(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 1 862 220 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
05.12.2007 Bulletin 2007/49

(51) Int Cl.:
B02C 13/13 *(2006.01)*

(21) Application number: **07109396.7**

(22) Date of filing: **01.06.2007**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK YU

(30) Priority: **01.06.2006 ES 200601269 U**

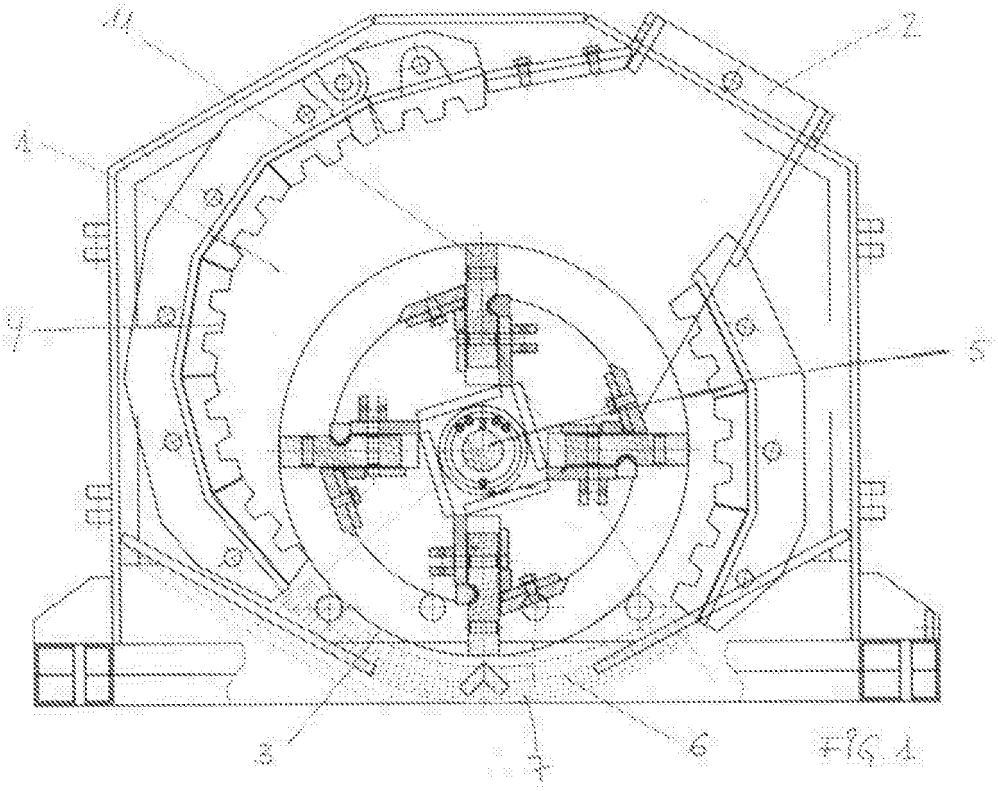
(71) Applicant: **Fernandez Coronado, Maximo**
08755 Castellbisbal (ES)

(72) Inventor: **Fernandez Coronado, Maximo**
08755 Castellbisbal (ES)

(74) Representative: **Pons Arino, Angel**
Glorieta Rubén Dario N° 4
28010 Madrid (ES)

(54) **Mill for the grinding of minerals**

(57) Mill for the grinding of minerals of the type made up of a grinding chamber fitted with an opening through which the minerals enter and another for their outlet, the walls of which are lined with several robust teeth against which the minerals to be ground are projected by means of a rotor that rotates inside, characterised by having an adjustable sizing screen fitted to the outlet opening of the grinding chamber to select the granulometry of the ground fragments.



EP 1 862 220 A1

Description

OBJECT OF THE INVENTION

[0001] The present invention refers to a mill for the grinding of minerals, such as stones and aggregates in general, in order to reduce them to a suitable size for their use as construction material, such as gravel, coarse aggregate or to obtain cements, concretes and such like.

[0002] The object of the invention focuses on fitting means to select the granulometry, that is to say, the size of grain in the final ground product.

BACKGROUND OF THE INVENTION

[0003] On the market, there are already mills for the grinding of minerals, basically intended for the construction sector, made up of a chamber whose inner walls are lined with a number of robust teeth, against which the minerals to be ground are projected by means of a rotor that rotates inside. The above-mentioned grinding chamber has an inlet opening, generally at the top, which the minerals enter through for their crushing and grinding by being projected against the inner walls, and by the rotation of the rotor blades that traps them against the teeth in the walls.

[0004] These mills have an outlet opening at the bottom of the grinding chamber, out of which the ground minerals fall.

[0005] Since the ground minerals are freely expelled by the force of gravity through the bottom opening, the granulometry of the final product is very different and a later classification process is needed to be carried out in order to grind the fragments that are too large and unsuitable for the use in question again.

[0006] Another disadvantage of this type of mills is that they do not allow small mineral fragments below a specific granulometry to be ground, since they are expelled through the outlet opening of the chamber without being crushed, due precisely to their restricted size. This leads to waste quantities of ground material with excessive granulometry, unsuitable for use in the construction sector.

DESCRIPTION OF THE INVENTION

[0007] The mill for the grinding of minerals proposed by the invention solves the aforementioned problem by fitting means to select the granulometry, that is to say, the size of grain in the final ground product.

[0008] To this end, and in a more concrete way, the mill for the grinding of minerals is that of the type made up of a grinding chamber fitted with an opening through which the minerals enter and another for their outlet, the walls of which are lined with several robust teeth against which the minerals to be ground are projected by means of a rotor that rotates inside, having an adjustable sizing screen fitted to the outlet of the grinding chamber to select the granulometry of the ground fragments.

[0009] The aforementioned sizing screen is made up of a number of parallel metallic bars fitted to a set of guides with corresponding pipe grooves into which the bars are inserted.

[0010] Another possibility is that the sizing screen is made up of a metallic plate fitted with a number of openings with the same diameter, placed on a removable fastening guide.

[0011] As much in one case as the other, the fastening guide shall have a curvilinear shape following the grinding chamber's enveloping casing.

[0012] Where metallic bars are used, they shall be conically embodied so that the outlet holes are approximately parallel.

[0013] To select the granulometry of the final product, we only have to replace the metallic bars that make up the sizing screen by others with a different width, to increase or reduce the outlet opening of the screen. Where using a perforated metallic plate, it shall be replaced by another one fitted with openings of another diameter.

DESCRIPTION OF THE DRAWINGS

[0014] To complete the description that is being given and in order to help give a better understanding of the invention's characteristics, with the idea to provide an essential example of its practical undertaking, a set of drawings with an illustrative, non-restrictive character is attached as an integral part of the aforementioned description, showing the following:

Figure 1 shows a properly divided vertical section of the mill aimed at in the invention, where the inside of the grinding chamber, the rotor and arrangement of the sizing screen fitted to the outlet opening may be seen.

Figure 2 shows a detailed plant view of the sizing screen made up of metallic bars fitted to the guides.

Figure 3 shows a vertical section of the sizing screen shown in the previous figure.

Figure 4 shows a vertical section of the metallic bars that make up the sizing screen.

PREFERRED EMBODIMENT OF THE INVENTION

[0015] In view of the outlined figures, it may be seen that the mill for the grinding of minerals is of the type comprising a grinding chamber 1, fitted with an opening 2 through which the minerals to be ground enter and an outlet opening 3 to eject them once ground. The inside of the grinding chamber 1 is lined with a number of robust teeth 4, known as "palate", against which the minerals are projected and then ground by means of a rotor 5 that rotates inside the chamber.

[0016] To select the granulometry of the ground mineral, a sizing screen 6, made up of a number of parallel metallic bars 7, is fitted to the outlet opening 3.

[0017] The fastening of these metallic bars 7 is carried out by way of a set of guides 8, which have a curvilinear shape following the grinding chamber's enveloping casing. The aforementioned guide 8 is fitted with a number of grooves 9 into which the metallic bars 7 are inserted through slots 10 made at their ends. So that the opening defined between the consecutive metallic bars 7 is approximately parallel, a conical embodiment design has been used.

[0018] Due to the arrangement of the guides 8, we may replace the metallic bars 7 by others with a different width to increase or reduce the screen's outlet opening.

[0019] Another embodiment of the sizing screen 6 consists of using a perforated metallic plate, not shown in the drawings, at the outlet opening 3, which has the same curvilinear shape as the guides 8. In this case, to select the granulometry of the ground mineral, the perforated plate is replaced by another one having openings of a different diameter.

[0020] Thus, due to the sizing screen 6 fitted to the outlet opening 3, the mill shall eject the ground minerals whose size is less than the opening of the sizing screen. The rest of the larger fragments shall continue rotating inside the grinding chamber 1, driven by the blades 11 of the rotor 5, to be ground again in the following laps until their size is less than that of the screen's opening 6, at which moment they will be ejected from the grinding chamber.

[0021] In the design, the sizing screen 6 is fitted to the outlet opening 3 and has a curvilinear shape following the grinding chamber's enveloping casing, so that the fragments smaller than the opening of the screen continue their next circular lap inside the grinding chamber 1, without causing undesired blocking or accumulation.

Claims

1. Mill for the grinding of minerals of the type made up of a grinding chamber fitted with an opening through which the minerals enter and another for their outlet, the walls of which are lined with several robust teeth against which the minerals to be ground are projected by means of a rotor that rotates inside, **characterised by** having an adjustable sizing screen fitted to the outlet opening of the grinding chamber to select the granulometry of the ground fragments.

2. Mill for the grinding of minerals, according to claim 1, **characterised by** the sizing screen being made up of a number of parallel metallic bars fitted to a set of guides with corresponding pipe grooves into which the bars are inserted.

3. Mill for the grinding of minerals, according to claim 1, **characterised by** the sizing screen being made up of a metallic plate with a number of holes of the same diameter fitted to a removable fastening guide.

4. Mill for the grinding of minerals, according to claim 2, **characterized by** the metallic bars having a conical embodiment.

5. Mill for the grinding of minerals, according to claims 2 and 3, **characterised by** the fastening guides having a curvilinear shape following the grinding chamber's enveloping casing.

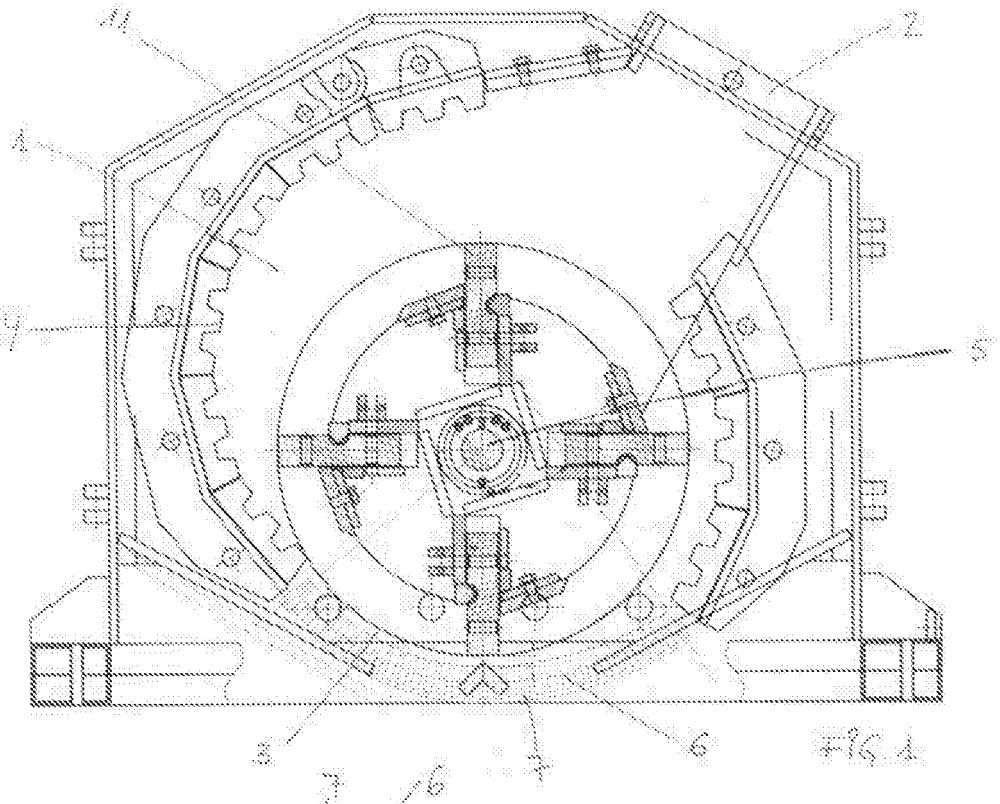


Fig. 1

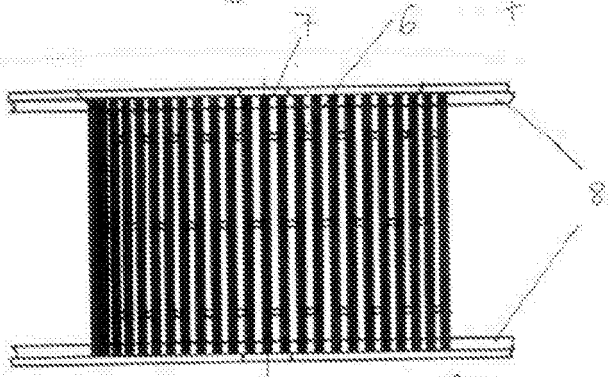


Fig. 2

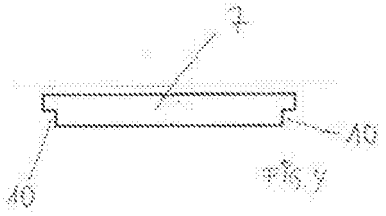


Fig. 3

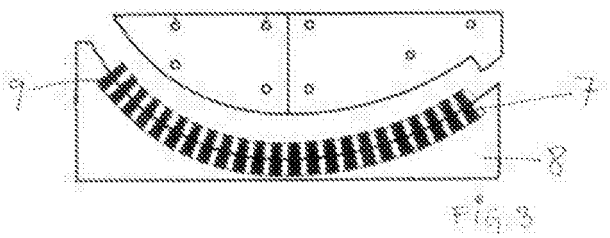


Fig. 4

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 07 10 9396

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 1 338 845 A (SCHUTZ JOSEPH M) 4 May 1920 (1920-05-04) * the whole document *	1,2,4,5 3	INV. B02C13/13
X Y	US 3 480 214 A (WAGENEDER FRANZ) 25 November 1969 (1969-11-25) * the whole document *	1,2,4,5 3	
Y A	US 5 772 134 A (BOULDIN FLOYD E [US] ET AL) 30 June 1998 (1998-06-30) * the whole document *	3 1	
			TECHNICAL FIELDS SEARCHED (IPC)
			B02C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	13 September 2007	Kopacz, Ireneusz

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

1

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 10 9396

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

13-09-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 1338845 A	04-05-1920	NONE	
US 3480214 A	25-11-1969	AT 277725 B	12-01-1970
		BE 703954 A	01-02-1968
		CH 466008 A	30-11-1968
		DE 1607619 A1	16-07-1970
		ES 339032 A1	16-04-1968
		FI 41706 B	30-09-1969
		FR 1537208 A	23-08-1968
		GB 1133898 A	20-11-1968
		SE 331222 B	14-12-1970
US 5772134 A	30-06-1998	US 5558281 A	24-09-1996

EPO FORM P0459

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