



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
06.05.2015 Bulletin 2015/19

(51) Int Cl.:
B03B 9/00 (2006.01) B02C 23/14 (2006.01)

(21) Application number: **13460082.4**

(22) Date of filing: **13.12.2013**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME

(71) Applicant: **Katowicki Holding Weglowy S.A.**
40-022 Katowice (PL)

(72) Inventors:
• **Falkus, Grzegorz**
43-100 Tychy (PL)
• **Matysik, Jacek**
41-948 Piekary Slaskie (PL)
• **Marek, Filipek**
40-750 Katowice (PL)

(30) Priority: **30.10.2013 PL 40585813**

(54) **Method for obtaining aggregate of post-mining gangue and machinery for carrying out the method**

(57) Method for obtaining aggregate of post-mining gangue obtained from the process of classification and concentration of coal and from underground preparatory works and coal seam works, characterized in that the gangue is driven by belt conveyors to the hopper (3), from where it is redirected through a magnetic separator (4) eliminating metal contamination, to the selective impact crusher (5) of first degree comminution, wherein the product obtained from this crusher is initially screened through a double-deck vibrating screen (6), wherein the under-screen product is stored as material for backfilling of mining workings, and the over-screen product is subjected to a subsequent process of crushing in an impact

selective crusher of second stage comminution (7) and then the crushing products are targeted to triple-deck vibrating screen (8) to undergo a process of classification. The system of devices for obtaining aggregate of post-mining gangue contains consecutively arranged devices: hopper (3), magnetic separator (4), selective impact crusher (5) of first-degree comminution, double-deck vibrating screen (6), selective impact crusher of second-degree comminution (7), and triple-deck vibrating screen (8), wherein the devices included in the system are joint by a system of central dedusting (9), which captures dust generated during operation of crushers (5) and (7) and vibrating screens (6) and (8).

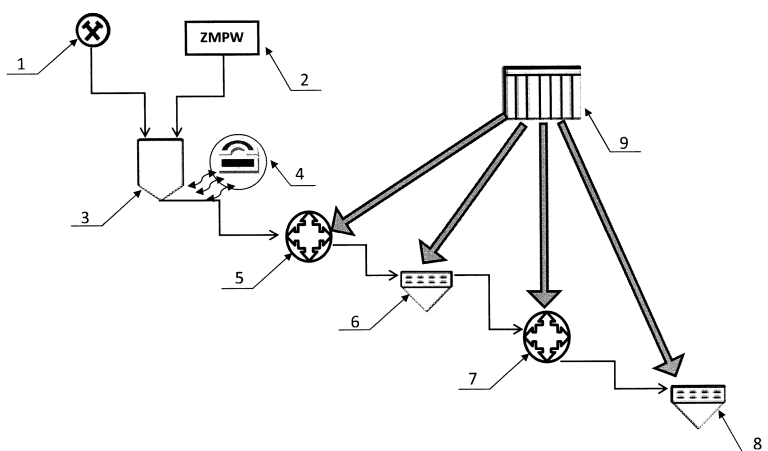


Fig 1

Description

[0001] The subject of invention is method for obtaining of aggregate of the post-mining gangue extracted in the process of classification and concentration of coal as well as from underground preparatory works and providing coal seams works and a system of devices for carrying out the method.

[0002] Coal mining is one of the most waste productive industries. The quality of the waste is variable at the time and depends on the quality of coal deposits, methods of coal seams excavation and concentration technology. So far, post-mining waste are used occasionally, among the others in the process of mining workings backfilling in underground coal mines.

[0003] The aim of the invention is to provide good quality aggregate that meets the DIN EN 13242 + A1: 2010 and BS EN 3043:2004 + ACC: 2004:2004 + Ap1 : 2010 standards, which can be used for the construction of flood levees, rail and road embankments, for the sub base of roads and motorways, and directly as a building material.

[0004] Method for obtaining aggregate of post-mining gangue according to the invention is characterized by that the gangue obtained in the process of classification and concentration of coal and from underground preparatory works and providing coal seams works, is driven by belt conveyors to the hopper, from where is redirected through a magnetic separator eliminating metal contamination to the selective impact crusher of first degree comminution. The obtained product is initially screened through a double-deck vibrating screen, wherein the under-screen product is stored as material for backfilling of mining workings, and over-screen product is subjected to subsequent process of crushing in impact selective crusher of the second stage of comminution and then crushing products are targeted to triple-deck vibrating screen and undergo a process of classification.

Aggregate from gangue obtained by the method under to the invention, may be unadulterated applied successfully in technologies, where there is effectively reduced the environmental impact by isolating layers of sub base from moisture.

[0005] The system under the invention includes an arranged consecutively devices: hopper, magnetic separator, selective impact crusher of first-degree comminution, double-deck vibrating screen, selective impact crusher of second-degree comminution and triple-deck vibrating screen, wherein the devices included in the system are joint by system of central dedusting which captures dust generated during operation of selective impact crusher of first-degree comminution and selective impact crusher of second degree comminution and double-deck and triple deck vibrating screen.

[0006] The capture of dust during the process of obtaining of the aggregate improves the purity of obtained product and has a positive influence on the environment.

[0007] Method for obtaining aggregates of post-mining gangue and device system according to the invention will

be explained on the example of realization on the basis of Figure 1.

[0008] Gangue obtained in the process of classification and concentration of coal in coal processing plant **2** and from the underground preparatory works and providing coal seams works of the granulation between 0-200 mm is driven by belt conveyors to the hopper **3**, from where is redirected through a magnetic separator **4** eliminating metal contaminants, to the selective impact crusher **5** of the first degree of comminution. The obtained product is initially screened by a double deck vibrating screen **6**, wherein the under-screen product < 4mm is stored as material for backfilling of mining workings, and the over-screen product > 4mm is subjected to a crushing process at the next selective impact crusher of the second stage comminution **7**, and then products of crushing the are directed to the triple-deck vibrating screen **8** and subjected to a process of classification.

As a result of the classification there is obtained full value aggregate of fraction 4 - 8mm, 8-16mm and 16 - 63 mm. The system of devices for the obtaining aggregate of post-mining gangue contains arranged consecutively devices: hopper **3**, magnetic separator **4**, selective impact crusher of first-degree comminution **5**, double-deck vibrating screen **6**, selective impact crusher of second-degree comminution **7**, and triple-deck vibrating screen **8**, wherein the devices included in the system are joint by system of central dedusting **9**, which captures dust generated during operation of crushers **5** and **7** and vibrating screens **6** and **8**.

Claims

1. Method for obtaining of aggregate of the post-mining gangue extracted in the process of classification and concentration of coal as well as from underground preparatory works and providing coal seams works which comprises of belt conveyors which drive gangue to the hopper (**3**), from where is redirected through a magnetic separator (**4**) eliminating metal contaminants, to the selective impact crusher (**5**) of the first degree of comminution, wherein the product obtained from selective impact crusher (**5**) is initially screened by a double deck vibrating screen (**6**), wherein the under-screen product is stored as material for backfilling of mining workings, and the over-screen product is subjected of the next crushing process at selective impact crusher of the second stage comminution (**7**), and then products of crushing the are directed to the triple-deck vibrating screen (**8**) and subjected to a process of classification.
2. The system of devices for obtaining aggregate of post-mining gangue of Claim no. 1 which comprises of arranged consecutively devices: hopper (**3**), magnetic separator (**4**), selective impact crusher (**5**) of first-degree comminution, double-deck vibrating

screen (6), selective impact crusher (7) of second-degree comminution, and triple-deck vibrating screen (8), wherein the devices included in the system are joint by system of central dedusting (9), which captures dust generated during operation of crushers (5) and (7) and vibrating screens (6) and (8). 5

10

15

20

25

30

35

40

45

50

55

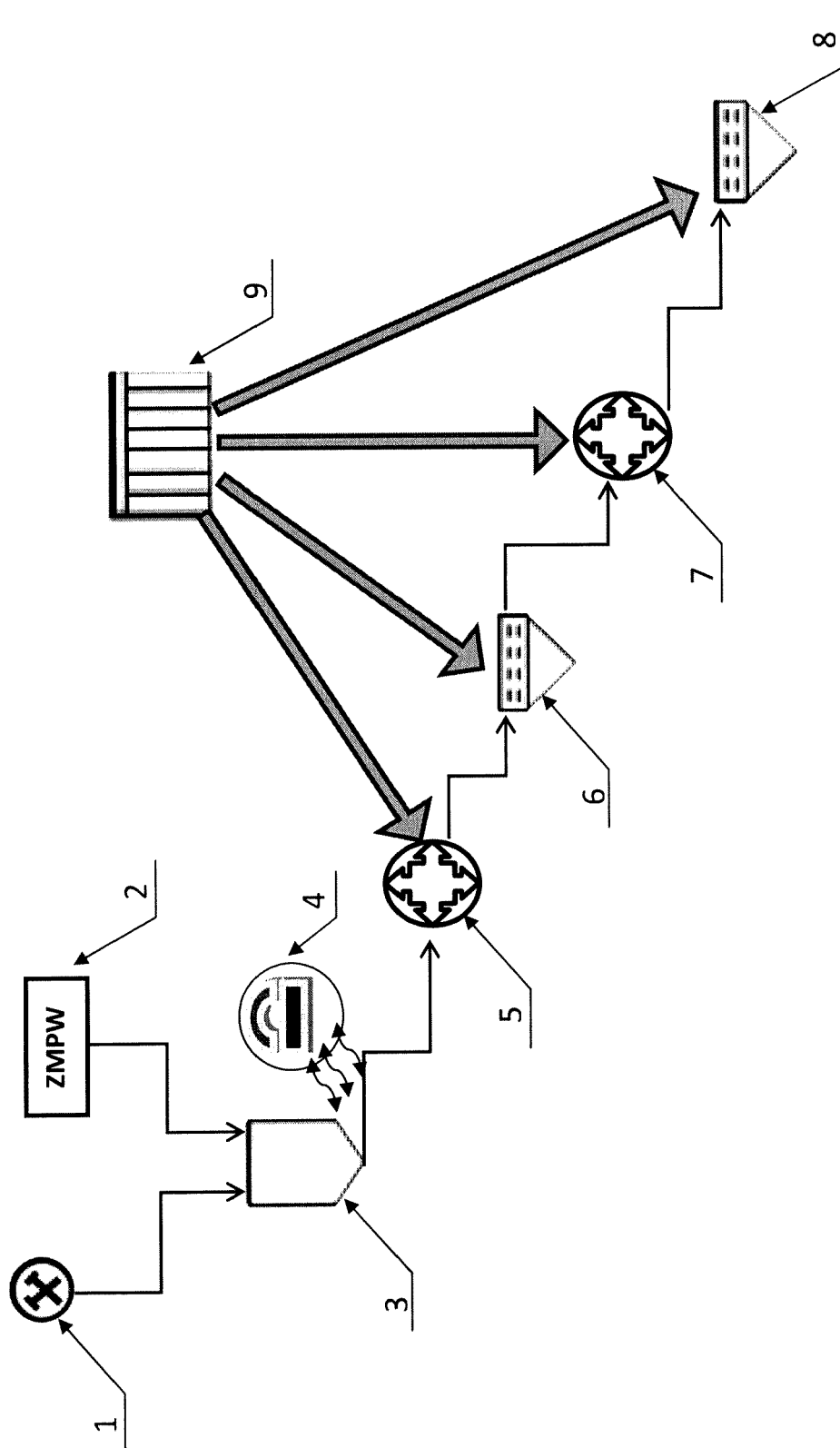


Fig 1



EUROPEAN SEARCH REPORT

Application Number
EP 13 46 0082

5

10

15

20

25

30

35

40

45

50

55

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	KR 100 956 626 B1 (INSUN ENT CO LTD [KR]) 6 May 2010 (2010-05-06)	1	INV. B03B9/00 B02C23/14
Y	* page 4, paragraph 12 - page 5, paragraph 22 *	2	
	* abstract; figure 1 *		

Y	DE 22 17 572 A1 (RUEHL GERHARD PROF DR ING HABI) 18 October 1973 (1973-10-18)	2	
A	* page 7, paragraph 3 - page 8, paragraph 1; figure *	1	

			TECHNICAL FIELDS SEARCHED (IPC)
			B03B B02C
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 12 March 2015	Examiner Leitner, Josef
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	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 13 46 0082

5

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.

12-03-2015

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 100956626	B1	06-05-2010	NONE
DE 2217572	A1	18-10-1973	NONE

15

20

25

30

35

40

45

50

55

EPO FORM P0459

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