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(54) **Double pneumatic action machine for the separation of the aggregates from light pollutants**

(57) The invention refers to the field of the machines used in the treatment of aggregate materials with the purpose to recover useful fractions of them, particularly it refers to the machines able to separate, crushed stone aggregate having a specific weight superior to 1300 kg/mc, from light pollutants like paper, wood, plastics, cans, etc.

The machine creates, on the flow of material to be treated, having a specific particle size not greater than 100 mm, stratification by specific weight and form through a vibrating distributor (1) and the machine has a dual pneumatic action consisting: of blowing the material falling onto a lower surface (5) in an upward direction and contemporary suction of the lightest particles already blown towards a belt mesh (12).

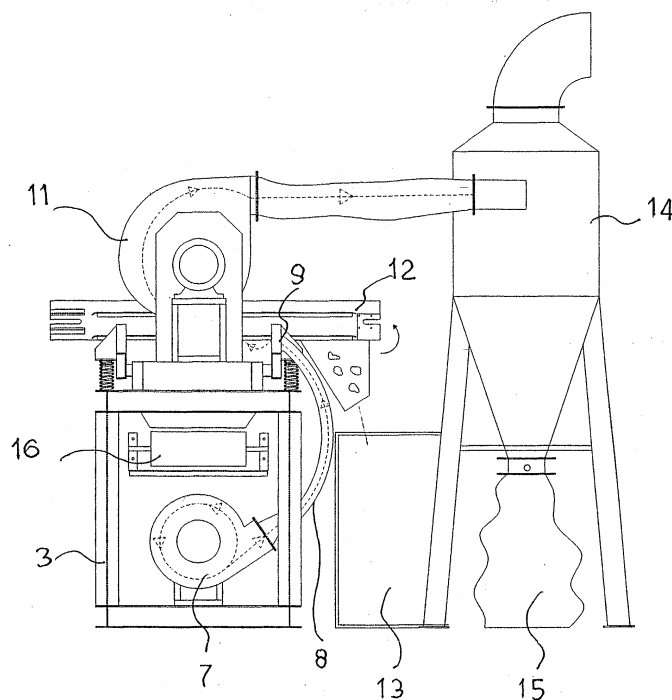


FIG.3

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Description

Technical field

[0001] The invention refers to the field of the machines used in the treatment of the aggregate materials with the purpose to recover meaningful fractions of them, particularly it refers to the machines able to separate, the crushed stone aggregate and assimilated to weight specific superior to the 1300 kg/mc, the light pollutants what paper, wood, plastics, cans, etc.

State of the technique

[0002] It is note in the commerce a machine, able to separate the aggregate materials preventively selected by plastic pieces, of wood, or of other impurities using air jets that, crossing the layer of aggregate material while it is falling to rain from a vibrating plan to another, it succeeds in dividing the lightest parts from those heavy. Are known also other machines that use however air jets to facilitate the stratification of the admixture of material to treat.

[0003] It is note in the commerce, also a machine that, vice versa it separates the light parts from those heavy through an suction action.

[0004] All these realizations although present in the commerce and therefore working, introduce however some drawbacks, essentially due to the fact that the separation of the light materials from those heavy is never complete, rather few satisfactory results, in fact in the machines of the anterior technique endowed with an only pneumatic action it is had the drawback that if increased the blowing or suction action meaningful fractions of aggregate material are thrown out associated to the pollutants.

[0005] Well comes therefore a machine that realizes superior performances allowing an optimal separation of the aggregate materials from light pollutants that also using itself of the known techniques opportunely modified and combined, bring meaningful innovations to the state of the technique.

Purposes and advantages of the invention

[0006] Purpose of the present invention is that to realize a combined machine, easily adaptable on fittingses of treatment and recycling different, automatic, to double pneumatic action, essentially constituted by a vibrating distributor connected to a regulating blowing, a net ribbon connected to an suction device, a ribbon conveyor and elements of unloading and recovery, in degree to effect with best efficiency in comparison to the known types, the selection of the crushed stone aggregates and the separation of the light parts from them.

[0007] The assignments, the purposes and others that will be underlined subsequently better are reached by a machine for the cleaning of the aggregate materials

characterized by the fact that it realizes on the flow of material to treat preventively stratified for specific weight and form through vibratory motion, the separation of the aggregates from the light pollutants with a double contemporary action of blowing and suction.

Description of the drawings and way of realizing the invention.

[0008] These and other characteristics as well as advantages will result evident from the following description and from the enclosed drawings furnished to only indicative purpose and not limitative in which:

the fig. 1 show, in a three-dimensional sight, the general one of the machine.

the fig. 2 show schematically in a sight in side plant the various components of the machine;

the fig. 3 show schematically in a back sight the various components of the machine;

the fig. 4 show a detail of the blowing suction system according to the present invention.

[0009] With reference to the drawings is pointed out with (1) the vibrating distributor consists of a rectangular container tray supported by large springs (2) attached to the frame (3) animated by a vibratory motion and has a pierced base for around three quarters of its length, The material to be treated in precedence submitted to shattering, ferritization and granulation so that treated of a specific particle size ot greater than 100 mm. it reaches to an extremity of vibrating distributor and because of the vibratory motion it advances and curtains to stratify itself for the different specific weights and coefficients of form, preparing the heaviest parts in low, essentially crushed stone aggregates, fragments of concrete, tiles, plasters, plasters and the lightest parts aloft, essentially wood, plastics, insulating materials , paper, torn, cans while the possible particles thinner of the aggregate they extend to cross the fund perforated of the distributor and recover.

[0010] In proximity of the three quarters of his length, the distributor (1) has a rung (4) that carries the distributor surface to a lower level (5), this time with no pierced surface, where the material opportunely stratified curtains to fall.

[0011] There is a pressurized air effusion mouth (6) in correspondence to the rung (4), which intercepts, in an upward direction, the material falling onto the lower surface (5), and pushes the heaviest materials away from the lighter ones, which tend to float, free from gravity.

[0012] The air is blown by an electric fan (7) positioned in the lower part of the machine which uses a flexible tube (8) to send the air to a fixed, slotted tube (9) that is an integral part of the distributor (1).

[0013] The light fraction of aggregate materials in suspension sort object of an action of lifting subsequently

comes through aspiration. In fact the mouth of a pipe (10), connected to an electric fan (11), positioned between metal mesh conveyor belt lines (12), assembled crosswise and directly above the surface (5), carries out a suction action on the light parts, already blown towards the belt mesh (12), so that these meet the lower mesh of the rotating belt (12) and are dragged and left to fall, and then collected in a container (13).

[0014] Any finer pollutant particles cross through the belt mesh (12) and are carried to a cyclone (14), where they are brought down and collected in a specific container (15). The mesh of the belt (12) is continually cleaned by the pollutant particles that stick to the mesh are blown off by the air, carried away by an air diversion and left to fall into the container (13).

[0015] The heavy fraction of aggregate completely cleaned from dust and light pollutants, falls onto the conveyor belt (16) situated below and longitudinally to the machine and is recovered for use.

[0016] By working on the specific valves, one can adjust the quantity of air sucked up or blow out, in order to treat the materials making up the heterogeneous mixture appropriately

[0017] From how much previously described and illustrated it can be seen that the invention reaches the preceded purposes, allowing a rational treatment of the results materials so that to select and to recover in optimal way the crushed stone aggregate cleaned from light pollutants; in fact under the combined action of the gravity, of the inertia of the aggregates, of the carry and of the due maintenance to the flow of air, the various constituent bodies the aggregate are forced to effect diversified trajectories making an effective discrimination and a differentiation so possible according to the density, of the coefficient of form and the dynamic inertia of the single constituent heterogeneous bodies the aggregate.

[0018] The machine is well protected from integrated pannellings so that to avoid every dispersion of dusty air in the environment.

Claims

1. Machine for cleaning crushed stone aggregate from light pollutants **characterized by** the fact that it creates, on the flow of material to be treated of a specific particle size no greater than 100 mm, stratification by specific weight and form through a vibrating distributor (1) and has a dual pneumatic action consisting: of blowing the material that has fallen onto a lower surface (5) in an upward direction and contemporary suction of the lightest particles already blown towards the belt mesh (12).
2. Machine for cleaning aggregate as in claim 1) **characterized by** the fact that the vibrating distributor (1) consists of a rectangular container tray support-

ed by large springs (2) attached to the frame (3) and has a pierced base for around three quarters of its length.

3. Machine for cleaning aggregate as in claims 1) and 2) **characterized by** the fact that the distributor (1) has a rung (4) that carries the distributor surface to a lower level (5), with no pierced surface.
4. Machine for cleaning aggregate as in claims 1) and 3), **characterized by** the fact that there is a pressurized air effusion mouth (6) in correspondence to the rung (4), which intercepts, in an upward direction, the material falling onto the lower surface (5), and pushes the heaviest materials away from the lighter ones, which tend to float, free from gravity.
5. Machine for cleaning aggregate as in claims 1) and 4) **characterized by** the fact that the air is blown by an electric fan (7) positioned in the lower part of the machine which uses a flexible tube (8) to send the air to a fixed, slotted tube (9) that is an integral part of the distributor (1).
6. Machine for cleaning aggregate as in claims 1), 2) and 3) **characterized by** the fact that the mouth of a pipe (10), connected to an electric fan (11), positioned between metal mesh conveyor belt lines (12), assembled crosswise and directly above the surface (5), carries out a suction action on the light parts, already blown towards the belt mesh (12), so that these meet the lower mesh of the rotating belt (12) and are dragged and left to fall, and then collected in a container (13).
7. Machine for cleaning aggregate as in claims 1) and 6) **characterized by** the fact that any finer pollutant particles cross through the belt mesh (12) and are carried to a cyclone (14), where they are brought down and collected in a specific container (15), while the pollutant particles that stick to the mesh are blown off by the air, carried away by an air diversion and left to fall into the container (13).
8. Machine for cleaning aggregate as in one or more of the previous claims **characterized by** the fact that the heavy fraction of aggregate completely cleaned from dust and light pollutants, falls onto the conveyor belt (16) situated below and longitudinally to the machine and is recovered for use.
9. Machine for cleaning aggregate as in one or more of the previous claims **characterized by** the fact that, by working on the specific valves, one can adjust the quantity of air sucked up or blow out, in order to treat the materials making up the heterogeneous mixture appropriately.

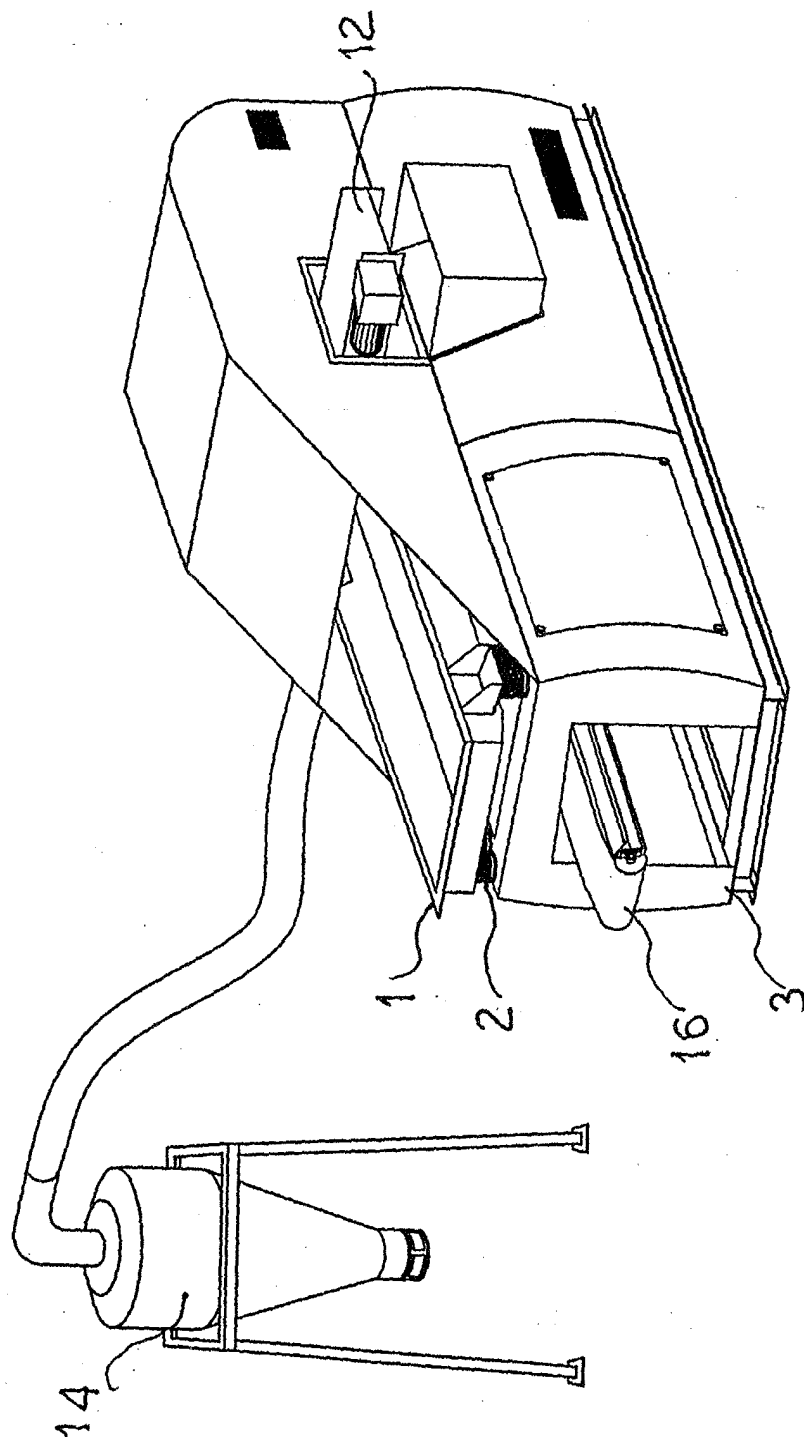


FIG. 1

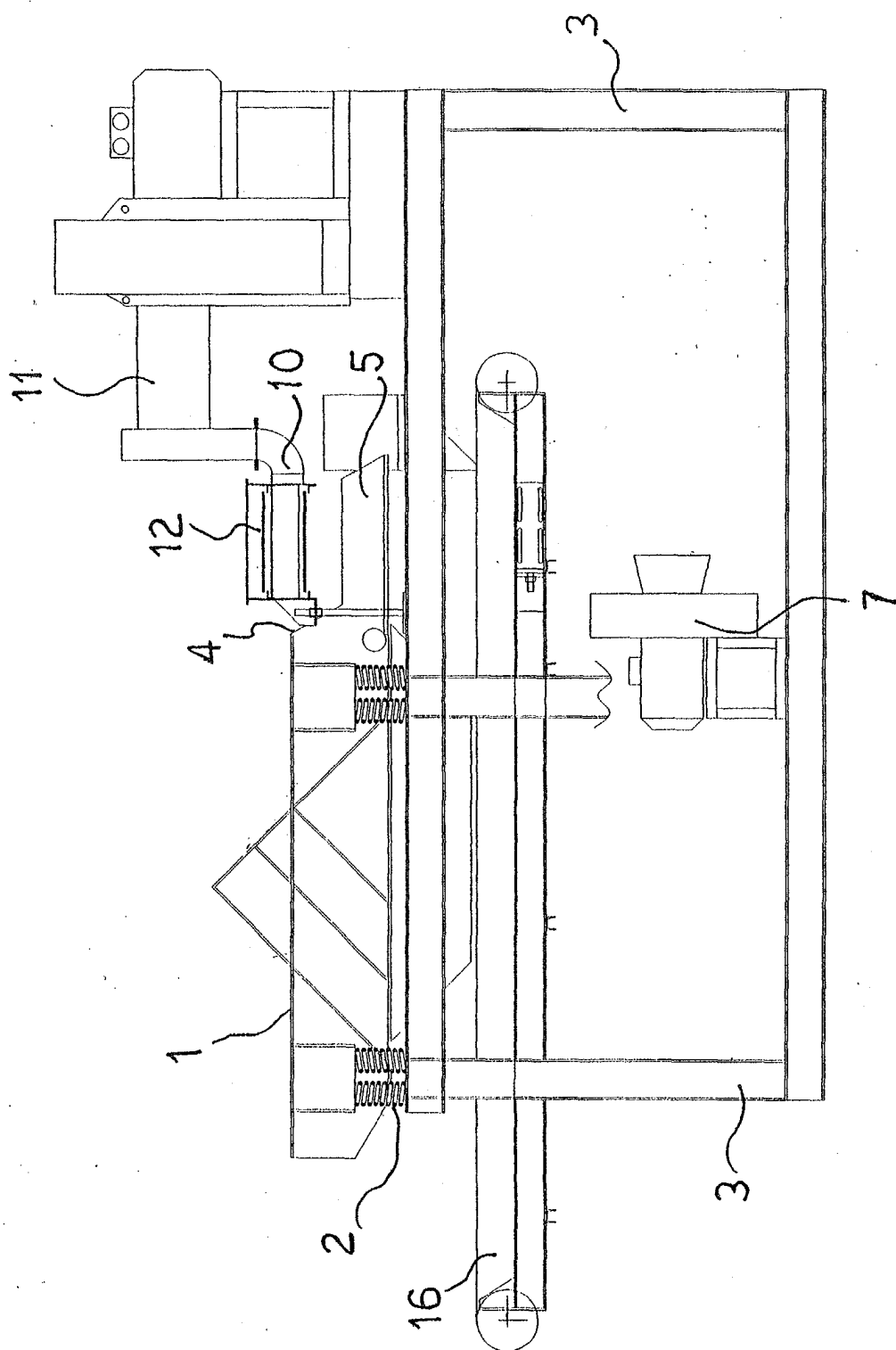


FIG. 2

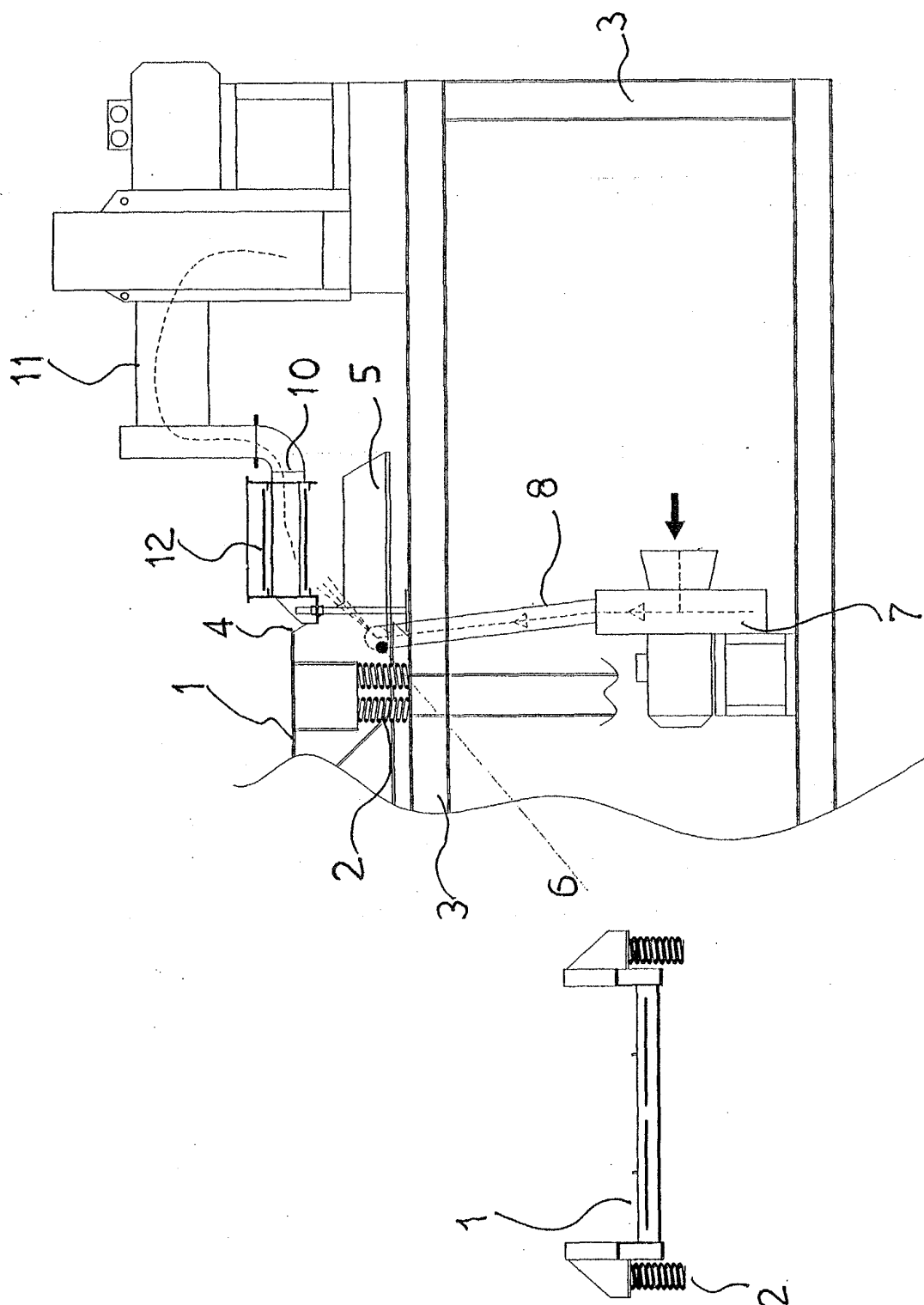


FIG. 4

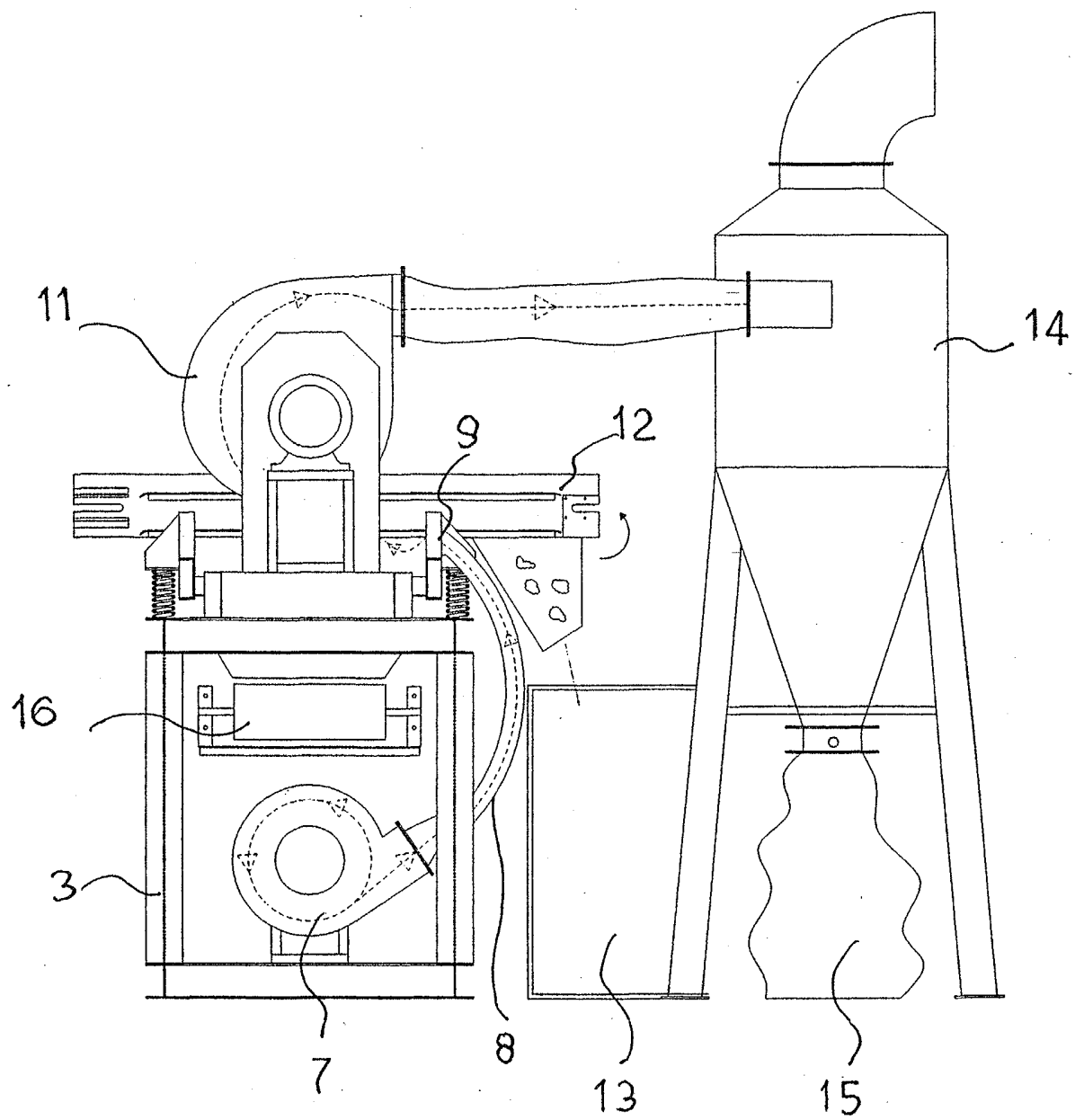


FIG.3



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EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5522

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	PATENT ABSTRACTS OF JAPAN vol. 1999, no. 14, 22 December 1999 (1999-12-22) -& JP 11 262732 A (NIIGATA ENG CO LTD), 28 September 1999 (1999-09-28)	1	B07B4/02 B07B7/06 B07B9/02 B07B9/00 B07B11/06
Y	* abstract; figures *	2-6,9	
Y	DE 19 11 846 U (E. BLUTHARDT) * page 5, paragraph 2 - page 7; figures *	2-6,9	
X	US 5 358 121 A (ROBAK CASIMIR B ET AL) 25 October 1994 (1994-10-25) * column 4, line 57 - column 6, line 47 *	1,9	
Y	* column 8, line 17 - line 35; figures 1,2 *	2-8	
Y	WO 01 00326 A (FRANSSON LARS ;FRANSSONS VERKSTAEDER AB (SE)) 4 January 2001 (2001-01-04) * the whole document *	2-8	
Y	US 4 242 197 A (ROTHERT HORST ET AL) 30 December 1980 (1980-12-30) * column 5, line 32 - column 6, line 19; figure 1 *	1-7	TECHNICAL FIELDS SEARCHED (Int.Cl.7) B07B B03B
Y	DE 197 02 253 A (HUELSMANN INES ;HUELSMANN INGO (DE)) 30 July 1998 (1998-07-30) * column 1, line 53 - column 2, line 40; figures *	1-7	
A	PATENT ABSTRACTS OF JAPAN vol. 1997, no. 03, 31 March 1997 (1997-03-31) -& JP 08 309287 A (NKK CORP), 26 November 1996 (1996-11-26) * abstract; figures 1-4 *		
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 14 January 2004	Examiner Leitner, J
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			

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

EP 03 42 5522

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
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14-01-2004

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
JP 11262732	A	28-09-1999	NONE		
DE 1911846	U		NONE		
US 5358121	A	25-10-1994	NONE		
WO 0100326	A	04-01-2001	AU	6040200 A	31-01-2001
			WO	0100326 A1	04-01-2001
US 4242197	A	30-12-1980	CH	575785 A5	31-05-1976
			AT	350486 B	11-06-1979
			AT	29976 A	15-11-1978
			AU	497901 B2	18-01-1979
			AU	1140376 A	01-09-1977
			BE	838301 A1	28-05-1976
			BR	7601207 A	14-09-1976
			CA	1034541 A1	11-07-1978
			DE	2544964 A1	16-09-1976
			DK	67876 A	28-08-1976
			ES	445029 A1	16-05-1977
			FI	760119 A	28-08-1976
			FR	2302148 A1	24-09-1976
			GB	1497772 A	12-01-1978
			IE	42268 B1	02-07-1980
			IT	1054565 B	30-11-1981
			JP	51107557 A	24-09-1976
			LU	74206 A1	23-07-1976
			NL	7600819 A	31-08-1976
			SE	411521 B	14-01-1980
			SE	7600555 A	30-08-1976
DE 19702253	A	30-07-1998	DE	19702253 A1	30-07-1998
JP 08309287	A	26-11-1996	JP	3282459 B2	13-05-2002

EPO FORM P0459

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