

EUROPEAN PATENT APPLICATION

Application number: 87302504.3

Int. Cl.⁴ **E21C 35/18**

Date of filing: 24.03.87

Date of publication of application:
28.09.88 Bulletin 88/39

Designated Contracting States:
DE FR

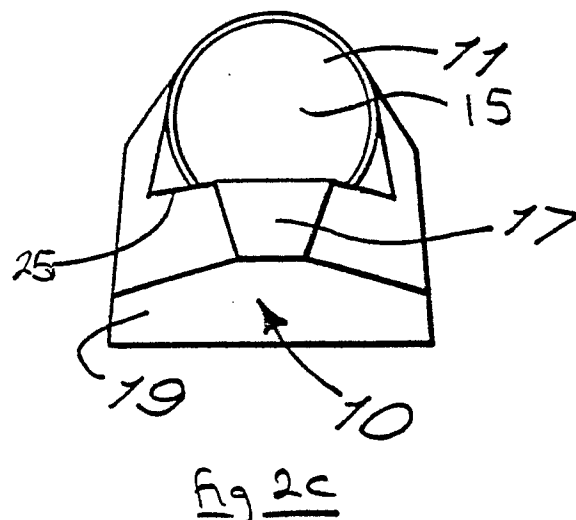
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Cutter tool tip inserts.

A tip insert (4) for a cutter tool (1) comprises a body (10) of a wear-resistant material (e.g. cemented tungsten carbide) and a disc-like cutting member (11) of a more wear-resistant material (e.g. polycrystalline diamond, conveniently in the form of a layer bonded to a cemented tungsten carbide substrate) secured to the body, the disc-like cutting member having at one part of its periphery its edge shaped to form a flat face (16), so as to provide, with one of its major faces (14), two flat faces (14, 16) disposed in intersecting planes, and the disc-like cutting member (11) being bonded via these two flat faces to complementary plane faces (12, 13) on the body, and the disc-like cutting member having exposed, cutting faces (15) at that part of its periphery opposite to the bonded faces.



Cutter Tools Tip Inserts

This invention is concerned with cutter tools and tip inserts therefor, and relates particularly but not exclusively to tools for cutting rock or other minerals.

It is known to provide rock cutting tools with composite tip inserts of a kind comprising a body of a wear-resistant material (such as cemented tungsten carbide) itself carrying a cutting member of an even more wear-resistant material (such as polycrystalline diamond, PCD). Conventionally, such a cutting member is of shallow cylindrical (i.e. disc-like) form, and comprises a layer of PCD bonded to a hard metal substrate. In use, the hard metal face is secured, e.g. by brazing, to a flat face on the body, and the cutting member may be entirely exposed (except for its brazed face) on the body or it may be secured in a recess in the body with a portion of the cutting member periphery exposed for cutting purposes.

These disc-like cutting members also find use in other types of cutting tool, wherein they are releasably secured so that when they become worn they may be removed and disposed of. This is wasteful of a not inexpensive part of a cutting machine, and the invention relates to one way of preventing such waste. More specifically, the invention proposes a composite tip insert of the kind referred to which permits the recovery for re-use of worn conventional cylindrical type cutting members, and which moreover provides firmer bonding of the cutting member to the body of the insert.

In one aspect, therefore, the invention provides a tip insert for a cutter tool, which insert comprises:

a body of a wear-resistant material, and a disc-like cutting member of a more wear-resistant material bonded to the body;

the disc-like cutting member having at one part of its periphery its edge shaped to form a flat face, so as to provide, with one of its major faces, two flat faces disposed in intersecting planes, the disc-like cutting member being bonded via these two flat faces to complementary plane faces on the body; and

the disc-like cutting member having exposed, cutting, faces at that part of its periphery opposite to the bonded faces.

In the insert of the invention the disc-like cutting member is bonded to the body (e.g. by brazing) via two of its faces, in different planes (one face is the shaped edge, the other is one of the disc's major faces). Accordingly, the cutting member can be secured to the body much more strongly than in the conventional arrangement in which only one face is bonded. Moreover, because the two faces are in intersecting planes the body offers

considerable mechanical support to the cutting member.

The disc-like cutting member may be wholly of the more wear-resistant material, but advantageously it is itself a two-part structure, comprising a cutting layer, conveniently of a very hard, wear-resistant, material such as PCD, bonded to a substrate of a hard, wear-resistant, material such as cemented tungsten carbide.

It will be appreciated that the invention allows the re-use of a conventional cylindrical-type (disc-like) cutting member; its worn edges can be machined away to provide the one, shaped, face.

Though the disc-like cutting member's flat edge is very conveniently actually flat - that is, planar - it may have a slight curve. For example, it may be cylindrical but with a radius of curvature considerably larger than the disc's own radius. Accordingly, the term "flat face" as applied to the cutting member's edge face includes a face that is slightly curved - and naturally the complementary plane face of the insert body can be correspondingly slightly curved.

The cutting member disc edge is shaped, perhaps by bevelling, to form a flat face in a plane intersecting that of one of the disc's major faces. The angle of intersection can be any suitable - one such is about 60° (a large acute angle) - but most preferably it is about 90°.

For mounting the insert body on the cutter tool, the body itself preferably has two flat faces disposed in intersecting planes and arranged to be bonded to complementary plane faces on the tool. Such intersecting planes are dependent on the form of the body, and naturally vary with requirements. Usually, however, they intersect at a fairly large acute angle - 60°, say, or up to 90°.

The invention extends, of course, to a cutter tool having one or more tip insert of the invention as described and claimed herein.

The following is a description, by way of example only, of an embodiment of the invention. Reference is made to the accompanying Drawings, in which:-

Figures 1 A and B are respectively front and side views of a cutter tool having a tip insert in accordance with the invention;

Figures 2 A, B and C are respectively rear, side and front views of a tip insert according to the invention, and suitable for use in the tool of Figure 1.

The tool of Figures 1A and B has a body (1) with a shank (2) at one end and a cutting tip (3) at the other. The tip 3 is an insert (4) bonded into a generally V-shaped socket (5) at the cutting end.

The insert 4 shown in Figure 1 is an insert of the invention, as shown in Figure 2.

The insert of the invention is a two-part insert. It comprises a body (10) made of cemented tungsten carbide, and a cutting member (11) itself comprising a polycrystalline diamond layer (11a), which is harder and more wear-resistant than the material of the body 10, bonded to a cemented carbide substrate (11b).

The body 10 has an open recess (25) defined by two flat faces (12, 13) which lie in planes which intersect each other at an angle of 90°. The cutting member 11 is in the form of a shallow cylinder of disc having flat opposite faces (14, 15) lying in parallel planes, which a segment removed to provide a flat end face (16) lying in a plane intersecting the planes of the faces 14, 15 at 90°. The faces 14, 16 of the cutting member 11 are bonded, e.g. by brazing (this is not shown in the Figures) to the faces 12, 13 of the body 10. The face 15 of the cutting member is then co-planar with an adjoining face (17) on the body 10, and the whole of the faces 14, 16 of the cutting member are supported by the faces 12, 13 of the body 10.

It will be understood that the cutting member 11 may be produced from a used cutting member, which was originally of true cylindrical form but which has been worn on part of its periphery, by machining away the worn part to provide the flat face 16. However, the cutting member may be originally formed in the required shape - and the required shape may take almost any form provided that there are two flat faces in intersecting planes for bonding to the body 10.

The body 10 itself has two flat faces (18, 19) in planes intersecting at an angle which is about 60°, which faces are bonded to complementary flat faces on a cutter tool (as in Figure 1). The tool may be of any suitable form, e.g. with a shank of rectangular cross-section or of frusto-conical shape, but should obviously not be rotatably mounted in use.

Claims

1. A tip insert (4) for a cutter tool (1), which insert (4) comprises

a body (10) of a wear-resistant material, and a disc-like cutting member (11) of a more wear-resistant material bonded to the body (10), characterised in that

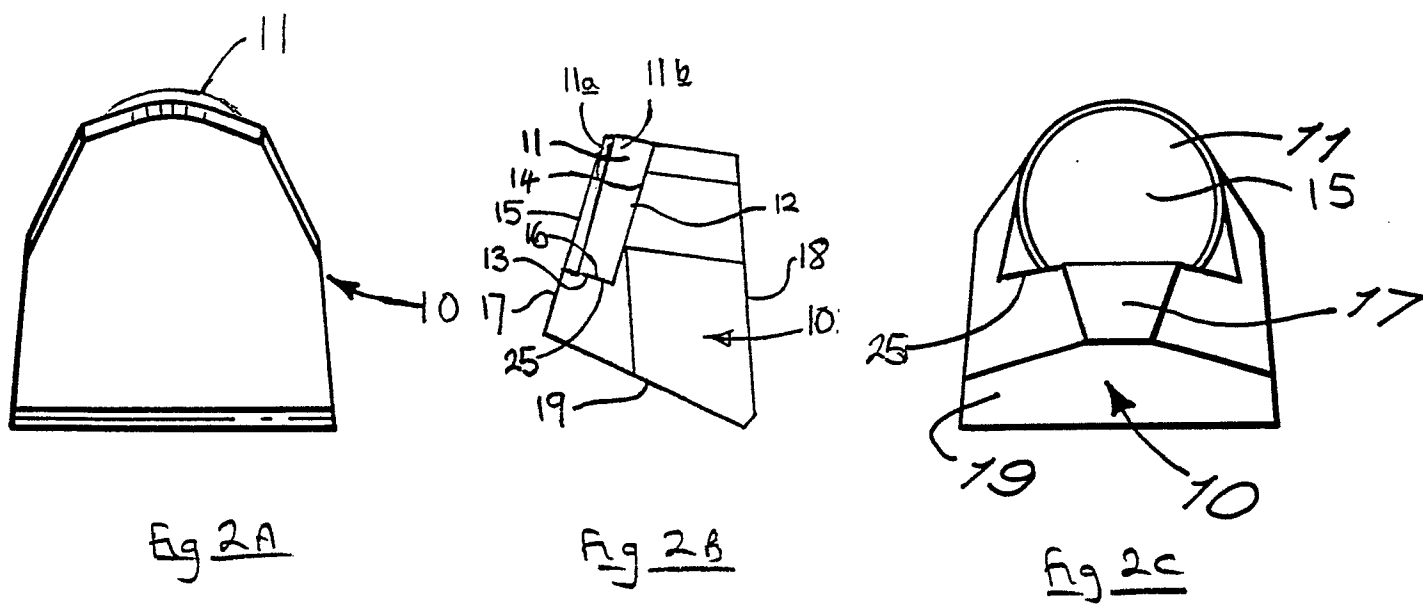
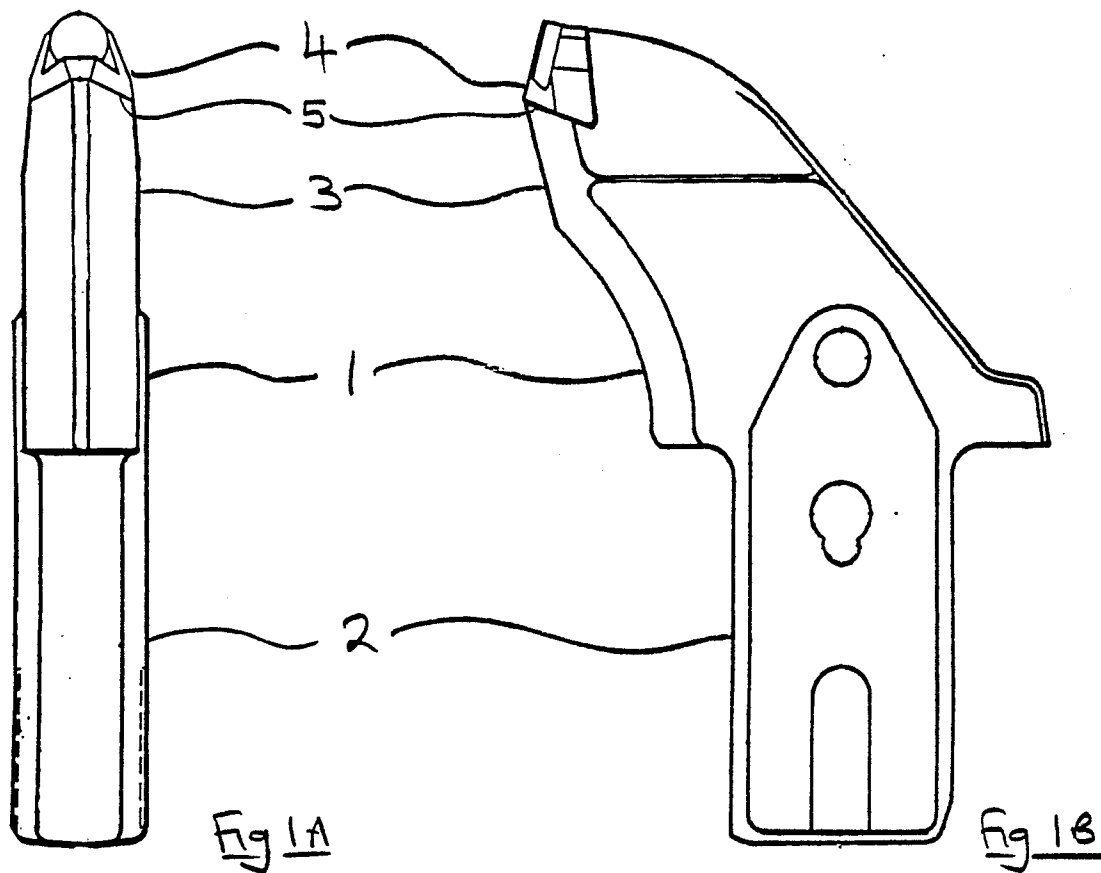
the cutting member (11) has at one part of its periphery its edge shaped to form a flat face (16), so as to provide, with one of its major faces (14), two flat faces (14, 16) disposed in intersecting planes, the cutting member (11) being bonded via these two flat faces (14, 16) to complementary

plane faces (12, 13) on the body; and in that

the cutting member has exposed, cutting, faces (15) at that part of its periphery opposite to the bonded faces (14, 16).

2. A tip insert according to Claim 1, wherein the cutting member's (11) two flat (bonded) faces (14, 16) lie in planes which intersect at an angle of 90°.

3. A cutter tool (1) having a tip insert or inserts (4) according to either preceding Claim.





EP 87 30 2504

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)
X	EP-A-0 103 391 (COLLIN) * Page 8, lines 4-16; figures 5,6 *	1-3	E 21 C 35/18
X	US-A-4 498 549 (JÜRGENS) * Column 2, lines 4-45; figures 5,6,13 *	1-3	
A	EP-A-0 104 893 (DE BEERS) * Abstract; figures *	1-3	
A	GB-A-2 170 843 (DE BEERS) * Abstract; figures *	1-3	
A	DE-U-8 616 229 (DE BEERS) * Figures *	1-3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			E 21 C E 21 D E 21 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29-10-1987	Examiner RAMPELMANN J.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	