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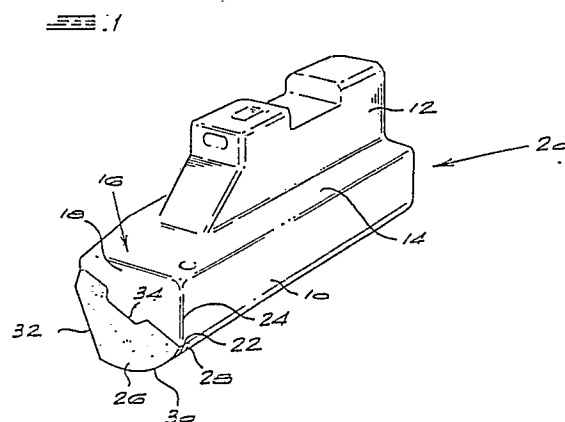
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54 **Cutting tool for a mining machine.**

- 57 A cutting tool for a mining machine comprising:
- (i) an elongate body (10) having a working end (16) and an opposite end (20);
 - (ii) a formation (12) projecting to one side (14) of the elongate body (10) intermediate the ends (16), (20) and adapted to engage a complementary formation in the mining machine;
 - (iii) the working end of the body (16) having an essentially planar portion (18) extending from an outer edge (24) of that end;
 - (iv) a recess (22) formed in the planar portion (18) which extends into the body from the outer edge (24);
 - (v) an abrasive compact (26) located in the recess (22) and bonded to the body (10); and
 - (vi) a cutting edge for the tool defined by an edge (30), (32) of the abrasive compact which is coincident with the outer edge (24).



Description

CUTTING TOOL FOR A MINING MACHINE

BACKGROUND OF THE INVENTION

This invention relates to cutting tools for use in mining machines of the kind which are used to cut a variety of soft materials such as coal.

One such cutting tool comprises a holding lug and a cutting insert secured in a bore or socket in one end of the lug. The cutting insert may be made of a wear-resistant material such as cemented carbide. Alternatively, the cutting insert may comprise an elongate pin one end of which has secured to it an abrasive compact which provides a cutting edge for the insert.

A plurality of these cutting tools (also known as picks) are positioned on a working surface, for example, the surface of a drum, and moved in a cutting direction against the face of the material to be cut. The cutting action is a slicing action in which the cutting insert is subjected to stress only when it is in contact with the material being cut. In other words, the cutting insert is subjected to alternate conditions of stress and non-stress.

Examples of cutting tools of this type are described in United States Patent Specifications Nos. 4,655,508 and 4,678,237.

The invention is concerned with the cutting tools for mining machines of a type different to those discussed above. In particular the cutting tools are for machines which are used to cut soft to brittle coals in a gouging-type action. Such cutting tools comprise an elongate body, a formation projecting from one side of the elongate body for securing the tool to a movable surface of a machine, and a working surface at one end of the body. That working surface has secured in it a cutting insert made of cemented carbide. Cemented carbide has the disadvantage that it wears relatively quickly and also can give rise to sparking which is dangerous in a coal mining environment. With these machines, the cutting insert is always in contact with the material being cut and this always under stress when in use.

SUMMARY OF THE INVENTION

According to the invention there is provided a cutting tool for a mining machine comprising:

- (i) an elongate body having a working end and an opposite end;
- (ii) a formation projecting from one side of the elongate body intermediate the ends and adapted to engage a complementary formation in the mining machine;
- (iii) the working end of the body having an essentially planar portion extending inwards from an outer edge of that end;
- (iv) a recess formed in the planar portion which extends into the body from the outer edge;
- (v) an abrasive compact located in the recess and bonded to the body; and
- (vi) a cutting edge for the tool defined by an edge of the abrasive compact which is coinci-

dent with the outer edge.

DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a perspective view of a first embodiment of the invention; and

Figures 2 to 4 illustrate the working ends of three other embodiments of the invention.

DETAILED DESCRIPTION OF THE INVENTION

The cutting edge is preferably provided in two sections at an angle to each other, each section being coincident with the outer edge of the planar portion in which the abrasive compact is located. The two sections may both be straight or one may be straight and the other curved.

The abrasive compact will preferably be bonded to a cemented carbide support to form a composite abrasive compact. The composite abrasive compact will be located in the recess and bonded to the body through the cemented carbide support. Bonding of the compact or the composite abrasive compact may be achieved by means of a suitable high strength braze.

Examples of abrasive compacts and composite abrasive compacts are described in United States Patent Specifications Nos. 3,745,623, 3,743,489 and British Patent No. 1,489,130.

Three embodiments of the invention will now be described with reference to the accompanying drawings. Referring to Figure 1, the cutting tool comprises an elongate body 10 having a formation 12 integrally formed therewith and projecting from one side 14 thereof. The body 10 has a first end 16 which provides a working planar surface 18 for the cutting tool and an opposite end 20. The working surface 18 has a recess 22 formed therein. This recess extends inward from an outer edge 24 of the planar working surface 18.

Located in the recess is a composite abrasive compact comprising an abrasive compact 26 bonded to a cemented carbide support 28. The cemented carbide support is bonded to the body 10 by means of a suitable high strength braze. The exposed outer edge of the abrasive compact is in two sections, a curved section 30 and a linear section 32. Both sections are coincident with the outer edge 24 of the planar working surface 18. This exposed outer edge of the abrasive compact provides the cutting edge for the tool.

The top planar surface of the abrasive compact 26 lies in the same plane as the planar working surface 18.

Figures 2 to 4 illustrate alternative embodiments and like parts carry like numerals. The configuration of the planar working surface 18 and the configuration and shape of the composite abrasive compact varies in each case. In embodiments 2 and 3 the two sections 30 and 32 of the cutting edge are both straight.

The composite abrasive compact is preferably a

composite diamond abrasive compact. Such composite compacts are well known in the art.

Each of the cutting tools illustrated above may be suitably mounted in a mining machine of the type which is used to cut soft to brittle coals in a gouging-type action. In use, the cutting edges of the abrasive compacts of the tools will maintain constant contact with the material being cut. Typically, the tool is caused to traverse this material at a rate of 6 metres/second or more. The cutting tool ploughs its way through the coal dislodging it from the surface in which it is embedded in a scraping action. Because the cutting edge is provided by abrasive compact, the wear is much less than with a cemented carbide cutting edge, which due to the high cutting speed will tend to become blunt at a much earlier stage. In contrast, the compact edge remains sharp resulting in a more efficient cutting operation and reduced incidence of spark ignition. Further it has been found that the tendency for the cutting inserts, i.e. the composite abrasive compacts, to be dislodged in use is substantially reduced. In relation to embodiments 1 and 3, the interlocking configuration illustrated generally by the numeral 34 is believed to assist in this regard.

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preceding claims wherein the top exposed surface of the abrasive compact is planar and lies substantially in the same plane as that of the planar portion (18) of the body (10) in which it is located.

6. A cutting tool according to any one of the preceding claims wherein the abrasive compact is bonded to a cemented carbide support (28).

Claims

1. A cutting tool for a mining machine comprising:
 - (i) an elongate body (10) having a working end (16) and an opposite end (20);
 - (ii) a formation (12) projecting to one side of the elongate body (10) intermediate the ends (16) (20) and adapted to engage a complementary formation in the mining machine;
 - (iii) the working end (16) of the body having an essentially planar portion (18) extending from an outer edge (24) of that end;
 - (iv) a recess (22) formed in the planar portion which extends into the body from the outer edge (24);
 - (v) an abrasive compact (26) located in the recess and bonded to the body (10); and
 - (vi) a cutting edge for the tool defined by an edge (30) (32) of the abrasive compact which is coincident with the outer edge (24).
2. A cutting tool according to claim 1 wherein the cutting edge is provided by two sections (30) (32) at an angle to each other, each section being coincident with the outer edge (24) of the planar portion (18) in which the abrasive compact is (26) located.
3. A cutting tool according to claim 2 wherein the two sections (30) (32) of the cutting edge are both straight.
4. A cutting tool according to claim 2 wherein one section (32) of the cutting edge is straight and the other section (30) is curved.
5. A cutting tool according to any one of the

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FIG. 1

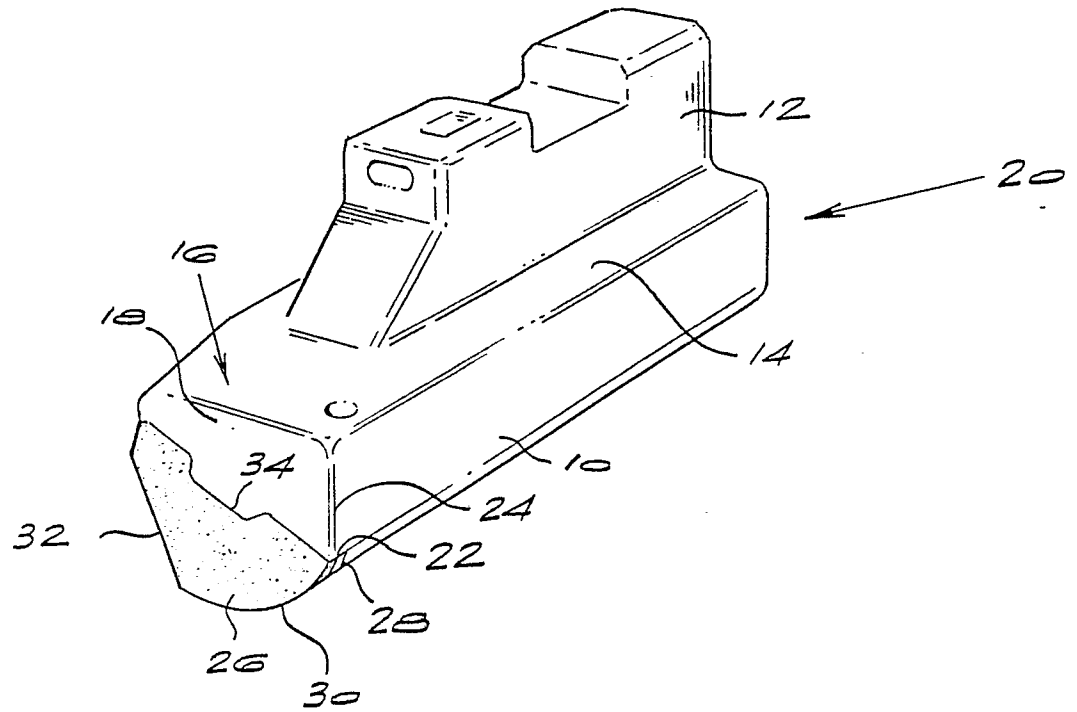


FIG. 2

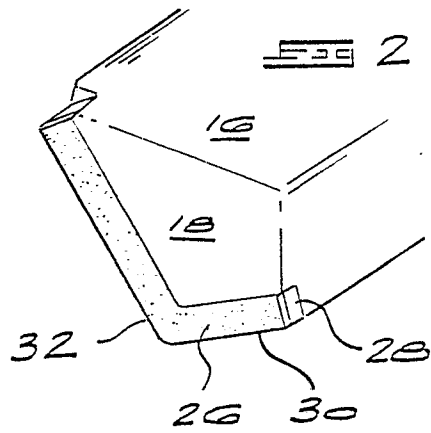


FIG. 3

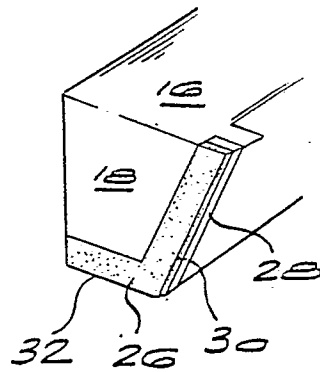
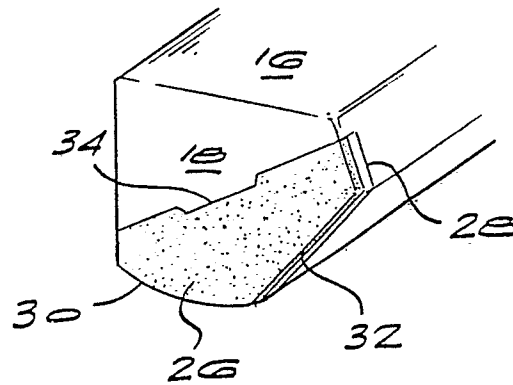


FIG. 4





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.5)
X	DE-A-2 618 335 (TITANIT-BERGBAUTECHNIK) * Page 4; figures *	1,5	E 21 C 35/18 E 21 C 27/44
Y	---	2,3,6	
Y	DE-A-3 315 624 (KOMOTZKI) * Column 2, lines 17-28; figure 1 *	2,3	
Y	---		
Y	DE-A-3 500 931 (DE BEERS) * Page 9, lines 20-30 *	6	
Y	---		
A	DE-A-3 439 508 (KOMOTZKI) * Figure 1 *	1	
A	-----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E 21 C E 21 D
Place of search THE HAGUE		Date of completion of the search 05-10-1989	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			