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(54) **COMBINED CLASSIFIER**

(57) A combined classifier includes an outer cylinder (1) and an inner cylinder (2) fixed in the outer cylinder (1). A classifying motor (3) is mounted on the upper end of the outer cylinder (1) by a bracket. The lower end of the output shaft of the classifying motor (3) is fixedly connected with a rotating shaft (4) which extends into the inside of the outer cylinder (1). The lower end of the rotating shaft (4) is provided with a classifying impeller (5) which is above the inner cylinder (2). A feeding inlet (9) is set on the outer housing above a scatter plate (8), and a discharging outlet (10) is provided on the lower end of the outer cylinder (1). A cone-shaped discharging hopper (11) is set on the lower end of the inner cylinder (2), and the side wall thereof is provided with sieve openings. The discharging hopper (11) is communicationally connected with an air classifier (12). The combined classifier is provided to scatter and classify the materials squeezed by a roll squeezer, thereby separating the materials that are not squeezed or not fully squeezed by the combination of air classification and screen sizing, and conveying the materials back to the roll squeezer to re-squeeze, so that the classifying efficiency can be improved.

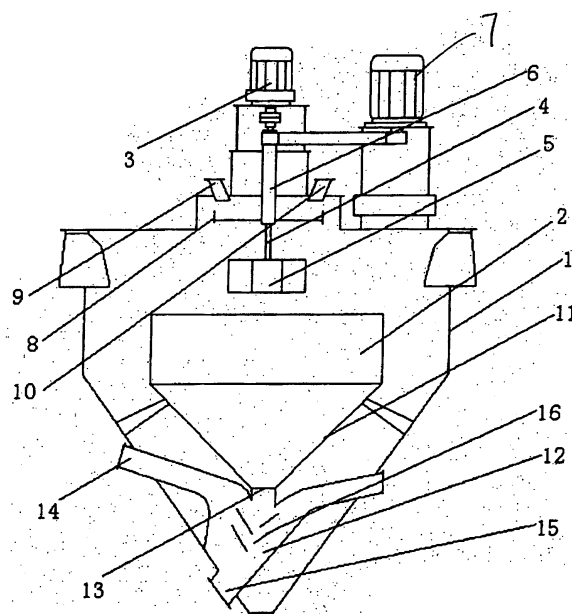


Fig. 1

Description

FIELD OF THE INVENTION

[0001] This application relates to a scatter classification device, in particular to a combined classifier.

BACKGROUND OF THE INVENTION

[0002] At present, with the rapid development of China's national economy in recent years, the cement production of China has already been up to one billion tons. New production lines are all large-scale production lines having annual production of 700,000 tons or more. Power consumption per ton of cement is about 90-100 kWh, and the power consumption of cement grinding process is 60-70% of the cement production power consumption. The annual power consumption of the cement grinding process is up to about 60 billion kWh. The roller press is successfully applied in the cement grinding system to increase the production of the system by 50%-200% and save the power by 20%-40%. In this way, the energy may be saved and the power consumption of cement production is reduced, thereby realizing the sustainable development. The roller press employs the high-pressure material bed crushing theory and operates in a manner of individual particle crushing groupization. The granularity of fragile materials is reduced rapidly after being pressed under high pressure (the pressure of the pressing area is about 150 MPa), with the content of fine powders smaller than 0.08mm being up to 20-30%, and the content of materials smaller than 2mm being above 70%. Besides, there is a mass of micro cracks in the pressed materials, which improves the grindability of the materials and greatly reduces the energy consumption for grinding the materials in the next procedure. Based on the actual usage data already obtained, compared with the conventional grinding system, the grinding system using the roller press increases the production by 50-200%, reduces the power consumption per unit yield by 20-40%, and decreases the operating noise of the device which improves the worker's working environment, thereby showing remarkable economical benefits and social benefits.

SUMMARY OF THE INVENTION

[0003] The object of the present application is to provide a combined classifier for scattering and multi-classifying materials pressed by a roller press, specifically, separating materials unpressed and pressed insufficiently by using the combination of air classification and screening and feeding the separated materials back into the roller press to be re-pressed, which has high classification efficiency.

[0004] The technical solutions of the present application are as follows.

[0005] A combined classifier includes an outer cylinder and an inner cylinder fixedly provided inside the outer

cylinder, wherein a classifying motor is installed on an upper end of the outer cylinder by a bracket, a rotating shaft extends into the outer cylinder and is fixedly connected to a lower end of an output shaft of the classifying motor, a classifying impeller is located above the inner cylinder and is installed on a lower end of the rotating shaft, a hollow shaft sleeves outside the rotating shaft and is driven by a scatter motor, a material scatter plate is installed on a lower end of the hollow shaft, above the material scatter plate a material inlet is provided in the outer cylinder, a material outlet is provided in a lower end of the outer cylinder, and wherein a cone-shaped material unloading hopper is provided at a lower end of the inner cylinder and is provided with sieve openings on a sidewall thereof, an air classifier is communicatively connected to the material unloading hopper and includes an air intake passage, an air discharging passage, a material discharging passage and a material unloading passage which intersect, and material scatter boards staggered with each other are fixed at an intersection of the passages.

[0006] The air classifier is provided in the outer cylinder, with the air intake passage, the material discharging passage and the material unloading passage all extending out of a side wall of the outer cylinder; or the air classifier is provided outside the outer cylinder.

[0007] The material scatter boards are processed for wear-resistance, and are arranged in a fishbone shape.

[0008] The advantages of the present application are as follows.

[0009] In the present application, materials are classified in multiple stages, resulting in high classification efficiency; and a principle of screening prior to air classification is employed, thus energy consumption is saved.

[0010] The portions fully contacting with the materials are all processed for wear-resistance or made of wear-resistant materials, thus the service life of the device is prolonged.

[0011] A damageable structure needed to be regularly replaced is formed by assembling its components made respectively, which may reduce the weight of the damageable structure and facilitate the assembly and the disassembly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Figure 1 is a schematic view of the structure of the present application.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0013] Referring to figure 1, a combined classifier including an outer cylinder 1 is shown. An inner cylinder 2 is fixedly provided inside the outer cylinder 1. A classifying motor 3 is installed on an upper end of the outer cylinder 1 by a bracket. A rotating shaft 4 extending into the outer cylinder 1 is fixedly connected to a lower end of an output shaft of the classifying motor 3. A classifying im-

peller 5 located above the inner cylinder 2 is installed on
 a lower end of the rotating shaft 4. A hollow shaft 6
 sleeves outside the rotating shaft 4 and is driven by a
 material scatter motor 7. A material scatter plate 8 is in-
 stalled on a lower end of the hollow shaft 6, and above
 the material scatter plate 8 a material inlet 9 is provided
 in the outer cylinder. A material outlet 10 is provided in
 a lower end of the outer cylinder 1. A cone-shaped ma-
 terial unloading hopper 11 is provided at the lower end
 of the inner cylinder 2, and is provided with sieve open-
 ings on the sidewall thereof. An air classifier 12 is com-
 municationally connected to the material unloading hop-
 per 11, and includes an air intake passage, an air dis-
 charging passage 13, a material discharging passage 14
 and a material unloading passage 15 which intersect.
 Material scatter boards 16 staggered with each other are
 fixed at an intersection of the above passages, and are
 processed for wear-resistance, and are arranged in a
 fishbone shape. The air classifier is provided in the outer
 cylinder, with the air intake passage, the material dis-
 charging passage and the material unloading passage
 all extending out of a side wall of the outer cylinder. Al-
 ternatively, the air classifier may also be provided outside
 the outer cylinder.

tending out of a side wall of the outer cylinder; or the
 air classifier is provided outside the outer cylinder.

3. The combined classifier according to claim 1, where-
 in the material scatter boards are processed for
 wear-resistance, and are arranged in a fishbone
 shape.

Claims

1. A combined classifier comprising an outer cylinder
 and an inner cylinder fixedly provided inside the outer
 cylinder, wherein a classifying motor is installed on
 an upper end of the outer cylinder by a bracket, a
 rotating shaft extends into the outer cylinder and is
 fixedly connected to a lower end of an output shaft
 of the classifying motor, a classifying impeller is lo-
 cated above the inner cylinder and is installed on a
 lower end of the rotating shaft, a hollow shaft sleeves
 outside the rotating shaft and is driven by a scatter
 motor, a material scatter plate is installed on a lower
 end of the hollow shaft, above the material scatter
 plate a material inlet is provided in the outer cylinder,
 a material outlet is provided in a lower end of the
 outer cylinder,
 and wherein a cone-shaped material unloading hop-
 per is provided at a lower end of the inner cylinder
 and is provided with sieve openings on a sidewall
 thereof, an air classifier is communicationally con-
 nected to the material unloading hopper and com-
 prises an air intake passage, an air discharging pas-
 sage, a material discharging passage and a material
 unloading passage which intersect, and material
 scatter boards staggered with each other are fixed
 at an intersection of the passages.
2. The combined classifier according to claim 1, where-
 in the air classifier is provided in the outer cylinder,
 with the air intake passage, the material discharging
 passage and the material unloading passage all ex-

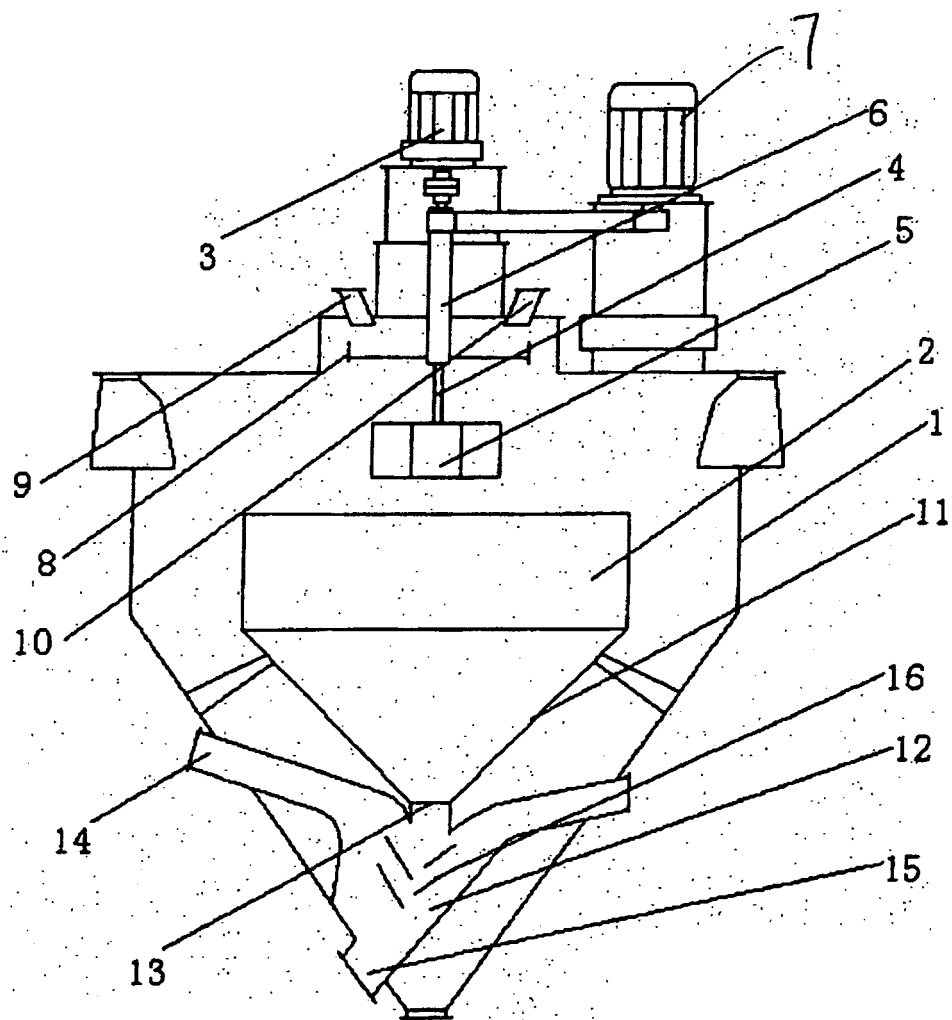


Fig. 1

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/001401

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

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)

IPC: B07B

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)

WPI, EPODOC, CNPAT, CNKI: classify+, separate+, sieve+, powder, cement, inner, out+, cylinder, cone+, hopper, drum

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
P,X	CN101745503A(HEFEI CEMENT RESEARCH & DESIGN INSTITUTE) 23 Jun. 2010(23.06.2010) claims 1-3	1-3
A	CN2183829 Y(HEFEI CEMENT RESEARCH AND DESI) 30 Nov. 1994(30.11.1994) Pages 3-4, figure 2	1-3
A	CN2267869 Y(YU, Jianguo) 19 Nov. 1997(19.11.1997) the whole document	1-3
A	DE1607654 A1 (POLYSIUS AG) 08 Jan. 1970 (08.01.1970) the whole document	1-3
A	GB1215914 (POLYSIUS AG) 16 Dec. 1970(16.12.1970) the whole document	1-3

☐ Further documents are listed in the continuation of Box C.
 ☒ See patent family annex.

* Special categories of cited documents:	“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
“A” document defining the general state of the art which is not considered to be of particular relevance	“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
“E” earlier application or patent but published on or after the international filing date	“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
“L” document which may throw doubts on priority claim (S) or which is cited to establish the publication date of another citation or other special reason (as specified)	“&” document member of the same patent family
“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	

Date of the actual completion of the international search 11 Dec. 2010 (11.12.2010)	Date of mailing of the international search report 23 Dec. 2010 (23.12.2010)
Name and mailing address of the ISA/CN The State Intellectual Property Office, the P.R.China 6 Xitucheng Rd., Jimen Bridge, Haidian District, Beijing, China 100088 Facsimile No. 86-10-62019451	Authorized officer CHEN, Xuxuan Telephone No. (86-10)010-62085883

Form PCT/ISA /210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/CN2010/001401

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN101745503A	23.06.2010	None	
CN2183829 Y	30.11.1994	None	
CN2267869 Y	19.11.1997	None	
DE1607654 A1	08.01.1970	None	
GB1215914 A	16.12.1970	None	

Form PCT/ISA /210 (patent family annex) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2010/001401

Continuation of : A. **CLASSIFICATION OF SUBJECT MATTER** of second sheet

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