will be described below with reference to the

accompanying drawings.

- [25] Figure 1 is a perspective view of a cutter for chamfering according to an embodiment of the present invention, Figure 2 is a front view of the cutter for chamfering illustrated in Figure 1, Figure 3 is a cross-sectional view of the cutter for chamfering illustrated in Figure 2 along the line A-A', and Figure 4 is a rear view of the cutter for chamfering illustrated in Figure 2.
- [26] As shown in Figure 1 and Figure 2, a chamfering cutter according to an aspect of the present invention can include a through-hole 10 in the center, through which a fastening bolt may be inserted to secure the cutter to a rotating shaft. The cutter and can form a cogwheel-like shape, having a multiple number of cutting blades 20 formed in a radial shape around the through-hole 10. Here, the number of cutting blades 20 may range from four to eight, and this embodiment will be described for an example in which six cutting blades are used.
- [27] As shown in Figure 1 and Figure 3, each cutting blade 20 may be shaped to generally protrude towards the center.
- [28] Each cutting blade 20 may include a blade portion 32, 42, which is formed at the end in the direction of rotation to perform the cutting work during the rotating movement, and an arc portion 34, 44, which may continue from the blade portion 32, 42 and form a concave arced surface. Also, each cutting blade may be shaped such that the thickness of the cross section is decreased from the blade portion towards the direction opposite the direction of rotation, so that the portion joining the cutting portion of the next cutting blade is the thinnest. The blade portion 32, 42 may be formed slanted by a particular angle in the direction of rotation, with respect to the diameter.
- [29] These cutting blades 20 may be classified, according to how the arc portion 34, 44 is processed, into finish-grinding blades 30 and rough-grinding blades 40, and the two types of cutting blades 30, 40 may be positioned alternately. The finish-grinding blades 30 may have smoothly processed arc portions 34 to perform finish grinding, while the rough-grinding blades 40 may have roughly processed arc portions 44 to perform rough grinding.
- [30] Figure 5 is a cross-sectional view of the cutter for chamfering illustrated in Figure 2 along the line B-B'. At the end part of an arc portion 34 connected with a blade portion 32, a chip breaker 36 may be formed, which may be processed to have a doubly angled cross section. The chip breaker 36 may be formed in the part connecting to the blade portion 32, with a smaller angle than the overall cross-sectional angle of the arc portion 34. Forming chip breakers 36 shaped in this manner can reduce the sizes of chips created during the chamfering work, and since the chips may be removed immediately, can lower the cutting load by about 30%.
- [31] Figure 6 illustrates various possible shapes for the cross section of the arc portion on

a rough-grinding blade indicated as "C" in Figure 3. The rough-grinding blades 40 having various cross sections as indicated in the drawings may not be useful for high-precision work, such as finish grinding, but may reduce the size of the chips created during the chamfering and greatly lower the cutting load.

[32] Therefore, by using a chamfering cutter in which finish-grinding blades 30 having chip breaker 36 alternate with rough-grinding blades 40, as in the present embodiment, it is possible to lower the cutting load by about 60% compared to regular chamfering cutters.

[33] Furthermore, as illustrated in Figure 3, a cutter for chamfering according to an aspect of the present invention may include a securing portion 12 that has a tapered shape, where the diameter is gradually reduced, instead of having an orthogonally stepped cross section. The head of the fastening bolt coupled to the through-hole 10 may be caught on the securing portion 12.

[34] If the securing portion has a stepped shape according to the related art, the head of the fastening bolt may not evenly contact the securing portion, so that when the bolt is applied, the securing force may not be great. As such, a separate washer may be required.

[35] However, if a tapered securing portion 12 is used together with a bolt that has a head having a corresponding shape, according to an aspect of the present invention, the contact area with respect to the bolt can be greatly increased, whereby the securing force may also be greatly increased.

[36] The present invention has been described above with reference to particular embodiments. However, it is to be appreciated that the present invention is not limited to the embodiments disclosed above and that those skilled in the art can change or modify the embodiments without departing from the scope and spirit of the invention. Therefore, the scope of the invention is to be defined by the appended claims rather than by the foregoing particular embodiments.

Claims

- [Claim 1] A cutter for chamfering connected to a rotating shaft and configured to trim an edge of an object by rotating, wherein:
the cutter has a through-hole formed in a center thereof, the cutter connected with one end of the rotating shaft by way of a fastening bolt inserted through the through-hole;
the cutter is shaped as a cogwheel having a plurality of cutting blades positioned radially about the through-hole and formed as an integrated body;
the cutting blades are shaped to generally protrude towards a center, each of the blades comprising a blade portion and an arc portion, the blade portion formed in an end part of the cutting blade in a direction of rotation, the arc portion forming a concave arced surface; and
the cutting blades include finish-grinding blades and rough-grinding blades positioned alternately, the finish-grinding blades having smooth surfaces on the arc portions, the rough-grinding blades having rough surfaces on the arc portions.
- [Claim 2] The cutter for chamfering according to claim 1, wherein a chip breaker is formed at an end of the arc portion connected with the blade portion of the finish-grinding blade, the chip breaker having a doubly angled shape.
- [Claim 3] The cutter for chamfering according to either claim 1 or claim 2, wherein a securing portion having a tapered shape is formed in the through-hole, the securing portion configured to have a head of the fastening bolt caught thereon.