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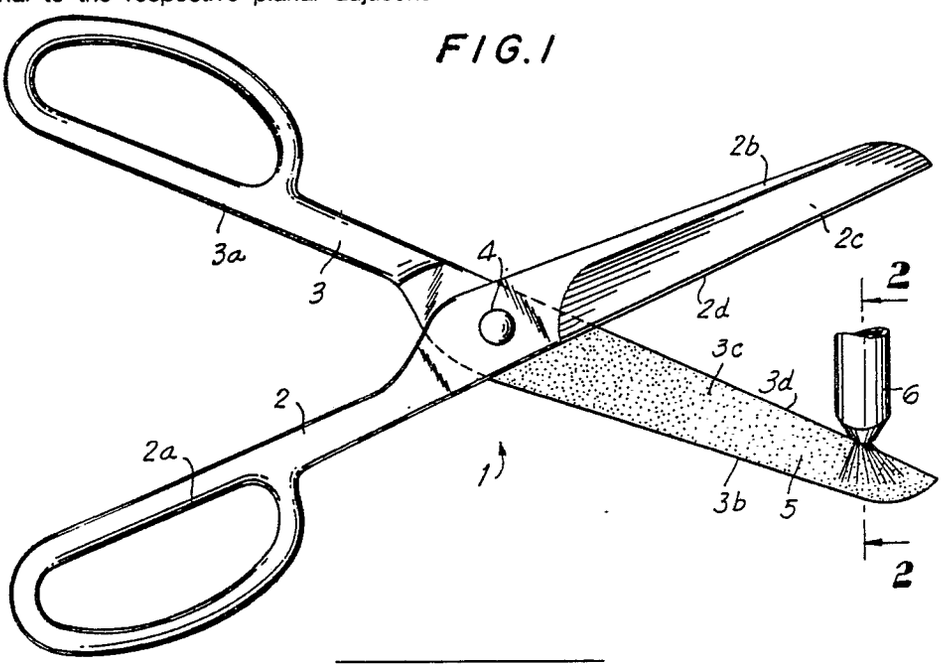
(54) Self-sharpening cutting implement and method of making the same.

(57) A pair of self-sharpening scissors (1) having a layer of abrasive material (5) applied to one of the planar surfaces (3c) adjacent the cutting edge (3d) of a cutting element (3) so that as the cutting edge (2d) of the other of the cutting elements (2) slides along this layer (5), it is sharpened. The layer (5) may be applied by spraying, plating, vapor deposition, vacuum metallizing, sintering, or adhering the abrasive material to the respective planar adjacent surface (3c).

FIG. 1



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SELF-SHARPENING CUTTING IMPLEMENT AND METHOD OF MAKING THE SAME

This invention relates to a self-sharpening cutting implement in general and, more particularly, to self-sharpening scissors, as well as to a method of making the same.

It has been proposed to make various cutting implements self-sharpening either during their use, or thereafter, or in a separate sharpening operation using permanently installed or replaceable parts. For instance, it is known from U.S. Patent No. 2,420,650 to mount abrasive elements in longitudinally extending recesses provided in the cutting blades of shears. This arrangement is disadvantageous in that the separate abrasive elements have to be very precisely manufactured and aligned and, moreover, are likely to be dislodged from the recesses and lost during use.

It is the object of this invention to design a cutting implement which is simple in construction, inexpensive to manufacture, easy to use, and has reliable self-sharpening properties.

A concomitant object is to devise a method of making the cutting implement self-sharpening, which method is easy to perform and achieves reliable results.

In pursuance of these objects, one feature of the invention resides in a self-sharpening cutting implement which comprises a pair of elongated cutting elements each having a gripping portion and a cutting portion, each of the cutting portions having a cutting edge and a substantially planar adjacent surface; means for so connecting the cutting elements to one another intermediate the cutting and gripping portions that the planar adjacent surfaces extend along a common plane and the cutting elements perform a pivoting movement about the connecting means along the aforementioned plane with each of the cutting edges contacting the planar adjacent surface of the respectively other of the cutting elements at least in a part of the trajectory of pivotal movement thereof; and a layer of abrasive material applied at least to one of the planar adjacent surfaces and operative for sharpening the cutting edge of the respectively other of the cutting elements during the movement thereof in the aforementioned part of the trajectory of movement thereof. A particular advantage of this construction of the cutting implement is that the layer need not be precisely aligned since it is applied to a surface that is already in the proper position relative to the cutting edge due to the construction of the cutting element and the operation of the connecting means, and that it can only be worn off but never lost since it constitutes an integral part of the respective cutting element. Moreover, the layer can be reapplied time and time again in a relatively simple manner not requiring any extraordinary skills.

The abrasive layer can be constituted by various materials, such as a plated abrasive material, sprayed abrasive material, vapor deposited abrasive material, vacuum metallized abrasive material, sintered abrasive material, or an adhered abrasive material, such as a mixture of settable organic binder and particulate abrasive material, such as grit.

According to another aspect of the invention, there is provided a method of making a cutting implement which includes two elongated elements that are movable relative to one another in a predetermined trajectory and have planar surfaces extending along a common plane and at least one being delimited by a cutting edge, this method comprising the step of applying a layer of an abrasive material at least to the other of the planar surfaces for sharpening the cutting edge during the movement in the aforementioned trajectory as the cutting edge is in contact with the abrasive material layer. The applying step can include spraying the abrasive material onto the planar surface, plating the abrasive material onto the planar surface, vapor depositing the abrasive material onto the planar surface, vacuum metallizing the abrasive material onto the planar surface, sintering the abrasive material onto the planar surface, adhering an adhesive substance having abrasive properties to the planar surface, or adhering an adhesive substance having abrasive particles interspersed therein to the planar surface.

In the accompanying drawings:

FIG. 1 is a side elevational view of self-sharpening scissors made in accordance with the present invention;

FIG. 2 is an enlarged sectional view taken along the line 2--2 of FIG. 1 during a spraying operation; and

FIG. 3 is a view similar to that of FIG. 2 but taken during the cutting operation.

Referring now to FIG. 1, reference numeral 1 identifies a cutting implement, such as scissors, which includes two cutting elements 2 and 3 which are connected to one another by a pivot or hinge 4 for pivoting along a common plane extending parallel to the plane of the drawing. The cutting elements 2 and 3 have respective gripping portions 2a and 3a configurated as eyelets, and respective

cutting portions 2b and 3b which have respective planar, recess-free, surfaces 2c and 3c extending in the aforementioned plane and delimited by respective cutting edges 2d and 3d.

A film-like layer 5 of an abrasive or honing material is integrally and permanently applied to the planar surface 3c of the cutting portion 3b. As shown in FIG. 2, the layer 5 is applied by a spraying nozzle 6 that is aimed at the planar surface 3c during the spraying operation. The spraying operation is performed in a conventional manner and using conventional materials, either at room temperature or at elevated temperatures. However, instead of using the illustrated spraying technique, the abrasive layer 5 can also be applied by using other known techniques, such as by plating, vacuum metallizing, vapor deposition, sintering, or by adhering the layer 5 to the surface 3c, using an abrasive adhesive substance, especially a binder having particulate abrasive material interspersed and embedded therein, such as a settable mixture of epoxy and grit.

Once the abrasive layer 5 has been applied to the planar surface 3c and has become a permanent integral part of the cutting portion 3b, such as by cooling, setting or otherwise hardening, it is possible to use the scissors 1 for cutting. During the cutting operation, as shown in FIG. 3, the cutting edge 2d of the cutting portion 2b slides along the abrasive layer 5 during at least a part of the pivoting movement of the cutting portion 2b relative to the cutting portion 3b, as the planar surfaces 2c and 3c are situated in a common plane. The contact of the cutting edge 2d with the abrasive layer 5, on the one hand, sharpens the cutting edge 2d by removing excess material thereof. On the other hand, this contact also hardens the material of the cutting portion 2b at the region of the cutting edge 2d, so that the tendency of the cutting edge 2d to become dull during its contact with the material being shorn or severed is counteracted and thus the time period of sharpness of the cutting edge 2d is effectively extended.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of arrangements differing from the type described above, such as in shears, pocket knives, mowers and other cutting implements or the like.

Claims

1. A self-sharpening cutting implement, comprising:
a pair of elongated cutting elements each having a gripping portion and a cutting portion, each of said cutting portions having a cutting edge and a substantially planar adjacent surface;
means for so connecting said cutting elements to one another intermediate said gripping and cutting portions thereof for pivoting movement relative to one another about said connecting means and along a common plane that said planar adjacent surfaces extend in said common plane and each of the cutting edges contacts said planar adjacent surface of the respectively other of said cutting elements at least in a part of the trajectory of relative pivotal movement thereof; and
a layer of abrasive material applied at least to one of said planar adjacent surfaces and operative for sharpening said cutting edge of the respectively other of said cutting elements during the movement thereof in said part of said trajectory.

2. The cutting implement as defined in claim 1, wherein the layer is film-like, and is integrally applied over and permanently attached to one of the planar adjacent surfaces.

3. The cutting implement as defined in claim 2, wherein the layer is applied by spraying, plating, vapor depositing, vacuum metallizing, sintering or adhering.

4. A method of making a cutting implement, which includes two elongated elements that are movable relative to one another in a predetermined path and have planar surfaces extending along a common plane and at least one being delimited by a cutting edge, self-sharpening, comprising the step of applying a layer of an abrasive material at least to the other of the planar surfaces for sharpening the cutting edge during the movement in the path as the cutting edge slides along the abrasive material layer.

5. The method as defined in claim 4, wherein the applying step includes spraying, plating, vapor depositing, vacuum metallizing, sintering or adhering the layer onto said planar surface.

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FIG. 1

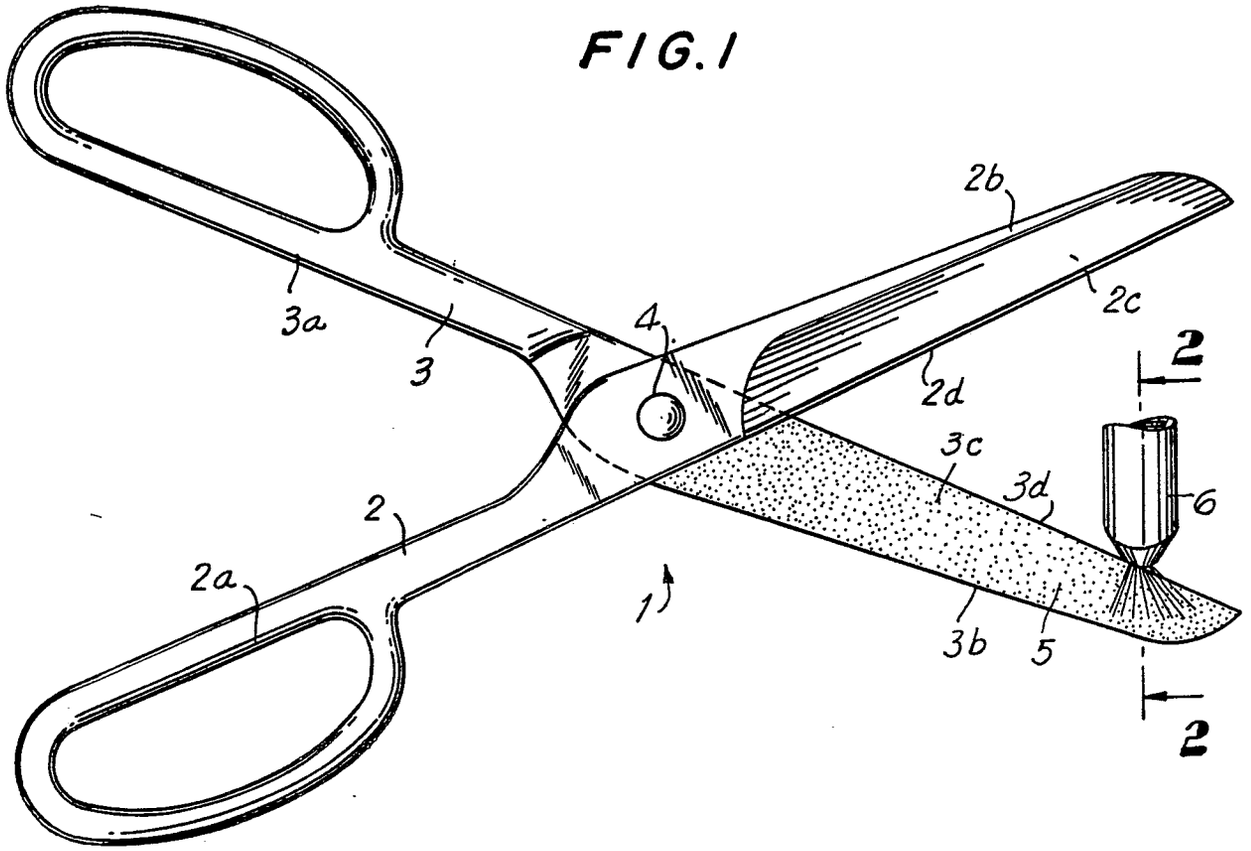
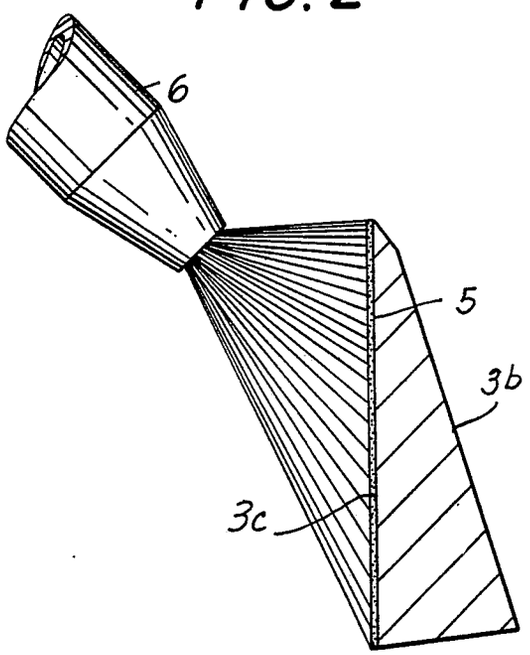


FIG. 2



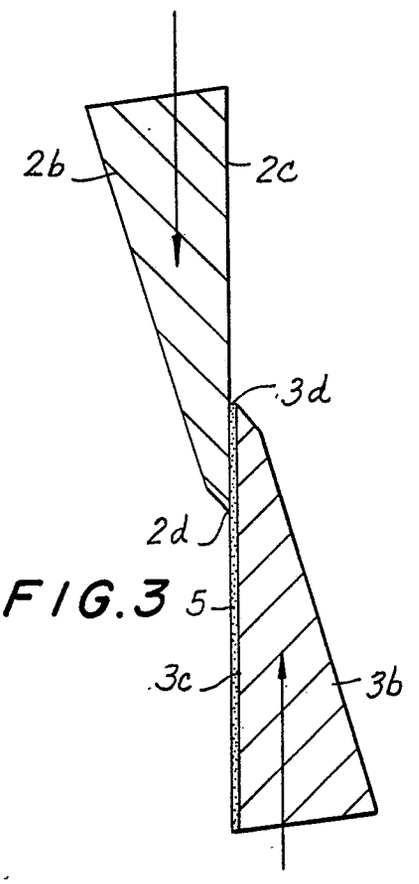


FIG. 3

European Patent Office

EUROPEAN SEARCH REPORT

Application number

EP 86 10 7110

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.4)
A,D	US-A-2 420 650 (BURCH) * Claim 1; figures 1-3 *	1,4	B 26 B 13/00
A	DE-A-3 022 510 (VOCEL) * Claims 1,2 *	1,4	
A	DE-A-2 360 729 (WENDEL) * Claims 1-4; figures 1-4 *	1,4	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 26 B
B 24 D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	26-01-1987	ERNST R.T.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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