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(71) Applicant: **Füritechnics Pty Ltd.**
Queensland 4101 (AU)

(72) Inventor: **Henry, Mark James**
Queensland 4101 (AU)

(74) Representative: **Berglund, Stefan**
Bjerkéns Patentbyra KB
Östermalmsgatan 58
114 50 Stockholm (SE)

(54) A blade sharpening system and an edge restoring unit capable of use therewith

(57) A knife sharpening system includes a plurality of sharpening units (22, 30), each performing a different sharpening operation, which are individually mountable on a base (2) for alternate use. One of those units (30) may be a knife edge former which is adjustable to produce edges of preselected different sharpness angles, and which is capable of use independently or as part of said system.

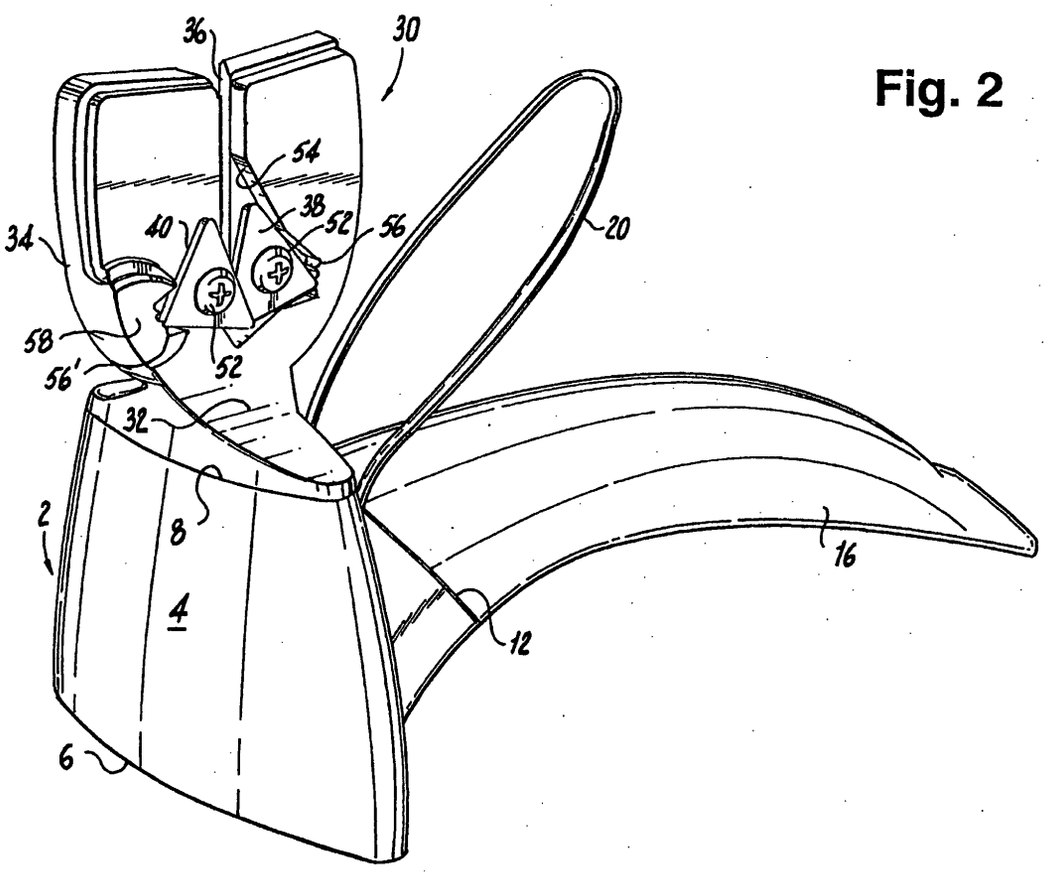

Fig. 2

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates to a knife sharpening system alternately accommodating different sharpening units and to knife edge restoring units useable independently or as part of said system.

2. Prior Art

[0002] Proper sharpening of knives to produce an effective cutting edge can involve several different operations, including in the first instance, shaping or reshaping the edge to present the desired cutting angle, which may differ from one knife to the next or from one knife use to another, and perfecting the edge to a desired degree of fineness or sharpness. Each operation is best performed by a different instrumentality and many such instrumentalities are available on the market. No one instrumentality can reliably perform all of the possible sharpening actions that may be called for. Thus the chef, or even the householder, in order to adequately to make provision for all of the various sharpening actions that may be required, must purchase and have available a number of different sharpeners, one for each specifically different sharpening operation, or employ the services of a professional blade sharpener, with varying success. This is not only a significant source of expense but may also call for the acquisition of a range of skills or the utilization of a significant amount of storage space which, particularly for the householder, may not be readily available.

[0003] Among the devices that may be used to initially form a blade edge or to restore the blade edge after use is a device in which a body having a slot through which a blade may be drawn is provided with angularly related cutting tool edges engaged by the blade as it is pulled through the slot, thereby to form a blade edge with an angular sharpening edge determined by the angular relation between the cutting tool edges across which the blade is drawn. A major drawback of devices of this type is that the cross-sectional angle of the produced edge is invariable, and hence each such device will produce only a single type of blade edge. If a different type of blade edge is desired, for example if the cross-sectional angle is to be changed to 40° rather than 20°, included, a different edge producing device of the type in question must be used for each desired sharpness angle. This too constitutes a source of expense, and usually results in the user settling for producing one sharpness angle in all of his knives even if different knives optimally should have different sharpening angles.

[0004] All sharpening devices present a safety problem, since they all call for the manual manipulation of a sharp blade, and sharpening is generally a two-handed operation, one hand holding the sharpening device steady and the other hand pulling the knife through the sharpening device. There is always a danger that after the knife is pulled through the sharpening device, which involves the exertion of some force on the knife tending to move it toward the hand steadying the device, the blade might inadvertently be swung from its proper position into engagement with the user's steadying hand, and the resulting cut may be a serious one.

SUMMARY OF THE INVENTION

[0005] It is an object of the present invention to provide a unified blade sharpening system suitable for use by the expert or by the amateur to perform a plurality of specific sharpening operations, thereby reducing overall expense and minimizing the storage space that is needed.

[0006] It is an object of the present invention to provide a sharpening system or device in which the possibility of injury to the hand of the user is significantly minimized.

[0007] It is a further preferred object of the present invention to provide a knife sharpener in the form of an edge producer in which the sharpness angle of the produced edge may be controllably varied, thus adapting that device for effective use with different types of knives or to convert the sharpness angle edge of a given knife from one angle to another.

[0008] Other objects of the present invention will become apparent from the following description.

[0009] In order to produce a knife sharpening system capable of performing different sharpening operation a mounting structure, here generically termed "base", is provided to which different knife sharpening units are interchangeably attachable, so that only one base need be provided for an edge forming or restoring unit, an edge sharpening unit, and/or an edge honing unit, each unit being readily associated with or disassociated from the base. The base is preferably provided with safety features effective no matter which type of sharpening unit may be employed at a given time, those safety features including the handle extending out from the base so that when the user grasps the handle his hand is relatively remote from the knife blade being manipulated, the handle preferably being moveable when the unit is not in use to a position relatively snug against the base, thereby minimizing storage space. In addition, the base may be provided with a guard located between the handle and the sharpening unit when in position on the base, thus providing further assurance that an errant blade will not accidentally cut the user's hand.

[0010] The blade edge former or restorer here disclosed, which may if desired be a self-contained unit apart from its utility as an interchangeable unit of the system here disclosed, is, as is conventional, provided with a pair of angularly related cutting tool edges across which a knife may be pulled to form or restore its cutting

edge. In the unit here disclosed, those cutting tool elements are adjustably mounted on the unit for positioning in a plurality of fixed angular positions so as to render the device capable of forming or restoring knife edges with different cross-sectional angles. To that end, and as here specifically disclosed, those cutting elements are mounted on the device so that when tightened to the device they engage physical stops such as notches which control their relative angular position but from which, when loosened, they may be moved from one stop to another, or rotated or replaced when wom.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The present invention will be described in connection with the accompanying drawings, in which:

Fig. 1 is a three-quarter prospective view of the system base with one type of knife sharpening unit in place thereon and with its handle shown in an inactive position;
Fig. 2 is a three-quarter prospective view of a base with a different sharpening unit in place thereon and with the handle in an extending operating position;
Fig. 3 is a side elevational view of the combination of Fig. 1 but with the handle in extended operating position;
Fig. 4 is a cross-sectional view of the base and handle, with the handle in extended operating position;
Fig. 5 is a front elevational view of the edge former or restorer of Fig. 2;
Fig. 6 is a side elevational view of the unit of Fig. 5; and
Figs. 7, 8, 9 and 10 are diagrammatic views showing various positions in which the abrasive elements may be mounted in order to produce edges of different sharpness angles.

DESCRIPTION OF THE EMBODIMENTS

[0012] The basic element of the knife sharpening system of the present invention is the base generally designated 2, the details of which are best shown in Figs. 3 and 4, which comprises a body 4 having a bottom wall 6 adapted to rest on a table-top or any other supporting surface and having a top wall 8 to which a vertical slot 10 opens. The bottom wall 6 is of appreciable area so as to provide a stable support for the body 2. Extending outwardly and downwardly from the body 4 is a wall 12 having an aperture 14, and the handle generally designated 16 is pivotally mounted in the aperture 14, retained there in any appropriate manner, as by C-clip 18. The handle 16 is thus moveable between an extended operative position shown in Figs. 2, 3 and 4 and a standby vertical position shown in Fig. 1. Mounted on the body 4, as by having its bent ends received in apertures in the sides of the body 4, is the wire guard 20, located between the handle 16 and the slot 10, the guard 20 being moveable between a vertical position alongside the handle 16 when the handle is in its vertical stand-by position and to a position between the handle 16 and whichever of the sharpening units may be mounted on the base 2.

[0013] As shown in Fig. 1, one such sharpening unit may be the tool generally designated 22 such as that disclosed in our European Patent Application Publication No. 1,329,291 entitled "Knife and Blade Sharpener", which comprises pairs of overlapping, resiliently flexible fingers or strips 24 and 26 which form opposed sharpening or honing faces operable to engage the sides of a knife blade drawn through and between the fingers, the sharpening effect being produced by abrasive or other materials on the knife-engaging surface fingers 24 and 26 all as described in that publication. As here used as part of the disclosed system, the fingers 24 and 26 are joined at their lower edges by a downwardly extending strip 28 designed to be received and snugly releasably retained in the slot 10 when that particular sharpening unit 22 is to be used. If desired strip 28 may be provided with lower end apertures or recesses 29 adapted to be engaged by ball bearings or other resilient members 31 in the base 2, thereby reliably retaining the unit 22 in place but permitting its ready removal by hand for replacement with a functionally different unit when that is called for.

[0014] Any type of handle 16 may be employed, either fixed to or articulately mounted on the base 2, the handle functioning to hold the base 2 in place while the user's hand is located a safe distance from where the knife to be sharpened is manipulated. The particular articulate mounting here specifically disclosed is preferred because, as may be seen by comparing Figs. 1 and 2, much space is saved when the system is not in use, and the single pivot method is robust and simple to manufacture.

[0015] The sharpening unit 22 of Fig. 1 is primarily designed to put a finishing touch on an existing sharp edge. A different type of unit is required to substantially initially form a cutting edge or to restore a cutting edge that has significantly deteriorated. The unit generally designated 30 and shown in Fig. 2 mounted on the base 2 is such a unit. That unit 30 has depending therefrom a downwardly extending strip 28 similar to the strip 28 depending from the unit 22 which is adapted to be similarly received in the base slot 10 when the unit 30 is to be utilized, the strip 28 being provided with apertures or notches 29 cooperating with the ball bearings or other resilient members 31 in base 2, as was the case with unit 22.

[0016] The unit 30 has a bottom wall 32 from which the strip 28 depends, with a wall 34 extending up from the bottom wall 32 and provided with a downwardly extending open-ended slot 36 adapted to receive a knife blade when the unit is to be used. Mounted on a side surface of the wall 34 are overlapping sharpening elements 38 and 40 having edges 42 and 44 respectively

which line up to produce a vertex 46 across which the knife to be sharpened is drawn, with the edges 42 and 44 acting on the knife to remove material and produce the desired knife edge shape.

[0017] Units of this type, referred to in the second paragraph of the "PRIOR ART", are known and may, if adapted for mounting on the base 2, be used in accordance with the present sharpening system invention. The unit 30 as here specifically disclosed constitutes, however, a significant improvement over its conventional counterpart. More specifically, each of the cutting tool elements 38 and 40 are individually mounted on a side surface of the wall 34 so as to be adjustably fixed in position, thereby to adjustably vary the angle produced at the vertex 46 and hence the angle of the knife edge that it will produce. To that end each of the abrasive elements 38, 40 may be triangular in shape and provided with through-openings to register with internally threaded openings 50 in the wall 34, and threaded clamping screws 52 pass through the openings in the abrasive elements 38, 40 and are threaded into the openings 50 in order to clamp abrasive elements 38, 40 against the side surface of the wall 34. By adjusting the rotative location of the elements 38, 40 the desired sharpening angle can be produced. Since the elements 38, 40 overlap, the side surfaces of the wall 32 on which the abrasive elements 38, 40 respectively are mounted must be at different elevations. Hence the face of the wall 32 on which the element 38 is mounted is recessed over the area 54 to a depth approximately that of the thickness of the cutting tool element 40, and the abrasive element 38 is mounted in the area 54 thereby to snugly overlap the abrasive element 40, which is in turn mounted on the unrecessed wall 34 to the left of the slot 36 as viewed in Fig. 2.

[0018] Since when a knife is pulled through the unit 32 to form or reform a sharpening edge it is urged downwardly into the vertex 46 it will tend to cause the elements 38, 40 to rotate in a direction such as to reduce the angle at vertex 46. The screws 52 may be screwed down sufficiently to prevent this undesired motion of the abrasive elements 38, 40 but it is preferred to provide a more positive limitation on the relative positions of those elements 38 and 40. Thus for the element 38 positioned within the recessed area 54, the inwardly facing edge of that recessed area 54 is provided with a series of notches 56 into which a comer of the triangular sharpening element 38 is adapted to be received, while the left hand face of the wall 32 on which the abrasive element 40 is mounted may be provided with an upstanding portion 58 the inwardly facing surface of which is provided with notches 56 corresponding to the notches 56 for the abrasive element 40. Thus the left hand face of the wall 32 may be considered as recessed when compared to the face of the upstanding portion 58. Therefore, as shown in Figs. 7-10, location of the pointed ends of the abrasive elements 38, 40 in one notch or another will fix the relative rotative positions of the elements 38, 40 to produce either no vertex (Fig. 7), a 10° vertex (Fig. 8), a 20° vertex (Fig. 9), or a 30° vertex (Fig. 10). To move the elements 38, 40 from one of their operatively adjustable positions to another one loosens the screws 52 sufficiently so that the abrasive elements 38, 40 can be lifted away from the wall 32 so as to escape from their respective notches, the elements 38, 40 are then rotated so that their pointed tips engage the newly desired notch 45, they are moved back toward the side surface of the wall 32 so that their tips enter the desired notches, and the screws 52 are tightened down to positively retain the elements 38, 40 in their newly adjusted position.

[0019] For a given positioning of the abrasive element 38 or 40 only their edges which produce the vertex 46 perform a knife sharpening function, while the two edges which produce the tips which engages the selected notches do not perform such a function. However, because the elements 38, 40 are here shown in the preferred form of triangles, and in particular substantially equilateral triangles, they may be readjusted in position so as to present fresh cutting tool edges in the knife sharpening process. To that end it is necessary only to loosen the holding screws 52, rotate the sharpening elements 38, 40 60° to position a new sharpening edge at the vertex 46, engage the sharpening elements 38, 40 with the appropriate notches, and then tighten down the screws 52. Moreover, when the cutting tool elements 38, 40 have been repositioned twice, so that all three edges of each triangle have become worn, the elements may be removed from the wall 32 and interchanged left to right, which in effect presents three new sets of edges for sharpening purposes.

[0020] The knife sharpening system of the present invention enables the chef, amateur or professional, to keep his collection of knives in top-notch condition, with each knife optimally sharpened, through the selective use of a plurality of sharpening units selectively associated with a single mounting base provided preferably with a handle and preferably with a safety guard functioning effectively with whatever sharpening unit may be mounted on the base. As a result the amount of storage space is minimized, sharpening is optimized and safety is enhanced.

[0021] In addition, the particular sharpening unit here disclosed for optimal initial formation of and ready restoration of a knife edge is provided with sharpening elements which are adjustably positionable to produce knife edges of selectively different sharpness angles. As a result a single unit is effective to sharpen different knives, or to modify the cross-sectional angle of a previously sharpened knife. The resultant savings in money and storage space and improved performance is significant.

[0022] While only a limited number of embodiments have been here specifically disclosed, it will be apparent that many variations may be made therein without departing from the innovative concepts as defined in the following claims.

Claims

1. A blade-sharpening system comprising a base having means accessible from the exterior thereof for receiving and holding a blade-sharpening unit, and in combination therewith, a plurality of blade-sharpening units each having a part operatively engagable with said receiving and holding means, each of said units alternately held by said base and each performing a different blade-sharpening operation.

2. The system of Claim 1, in which said receiving and holding means comprises a slot in said base open to the exterior, and said blade-sharpening unit parts are shaped to enter said slot, thereby to alternatively mount said unit on said base.

3. The system of either of Claims 1 or 2, in which a handle is articulately mounted on said base so as to be moveable between a standby position adjacent said base and a functioning position extending out from said base.

4. The system of Claim 3, in which said handle is mounted on said base to pivot about an axis inclined with respect to the bottom of said base.

5. The system of Claim 3, in which a protective element is mounted on said base and extends from said base between said handle and the blade-sharpening unit in place on said base.

6. The system of Claim 3, in which said base has a top wall and a side wall, said slot opens at said top wall and said handle is mounted on said side wall.

7. The system of Claim 1, in which one of said blade-sharpening units comprises a base, a wall extending up therefrom, said wall having a slot for receiving a knife blade to be sharpened, and a pair of sharpening elements mounted on said wall to opposite sides of said slot and extending partly over said slot so as to define between them an included angle coinciding with said slot, said sharpening elements being articulately mounted on said wall to be capable of assuming selected different fixed positions on said wall, thereby to produce different included angles, and means for releasably securing said elements to said wall in a desired relevant fixed position.

8. The system of Claim 7, in which said wall has a side surface intersected by said slot, said sharpening elements being pivotally mounted on said side surface.

9. The system of Claim 8, in which said side surface is provided with a plurality of stops adapted to be selectively engaged by said sharpening elements in their different relative positions respectively.

10. The system of Claim 8, in which said side surface is provided with a pair of recessed portions, one on each side of said slot, and in which said sharpening elements are mounted within said recessed portions respectively.

11. The system of Claim 10, in which said side surface is provided with a plurality of stops adapted to be selectively engaged by said sharpening elements in their different relative positions respectively, and in which said stops are located in said recessed portions.

12. The system of Claim 9, in which said stops are defined by spaced notches into which parts of said sharpening elements are selectively adapted to be received.

13. The system of Claim 2, in which said space-notches are located to be opened to said recessed portion.

14. A blade-sharpening unit comprising a base, a wall extending therefrom, said wall having a slot for receiving a knife blade to be sharpened, and a pair of sharpening elements mounted on said wall mounted on said wall to opposite sides of said slot and extending partly over said slot so as to define between them an included angle coinciding with said slot, said sharpening elements being articulately mounted on said wall to be capable of assuming selected different fixed positions on said wall, thereby to produce different included angles, and means for releasably securing said elements to said wall in a desired relevant fixed position.

15. The unit of Claim 14, in which said wall has a side surface intersected by said slot, said sharpening elements being pivotally mounted on said side surface.

16. The unit of Claim 15, in which said side surface is provided with a plurality of stops adapted to be selectively engaged by said sharpening elements in their different relative positions respectively.

17. The unit of Claim 15, in which said side surface is provided with a pair of recessed portions, one in each side of said slot, and in which said sharpening elements are mounted within said recessed portions respectively.

18. The unit of Claim 17, in which said side surface is provided with a plurality of stops adapted to be selectively engaged by said sharpening elements in their different relative positions respectively, and in

which said stops are located in said recessed portions.

19. The unit of Claim 16, in which said stops are defined by spaced notches into which parts of said sharpening elements are selectively adapted to be received.

20. The unit of Claim 19, in which said spaced-notches are located to be open to said recessed portions.

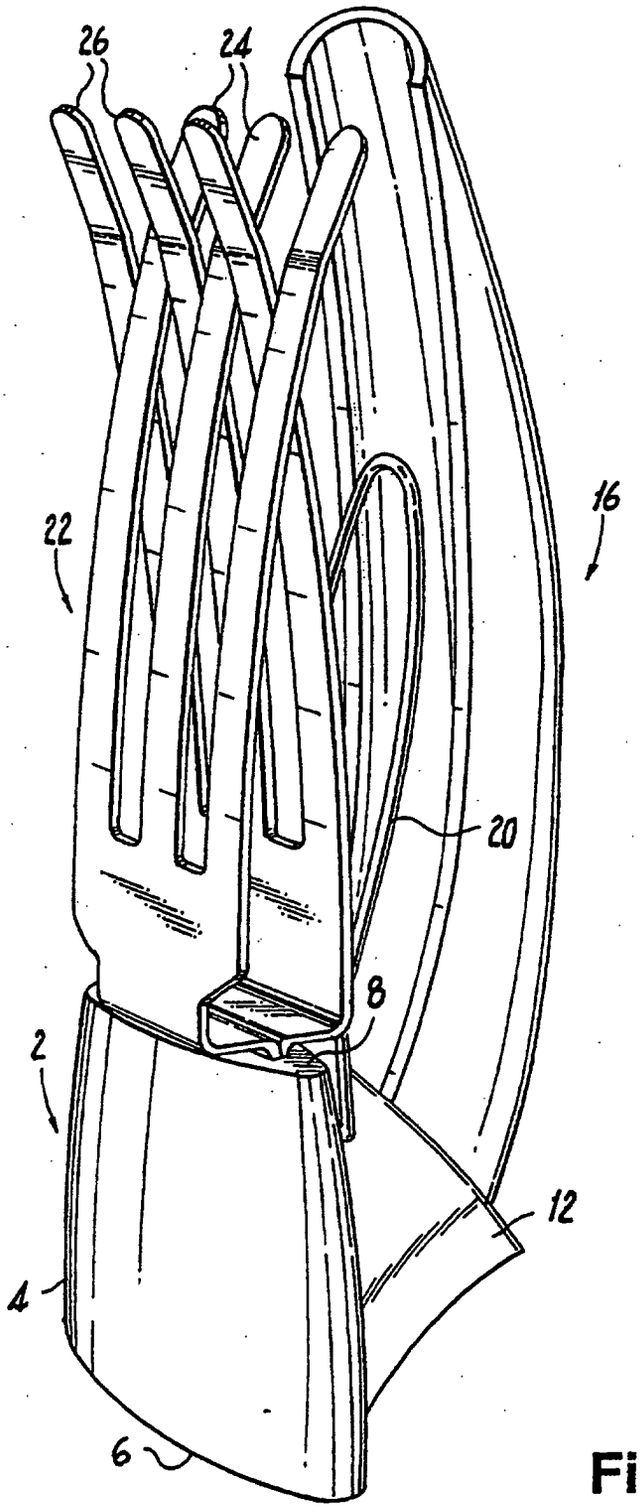
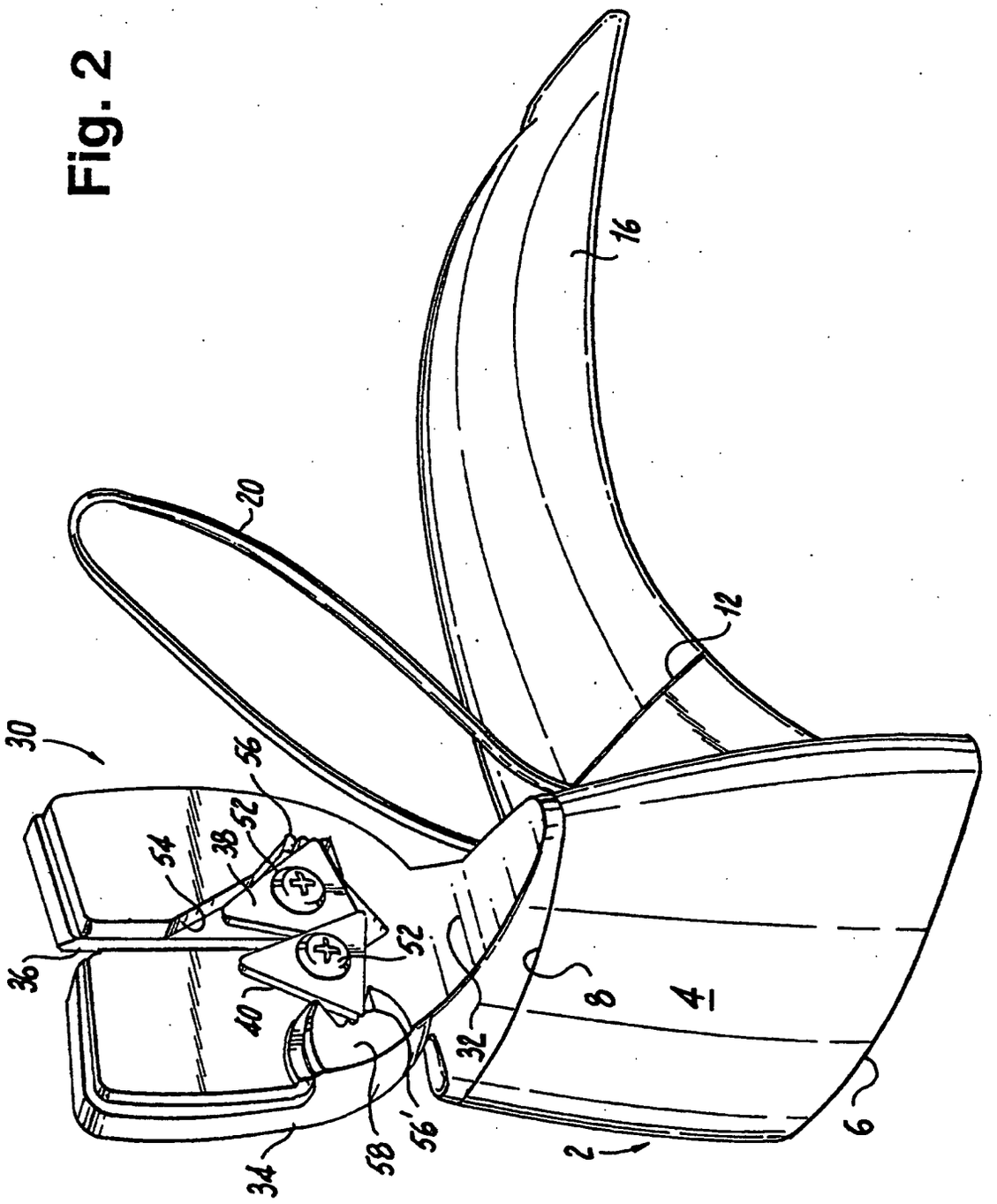


Fig. 1

Fig. 2



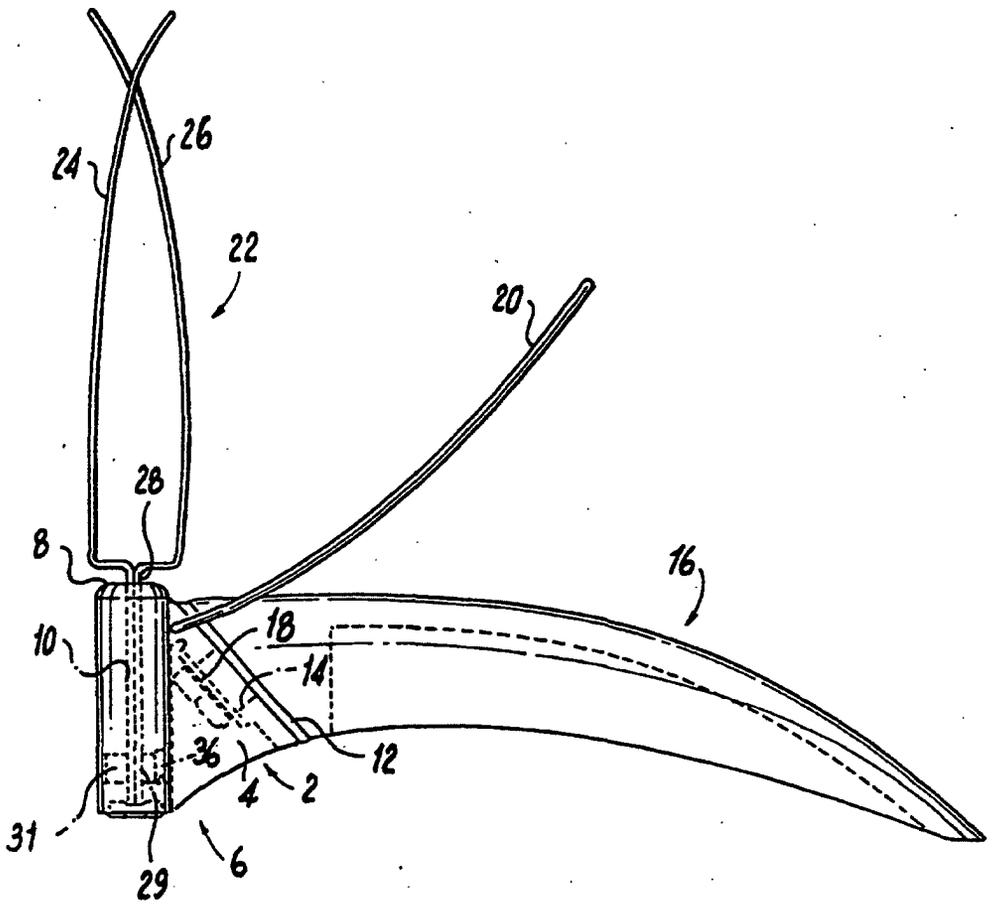


Fig. 3

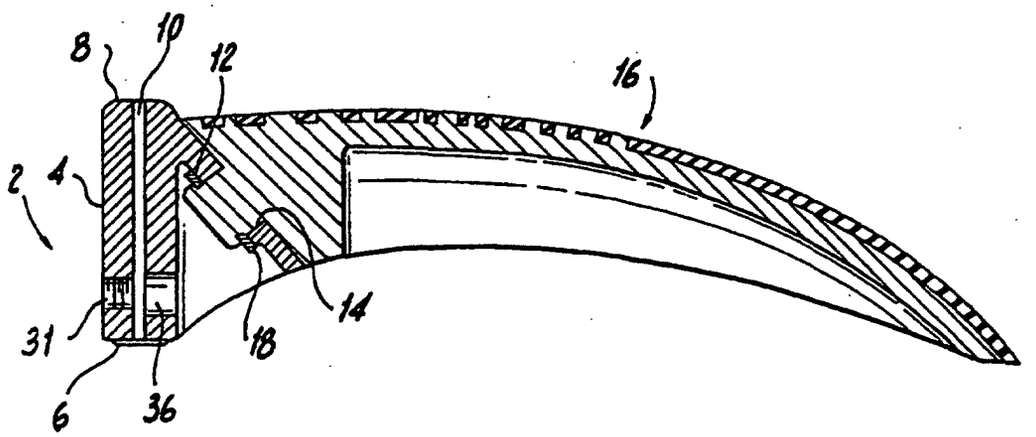


Fig. 4

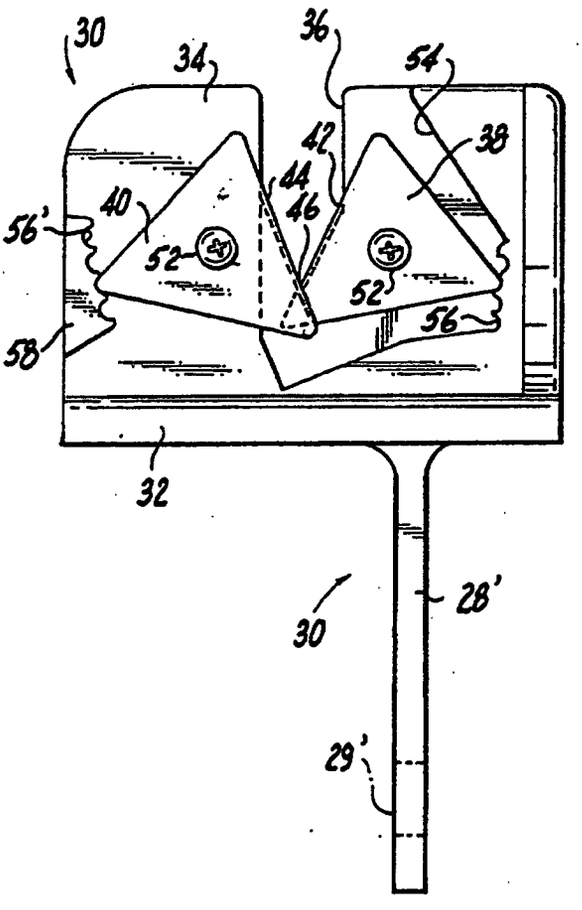

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Fig. 5

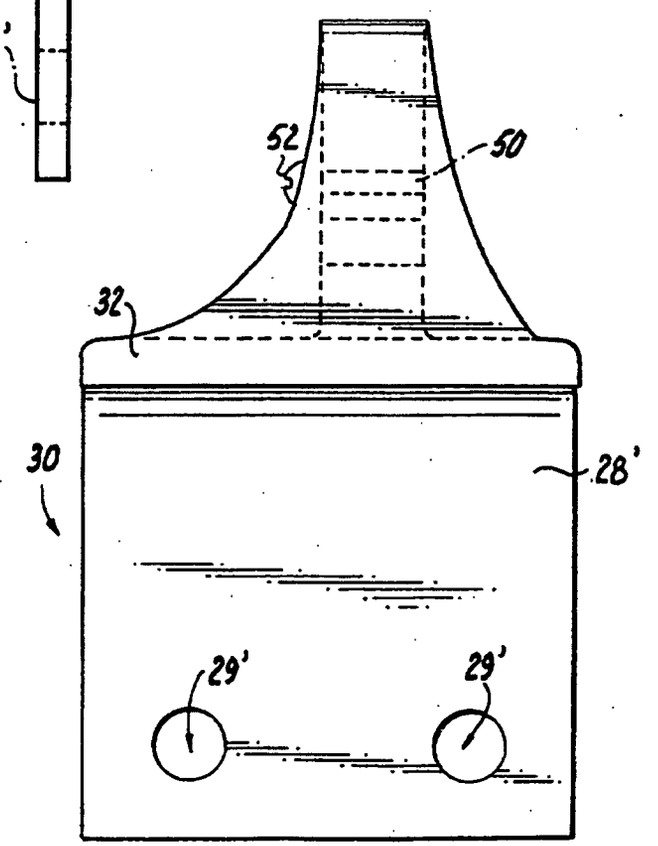
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Fig. 6

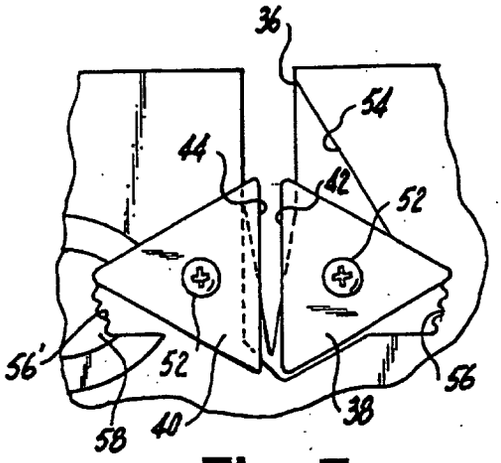

Fig. 7

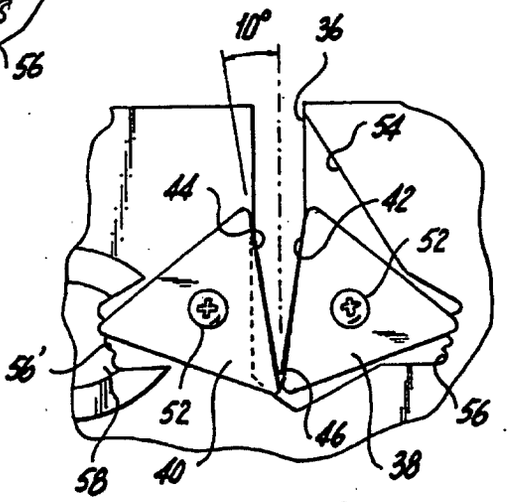

Fig. 8

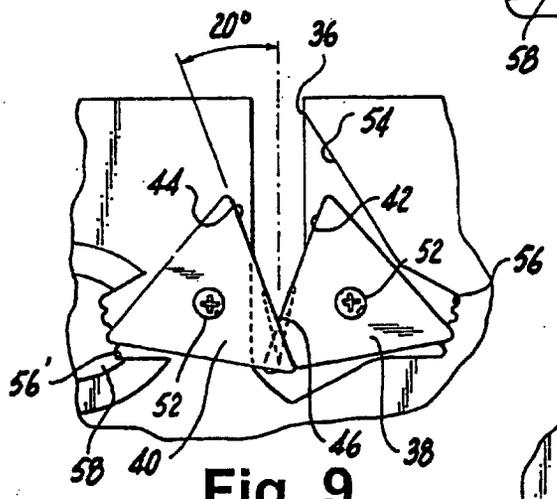

Fig. 9

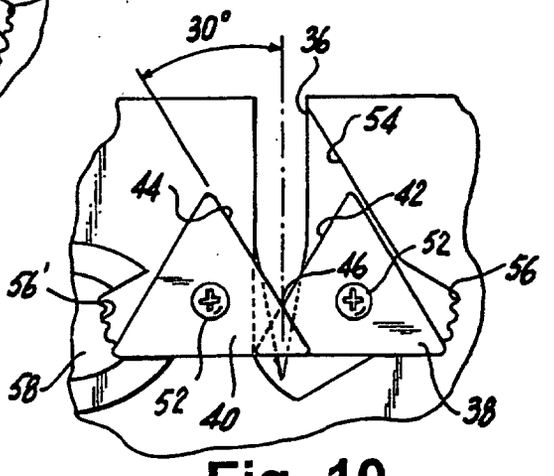

Fig. 10

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 04 44 5077

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X Y	US 6 393 946 B1 (KENESKY JAMES J ET AL) 28 May 2002 (2002-05-28) * column 5, lines 11-30; figure 1 *	1,2,14, 15 3-6	B24D15/08
Y	GB P08361A (BERNHARDT FERDINAND) 4 June 1914 (1914-06-04) * page 1, lines 30-43; figure 1 *	3-6	
A	GB 517 242 A (JAMES CHANTRY) 24 January 1940 (1940-01-24) * the whole document *	7-13, 15-20	
D,A	US 2003/075022 A1 (HENRY MARK JAMES) 24 April 2003 (2003-04-24)		

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

B24B
B24D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 September 2004	Koller, S

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 44 5077

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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27-09-2004

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