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(71) Applicant: **Di Mario, Giancarlo**
11026 Pont Saint Martin (AO) (IT)

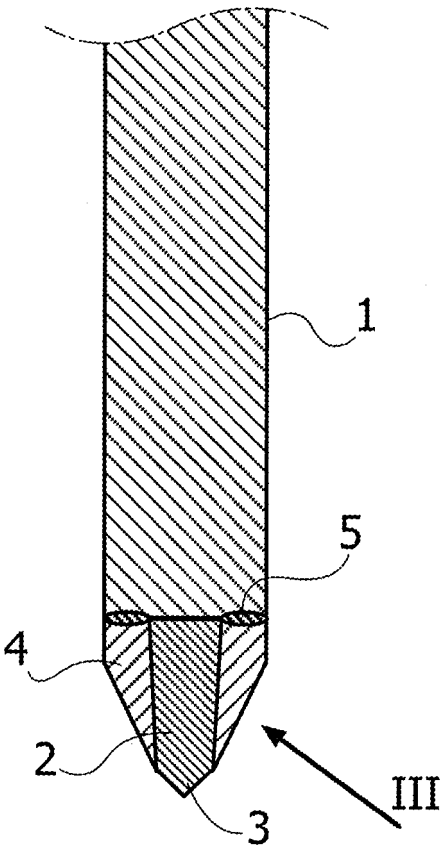
(72) Inventor: **Di Mario, Giancarlo**
11026 Pont Saint Martin (AO) (IT)

(74) Representative: **Buzzi, Franco**
Buzzi, Notaro & Antonielli d'Oulx
Via Maria Vittoria 18
10123 Torino (IT)

(54) Impact demolition tool

(57) An impact demolition tool, comprising a steel stem (1) with a hard-metal terminal (2) axially inserted inside a fixing sleeve (4) welded to the stem (1). The fixing sleeve (4) and the hard-metal terminal (2) have tapered surfaces (4a, 2a) for mutual coupling.

FIG. 1



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Description

[0001] The present invention relates in general to impact demolition apparatuses, and regards more in particular a tool for such apparatuses of the type comprising a stem made of steel having a terminal made of hard metal applied to the end of the stem.

[0002] A tool of this type is described and illustrated in the U.S. patent No. US-3,807,804 and has, as compared to traditional tools, a longer service life and a higher resistance to the effects of the stresses of impact against the material to be demolished (rock, asphalt, etc.) during the reciprocating motion of the stem, which is typically actuated by a liquid-operated or gas-operated or else mechanical actuator, via a striking hammer.

[0003] In the case of the U.S. patent No. US-3,807,804 the terminal made of hard metal is inserted axially, by means of hot or cold drive fit, within a cylindrical axial seat of a fixing sleeve, which is in turn welded to the end of the stem. The hard-metal insert has a tip projecting from the seat of the fixing sleeve and defining the active element of the demolition tool.

[0004] This solution, albeit, as has been said, more efficient and advantageous as compared to the demolition tools, the terminal of which is formed by the end itself of the steel stem, presents the drawback that the retention of the hard-metal terminal within the fixing sleeve is anything but reliable, also taking into account the high temperatures to which said elements are subjected during operation and the corresponding different coefficients of thermal expansion. The hard-metal terminal consequently tends, after a more or less limited period of operation, to disengage and slide out of the fixing sleeve.

[0005] A further drawback lies in the practical difficulty of proceeding to periodic sharpening of the tip of the hard-metal terminal, on account of the relative ease with which it can disengage from the fixing sleeve.

[0006] The object of the present invention is to overcome the aforesaid drawbacks, and said object is achieved thanks to the fact that the fixing sleeve and the hard-metal terminal have respective surfaces of mutual coupling tapered towards the tip of the terminal.

[0007] According to preferred embodiments of the invention, the tapering can be obtained thanks to surfaces of coupling of the seat of the fixing sleeve and of the hard-metal terminal that are conical or polyhedral.

[0008] Thanks to this arrangement, the drawbacks deriving from the risk of uncoupling between the hard-metal terminal and the fixing sleeve are effectively overcome both during use of the demolition tool and during the operations of sharpening of the terminal.

[0009] The invention will now be described in detail with reference to the annexed drawings, which are provided purely by way of non-limiting example and in which:

Figure 1 is a schematic view in longitudinal section of an impact demolition tool according to the invention;

Figure 2 is a perspective view of the tool of Figure 1;

Figure 3 shows at an enlarged scale the detail indicated by the arrow III in Figure 1; and

Figure 4 is a partially sectioned view of the tool of Figure 2.

[0010] With reference to the figures, an impact demolition tool according to the invention comprises a cylindrical stem 1 made of steel, designed to be operated with reciprocating rectilinear motion by a motor-driven apparatus, or also to form part of a manual tool.

[0011] Applied on the free end of the stem 1 is an insert made of hard metal 2 having a tip 3 projecting on the outside of a fixing sleeve 4, within which the hard-metal terminal is inserted. The base of the fixing sleeve 4 is firmly fixed to the end of the stem 1 by means of welding, preferably via an annular fusion weld 5.

[0012] The projecting tip 3 conveniently has a conical shape with angle of conicity in the region of 90°.

[0013] According to the peculiar characteristic of the invention the external wall of the hard-metal insert 2 designated by 2a in Figure 3, and the internal wall of the fixing sleeve 4 designated by 4a in the same figure, which define the surfaces of mutual coupling thereof, are tapered in the direction of the projecting tip 3.

[0014] The aforesaid tapering ensures a firm and reliable retention of the hard-metal terminal 2 within the fixing sleeve 4 even following upon an intense and prolonged use of the demolition tool, and even during the periodic operations of sharpening of the tip 3.

[0015] Said tapering can be provided according to a wide range of geometrical shapes: in the case represented in the figures the surfaces 2a and 4a are conical, with a conicity of a few degrees. However, they could even be polyhedral or pyramidal.

[0016] Of course, the scope of the present invention extends to the solutions that afford the same utility using the same innovative idea.

Claims

1. An impact demolition tool comprising a steel stem (1) having a hard-metal terminal (2), axially inserted inside a fixing sleeve (4) welded to the end of the stem (1), said hard-metal terminal (2) having a tip (3) projecting from said fixing sleeve (4), said tool being **characterized in that** said fixing sleeve (4) and said hard-metal terminal (2) have respective surfaces of mutual coupling (4a, 2a) tapered towards the tip (3) of said hard-metal terminal (2).

2. The impact demolition tool according to Claim 1, **characterized in that** said tapered coupling surfaces (2a, 4a) are conical.

3. The impact demolition tool according to Claim 1, **characterized in that** said tapered coupling surfac-

es (2a, 4a) are polyhedral.

FIG. 2

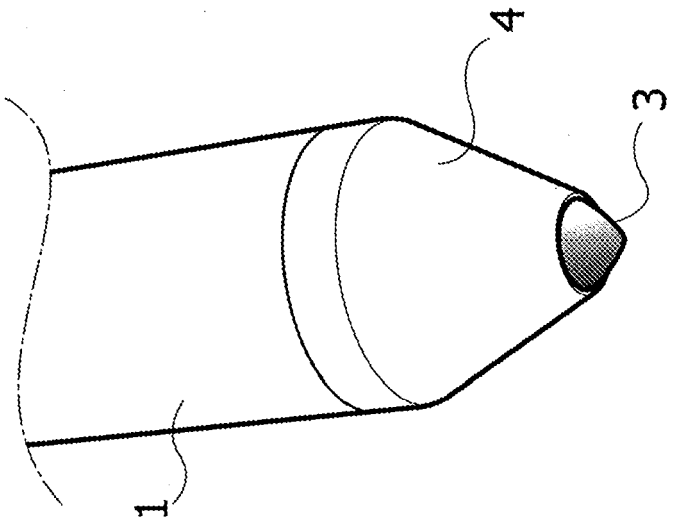


FIG. 1

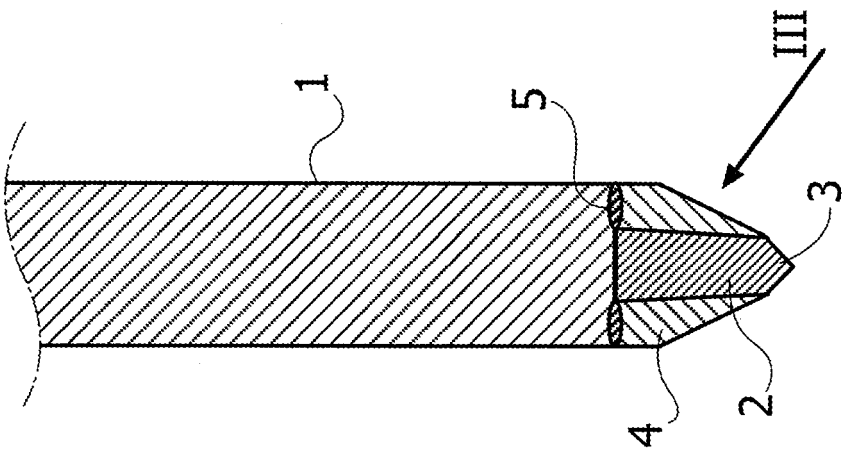


FIG. 3

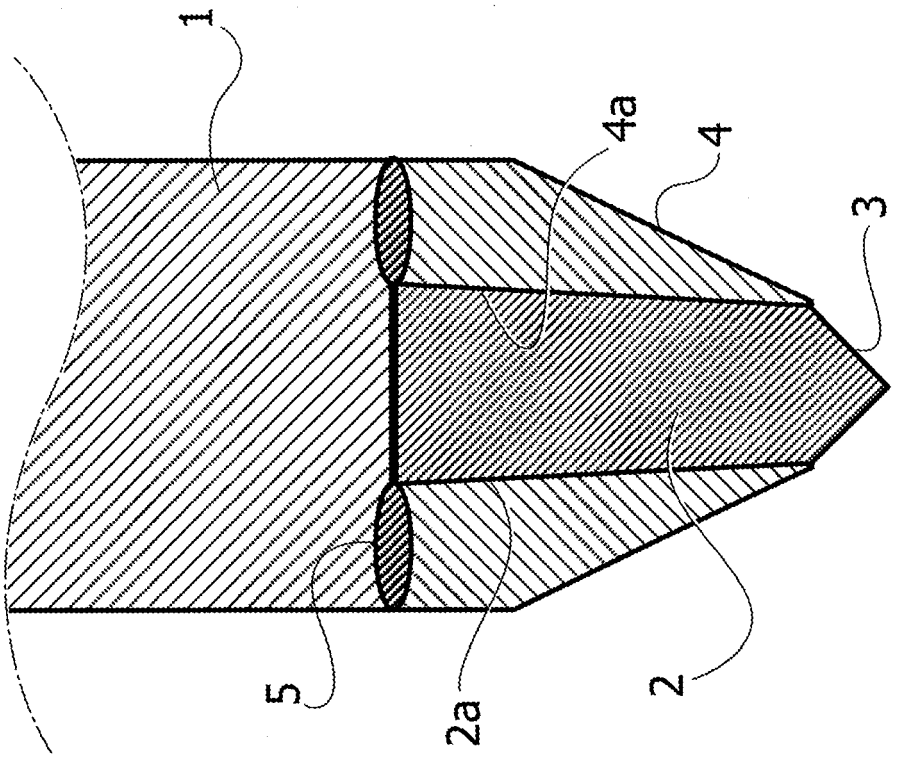
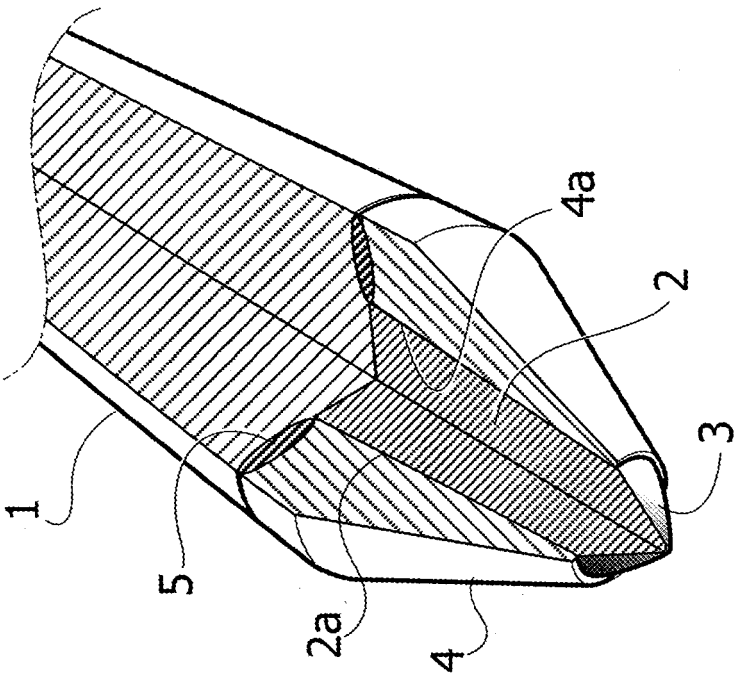


FIG. 4



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EUROPEAN SEARCH REPORT

Application Number
EP 10 18 6376

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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TECHNICAL FIELDS SEARCHED (IPC)

E21C
B25D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 February 2011	Rabolini, Marco

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 10 18 6376

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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- US 3807804 A **[0002] [0003]**