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- (54) Title: METAL BREAKER CONICAL CORE

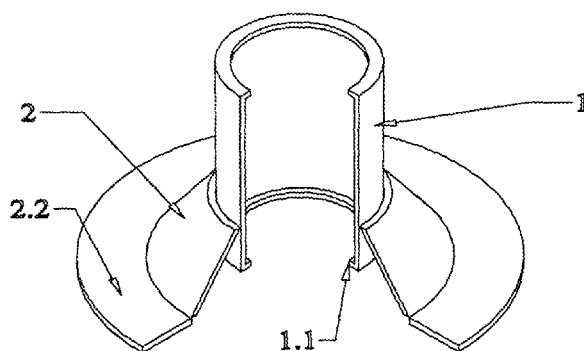


FIGURE 3

(57) Abstract: The present invention related to the metal breaker conical core that is used in the casting sector for the placement of the point risers into the mould and that provides the breaking of the metal solidified within the riser smoothly from the casting material while the point riser is separated from the mould in general can be used as conically or reversed conically as based on the direction of placement of the neck piece (1) into the conical piece (2); and is composed of the neck piece (1) enabling the access of the metal breaker conical core into the mould (4) and the riser (3), the notch (1.1) enabling the neck piece (1) to carry out the metal breaking procedure, the conical piece (2), the hole (2.1) of the conical piece (2) enabling the neck piece (1) to be placed in the conical piece (2), the flange foot (2.2) enabling the placement of the metal breaker conical core into the riser (3).

DESCRIPTION

METAL BREAKER CONICAL CORE

5 The present invention relates to the metal breaker conical core used for placement of the point risers in the mould in the casting sector and provides smooth breaking of the solidified metal in the riser from the casting material while the point riser is separated from the mould.

In the casting procedure, the hot raw material poured into the mould for shaping cools and solidifies in the mould and forms the casting piece (product). The liquid raw material in high
10 temperature poured into the mould is subject to a degree of volumetric shrinking (contraction) due to the metallurgical properties during the cooling and solidifying stages. The volumetric shrinking occurring in the mould results in internal stress and surface depression in the solidified casting piece. Such stress and depression cause the casting piece to be produced as defective. During the casting procedure; it is required to make liquid metal available in the
15 system which shall be sufficient to fill in the depression as a result of the volumetric shrinking of the cooling metal. Feeding of the depressions (gaps) created by the mentioned volumetric stress by liquid metal from a source is called the feeding of the casting and such liquid metal source is called the riser.

The points of the casting pieces, which are difficult to access and critical with respect to
20 depression, are fed by point (mini, spot) risers. Point risers are placed on the feeding points on the mould together with the metal breaker cores.

Metal breaker cores (kernel) are placed at the bottom sections of the risers (at the point where it is laid to the mould). During the placement of the risers on the casting mould; the metal breaker cores are settled into the mould by embedding or compressing into the mould sand.
25 The spring pin in the riser punches the top section of the riser (ceiling) and mould route during this embedding or compression and prepares the riser for pouring. The liquid metal (riser metal) is poured into the riser through this hole. The metal breaker cores are required to reduce the distance between the riser and the casting piece. When casting is completed, it is aimed that the metal breaker core remains as close as possible to the surface of the surface of

the casting piece. The metal breaker cores reduce the contact surface of the riser on the casting piece. Following the casting, the feeding metal solidifying and remaining on the piece (product) is separated from the casting piece by breaking by the metal breaker core. As of the properties of the metal breaker core, it is aimed that the breaking occurs close to the piece, even on the surface of the piece and close to the processing tolerances. Owing to the metal breaker cores with these properties, the procedures such as grinding, cutting etc. are applied scarcely or not applied at all to the casting product. This way, the production costs are reduced and cleaner casting products are enabled.

The metal breaker cores, of which the general use properties and performance expectations are explained above, are produced in various forms and properties in the known technique.

In the present technology; there are metal breaker core (kernel) samples mentioned in the documents no US 5299625 and US 4141406. However these cores cannot approach the casting piece over the mould due to their flat and neckless shapes. This state causes abundant volume of riser metal residuals to remain on the surface of the casting piece. Abundant volume of riser metal residuals on the casting piece increases the cutting and grinding procedures on the casting line. Extra procedures on the casting line cause increase of production costs and deformation on the casting piece surface.

The documents no EP 1879810 B1 and EP 1567294 B1 available in the present technology mention a foldable metal breaker core (kernel). During the placement of the riser on the mould, the foldable core folds and sets on the mould. Based on the folding of the core, the spring pin punches and opens the top section of the riser and the mould route. The contact points of the foldable metal breaker cores to the casting piece are close and the contact surfaces are small. The mentioned foldable cores perform better when compared to the other metal breaker cores available in the known technique, thanks to the mentioned properties. However, the foldable metal breaker cores can be used only with specific types of risers. Their adaptation to different riser and casting conditions is not possible. This state limits the use of the foldable metal breaker cores. Moreover, these do not enable reuse since the foldable cores fold while the risers are set on the mould.

The compatibility of the breaker core with the riser is very important with respect to the optimum casting performance and the ease of cutting, cleaning processes. Due to this reason, there are many types of breaker cores in the present technology with different shapes and

dimensions. The expectations from the metal breaker cores vary as based on the properties of the casting and the riser. In the known technique, there are metal breaker cores with different shapes and neck dimensions that extend into the riser or the mould. However, none of these products are adaptable. Consequently, the foundries are required to have many types of metal breaker cores as based on the properties of the casting they shall perform and the risers they shall use. This state brings extra cost for the business.

The present invention related to the metal breaker conical core that is used in the casting sector for the placement of the point risers into the mould and that provides the breaking of the metal solidified within the riser smoothly from the casting material while the point riser is separated from the mould, completely overcomes above mentioned disadvantages and it is characterized by; adaptability to many casting and riser properties due to its neck structure extending into both the riser and the mould and the settlement form of the neck piece into the conical piece (interchangeable form as conical, reverse conical), formation of a close and considerably narrow contact surface on the casting product due to the neck piece extending into the mould, thus, enabling clean breaking, consequently providing optimum casting performance and minimization of the cleaning, cutting, grinding processes, reduction of the risk of fall of the exothermic material, which becomes loose in the interior surface of the riser during casting, into the mould, obtaining two different types of metal breaker cores as conical and reverse conical by changing the mounting direction of the neck piece to the conical piece, accordingly, reduction of the production costs, and being economical, practical, adaptable and high performance.

The metal breaker conical core is composed of two parts as the neck and conical piece as of its general structure. Two types of metal breaker conic core as conical and reverse conical are obtained as based on the placement of the neck piece into the conical piece during production. Moreover, the length of the neck piece and the extent of insertion into the conical piece can be changed. This way, the insertion length of the neck piece into the mould or the riser or both is determined. Accordingly the production of cores appropriate for different casting requirements and different risers is enabled with low costs. Thanks to these properties, the metal breaker conical core is easily adaptable to the properties of the casting and the riser.

For example, when it is desired to have mould tightness under the riser, it is convenient that the core is set on the mould conically. In case of relatively soft mould sand, when it is desired to have the core set on the mould by tightly compressing into the sand, it is more appropriate

that the core is placed reverse conically into the mould. When it is desired to obtain a contact surface close to the casting product, it is advantageous to place the neck piece on the conical piece as extending into the mould. These examples can be increased as based on the changing properties of the casting, mould, casting piece and riser.

5 The present invention is illustrated in detail referencing the accompanied drawings, which;

Figure 1 is the general three dimensional view of the conical piece and neck piece.

Figure 2 is the general three dimensional view of metal breaker conical core, in the reverse conical state.

10 **Figure 3** is the three dimensional cross sectional view of metal breaker conical core, in the conical state.

Figure 4 is the three dimensional cross sectional view of metal breaker conical core in the reverse conical state..

Figure 5 is the view of the metal breaker conical core, in the reverse conical state, with the riser placed.

15 **Figure 6** is the view of the metal breaker conical core, casting process placement.

Legend:

NO	NAME OF THE PART
1	Neck piece
20	1.1
	Notch
2	Conical piece
2.1	Hole
2.2	Flange foot
3	Riser

4 Mould

5 Pin

The present invention, which relates to the metal breaker conical core, that is used in the casting sector for the placement of the point risers into the mould and that provides the breaking of the metal solidified within the riser smoothly from the casting material while the point riser is separated from the mould, in general; can be used as conically or reversed conically as based on the direction of placement of the neck piece(1) into the conical piece(2); and is composed of the neck piece(1) enabling the access of the metal breaker conical core into the mould(4) and the riser(3), the notch(1.1) enabling the neck piece(1) to carry out the metal breaking procedure, the conical piece(2), the hole(2.1) of the conical piece(2) enabling the neck piece(1) to be placed in the conical piece(2), the flange foot(2.2) enabling the placement of the metal breaker conical core into the riser(3).

The present invention operates in the following way:

15 The metal breaker conical core is composed of two parts as the neck piece(1) and conical piece(2) as of its general structure. The neck piece(1) can be placed on the conical piece(2) during the production by the hole(2.1) in the middle of the conical piece(2). The metal breaker conical core can be used as conical or reverse conical as based on the placement of the neck piece(1) on the conical piece(2). Moreover, as based on the length of the neck piece(1) and its form of placement into the conical piece(2), the neck piece(1) can be extended towards the mould(4) or the riser(3) or both. This state enables the adaptation of the metal breaker conical core to different riser(3), mould(4) and casting conditions.

25 The metal breaker conical core is placed into the riser(3) by the flange foot(2.2) on the conical piece(2). The flange foot(2.2) is completely seated in the riser(3) both in the reverse conical and the conical way.

After the metal breaker conical core is placed into the riser(3); the riser(3) is placed in the mould(4). The neck piece(1) is inserted into the riser(3) during this. The metal breaker conical core provides the riser(3) to approach the casting product by being placed on the mould(4). In this process, the neck piece(1) is seated on the mould(4) and the pin(5) in the riser(3) punches

and opens both the mould route and the ceiling part of the riser(3). The feeder metal is poured into the mould(4) through this.

Following the completion of the casting; the feeder metal solidified in the riser(3) is removed from the casting product through the notch(1.1) on the neck piece(1). The contact surface of
5 the neck piece(1) to the casting product being small and the notch(1.1) being close to the surface enable the breaking and removal of the feeder metal in a clean way.

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CLAIMS

- 1- The present invention relates to the metal breaker conical core which can be used as conically or reverse conically in the casting sector as based on the placement direction of the neck piece(1) on the conical piece(2), and it is characterized by being composed of the neck piece(1) and the conical piece(2).
- 2- A mechanism based on the conical piece(2) as claimed in Claim 1 and having a hole(2.1) which enables the neck piece(1) to be placed on the conical piece(2).
- 3- A mechanism based on the conical piece(2) as claimed in Claim 1 and having a flange foot(2.2) enabling the metal breaker conical core to be placed in the riser(3) sleeve.
- 4- A mechanism based on the neck piece(1) as claimed in Claim 1 and having a notch(1.1) enabling the neck piece(1) to carry out the metal braking function.

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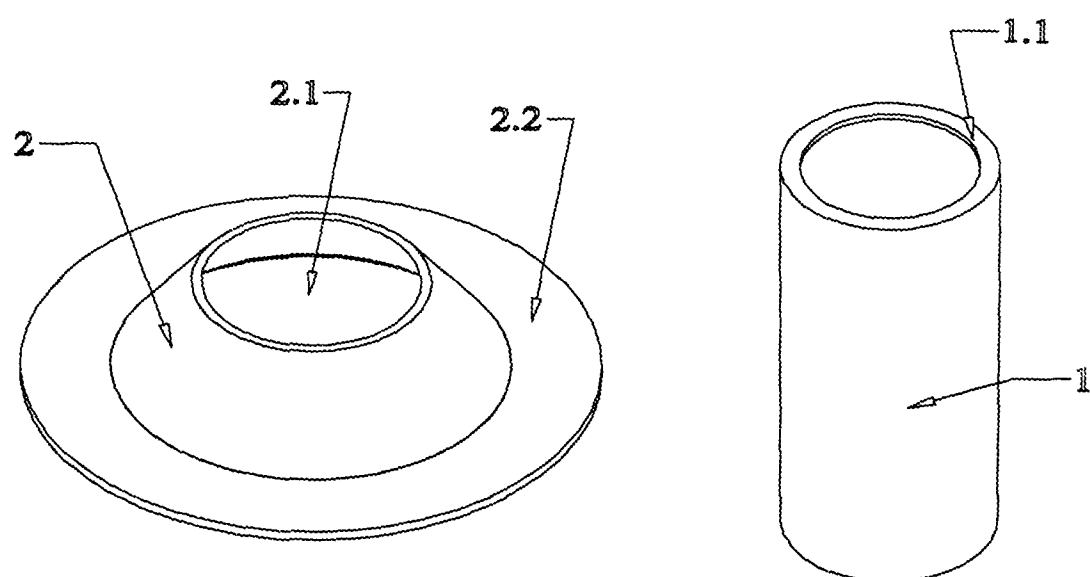


FIGURE 1

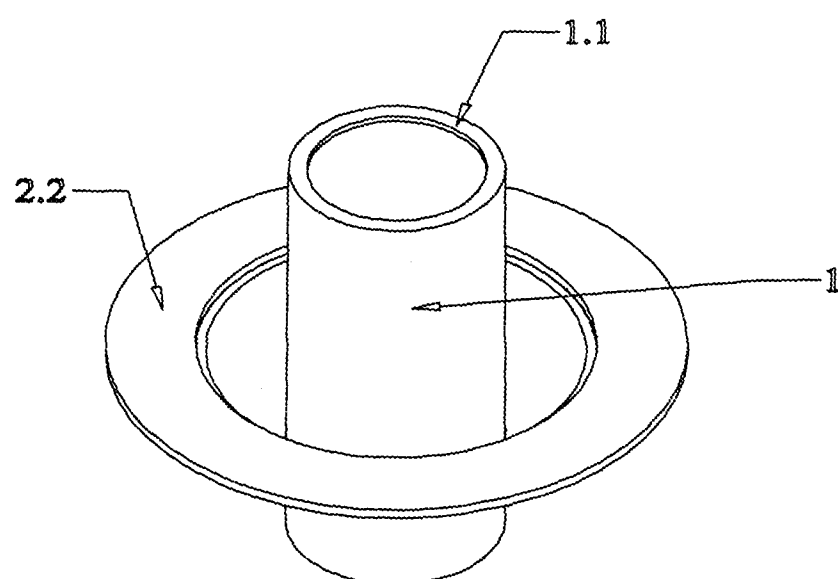


FIGURE 2

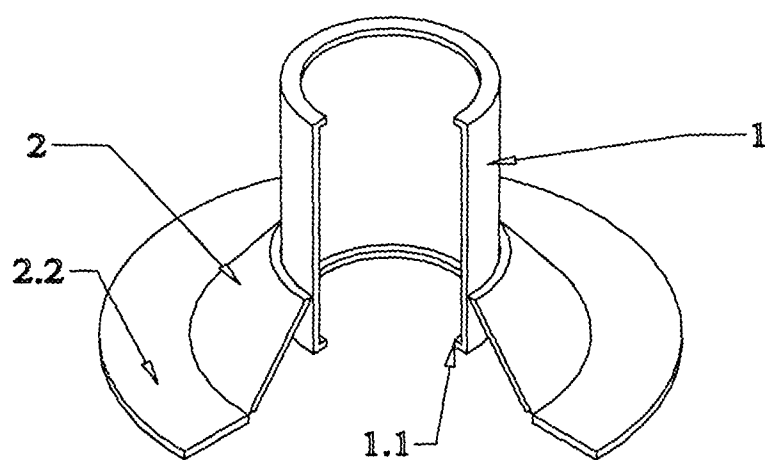


FIGURE 3

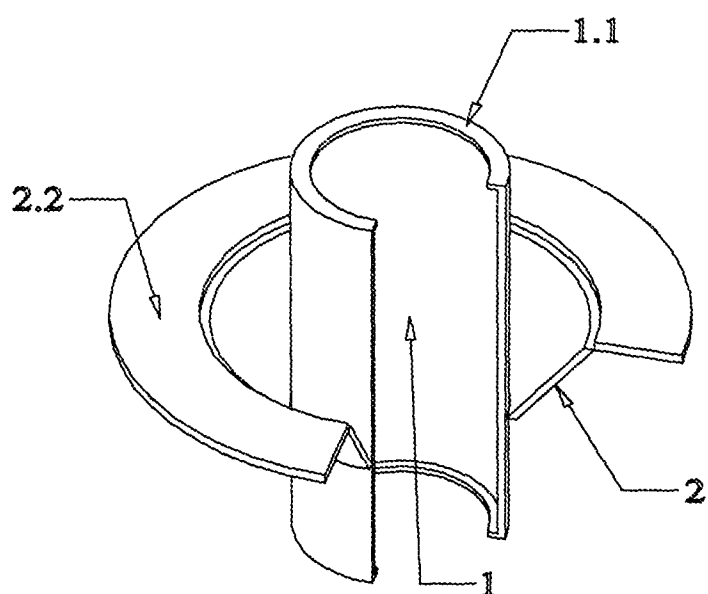


FIGURE 4

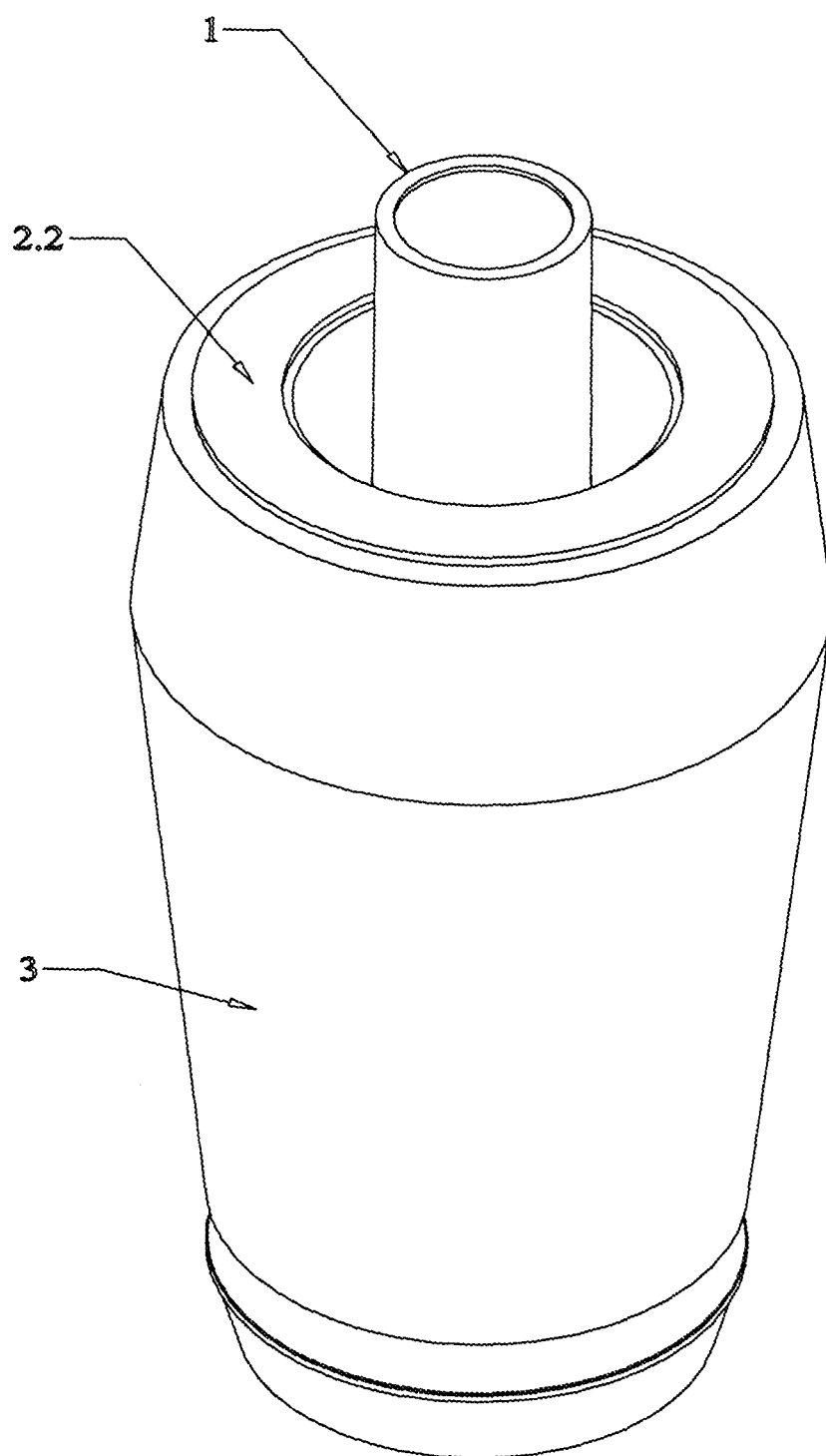


FIGURE 5

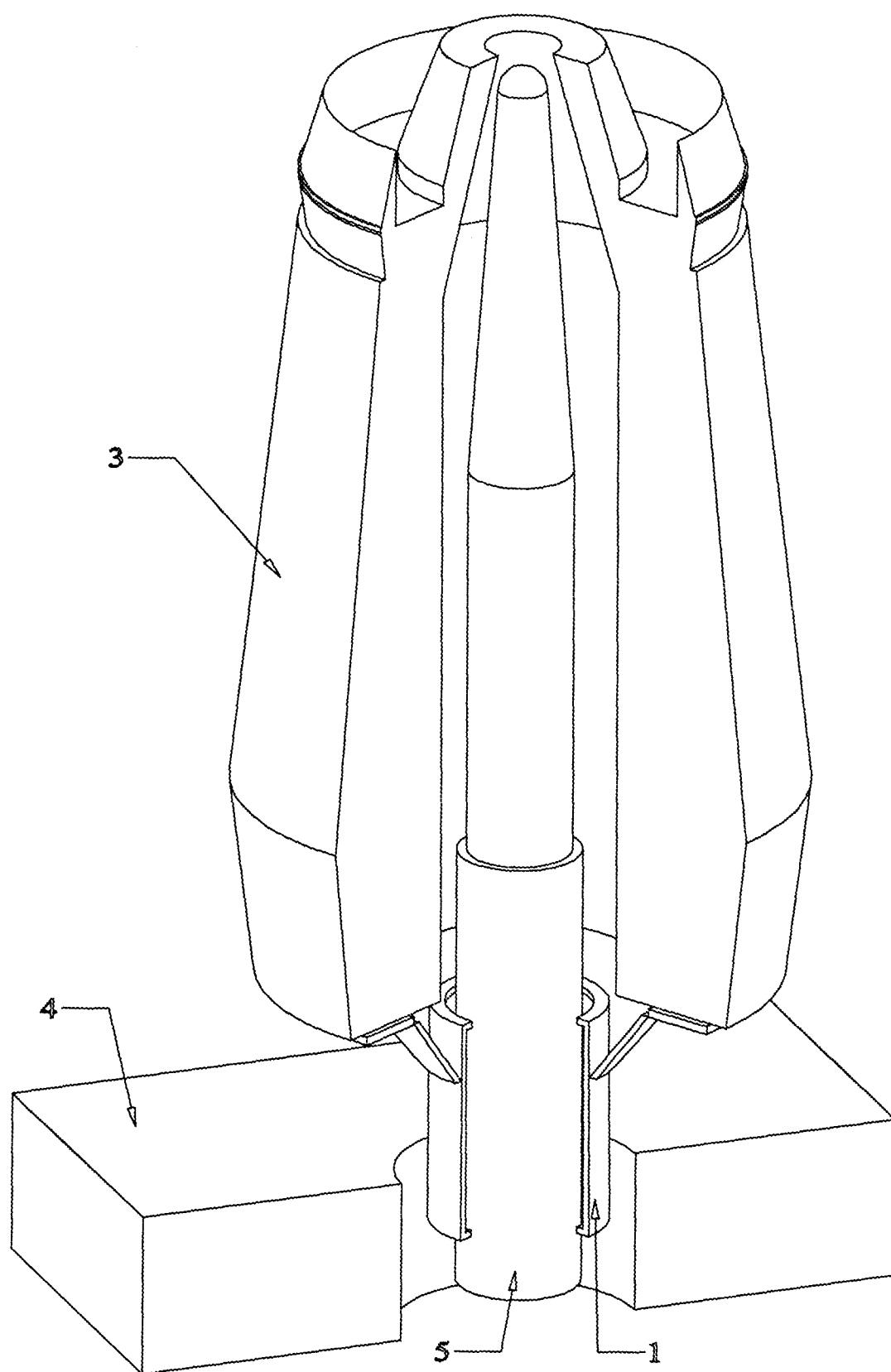


FIGURE 6

INTERNATIONAL SEARCH REPORT

International application No
PCT/TR2015/000295A. CLASSIFICATION OF SUBJECT MATTER
INV. B22C9/08
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B22C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 20 2005 017074 U1 (GTP SCHAEFER GIESTECHNISCHE PR [DE]) 29 December 2005 (2005-12-29) the whole document	1-4
X	DE 10 2007 061155 A1 (GUENDOGDU ABDURRAHMAN [DE]) 18 June 2009 (2009-06-18) the whole document	1,2
A	EP 1 879 710 A1 (FOSECO INT [GB]) 23 January 2008 (2008-01-23) cited in the application the whole document	1-4



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

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8 March 2016

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14/03/2016

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/TR2015/000295

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202005017074 U1	29-12-2005	AT 456986 T	15-02-2010
		DE 202005017074 U1	29-12-2005
		EP 1779944 A1	02-05-2007

DE 102007061155 A1	18-06-2009	NONE	

EP 1879710 A1	23-01-2008	AT 424950 T	15-03-2009
		AU 2007255228 A1	13-12-2007
		BR PI0712328 A2	10-01-2012
		CA 2597109 A1	12-11-2007
		CN 101466488 A	24-06-2009
		DE 202006011980 U1	05-10-2006
		EP 1879710 A1	23-01-2008
		ES 2322211 T3	17-06-2009
		JP 5068312 B2	07-11-2012
		JP 2009539612 A	19-11-2009
		KR 20090016577 A	16-02-2009
		US 2009014482 A1	15-01-2009
		WO 2007141466 A1	13-12-2007
