

FORM 1

623732

COMMONWEALTH OF AUSTRALIA

PATENTS ACT 1952

APPLICATION FOR A STANDARD PATENT

I\We,

OY TAMPELLA AB

of Lapintie 1, SF-33100
Tampere
FINLAND

hereby apply for the grant of a standard patent for an invention entitled:

METHOD AND APPARATUS FOR WETTING
THE PARTICLES CONTAINED IN A GAS FLOW.

which is described in the accompanying complete specification

Details of basic application(s):

Number of basic application	Name of Convention country in which basic application was filed	Date of basic application
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890517

FI

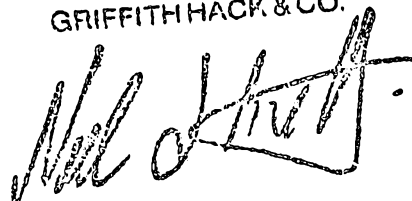
03 FEB 89

My/our address for service is care of GRIFFITH HACK & CO.,
Patent Attorneys, 601 St. Kilda Road, Melbourne 3004,
Victoria, Australia.

DATED this 01st day of February 1990

OY TAMPELLA AB

GRIFFITH HACK & CO.



TO: The Commissioner of Patents.

M 015593 010290

AUSTRALIA
PATENTS ACT 1952

APPLICATION
BY ASSIGNEE
OF INVENTOR

DECLARATION IN SUPPORT OF AN APPLICATION
FOR A PATENT

NAME OF
APPLICANT

In support of an application made by:
OY TAMPELLA AB

TITLE

for a patent for an invention entitled: METHOD AND APPARATUS FOR
WETTING THE PARTICLES CONTAINED IN A GAS FLOW.

FULL NAME AND
ADDRESS OF
SIGNATORY

I, Hannu Rusanen Raimo Hopia
of Eskonpolku 1 M Palomäentie 16
SF-33920 Pirkkala SF-33230 Tampere; Finland

do solemnly and sincerely declare as follows:

1. I am authorised by the above mentioned applicant for the patent to make
this declaration on its behalf.

FULL NAME AND
ADDRESS OF
INVENTOR(S)

2. The name and address of each actual inventor of the invention
is as follows:
Pentti JANKA, Janislammenkatu 9, SF-33410
Tampere, Finland

SEE NOTES OVER

3. The facts upon which the applicant is entitled to make this application
are as follows:

The said applicant is the assignee of the
actual inventor

DELETE PARAGRAPHS
3 AND 4 FOR
NON-CONVENTION
APPLICATION

4. The basic application(s) as defined by Section 141 of the Act was (were)
made as follows:

Country Finland on 3rd February 1989
in the name(s) Oy Tampella Ab
and in _____ on _____
in the name(s) _____

PLACE AND DATE OF
SIGNING

5. The basic application(s) referred to in the preceding paragraph was
(were) the first application(s) made in a Convention country in respect of
the invention the subject of this application.

Declared at Tampere
this 23rd day of April 19 90

Signed *Hannu Rusanen* *Raimo Hopia*
Position The Head of the Sales Manager
Department

GRIFFITH HACK & CO

PATENT AND TRADE MARK ATTORNEYS

MELBOURNE · SYDNEY · PERTH

(12) PATENT ABRIDGMENT (11) Document No. AU-B-49004/90
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(54) Title
METHOD AND APPARATUS FOR WETTING THE PARTICLES CONTAINED IN A GAS FLOW

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(56) Prior Art Documents
GB 720465
GB 1582232

(57) Claim

1. A method for wetting the particles contained in a gas flow, characterized in that a first and a second gas flow is separated from a common overall gas flow upstream of wetting, the first gas flow substantially including the particles of overall gas flow which particles are wetted at a wetting stage, and that said first and second gas flows are combined into an aggregate gas flow downstream of wetting stage.

4. An apparatus for wetting a particles-bearing gas flow, characterized by comprising:

- means for wetting a first, particles-bearing gas flow and

- means for aggregating said first, particles-bearing, wetted gas flow and a second gas flow which is substantially free of particles.

AUSTRALIA

623732

PATENTS ACT 1952

Form 10

COMPLETE SPECIFICATION

(ORIGINAL)

FOR OFFICE USE

Short Title:

Int. Cl:

Application Number:
Lodged:

Complete Specification-Lodged:
Accepted:
Lapsed:
Published:

Priority:

Related Art:

TO BE COMPLETED BY APPLICANT

Name of Applicant: OY TAMPELLA AB

Address of Applicant: Lapintie 1, SF-33100
Tampere
FINLAND

Actual Inventor:

Address for Service: GRIFFITH HACK & CO.,
601 St. Kilda Road,
Melbourne, Victoria 3004,
Australia.

Complete Specification for the invention entitled:
METHOD AND APPARATUS FOR WETTING
THE PARTICLES CONTAINED IN A GAS FLOW.

The following statement is a full description of this invention including the best method of performing it known to me:-

Method and apparatus for wetting the particles contained in a gas flow

The present invention relates to a method for wetting the particles contained in a gas flow.

In processes, which deal with gas flows containing particles, such as dust, there are several reasons for wetting the particles. Such processes include e.g. increasing the separating capacity of an electric filter and the desulfuration of combustion gases particularly when a gas flow contains alkaline particles, e.g. calcium oxide particles (CaO).

In the presently available methods, a wetting medium, such as water is added in a particles-bearing gas flow in a manner that the entire gas flow is brought under the influence of a wetting medium. Especially when it is not desirable to decrease the temperature of a gas flow, e.g. combustion or flue gases, below the temperature corresponding to the dew point of said gas flow, a problem results from the fact that the particles contained in a gas flow cannot be thoroughly wetted but the wetting thereof remains incomplete. The incomplete wetting is a problem especially in a venturi-type wetting process.

An object of this invention is to introduce an improved method for wetting the particles contained in a gas flow so that the particles can be wetted completely but, nevertheless, in a manner that other contributing factors having effect on the process, such as temperature corresponding to the dew point of a gas flow, can be made correct for a proper function of the process.

In order to achieve this object, a method of the invention is principally characterized in that a first and a second gas flow are separated from the same overall gas flow prior to wetting, said first gas flow substantially including the particles of said overall gas flow which are wetted at a wetting stage and that said first and second gas flows are brought together into a combined gas flow after the wetting stage.

The method is based on the fact that the first gas flow has a relatively high particle density compared to the overall and combined gas flows. The overall gas flow is separated into a partial flow which contains essentially all particles carried in the overall gas flow, the particle density in a thus produced first gas flow being high compared to the overall and combined gas flows. Thus, the amount of wetting medium can considerably exceed that amount of wetting medium which is capable of going below the temperature corresponding to the dew point of the first gas flow. Thus, the first gas flow and particles contained therein can be wetted effectively. If the particles contain alkali oxides, such as calcium oxide (CaO), they are effectively turned into hydroxides, such as calcium hydroxide ($(\text{Ca})\text{OH}_2$). Calcium hydroxide reacts effectively with sulphur dioxide. Following the wetting stage, into the first gas flow is combined a second gas flow which is a partial flow separated from the overall gas flow prior to wetting and which is led to the point of aggregation in a mechanically separated fashion. When the first wetted gas flow and a second gas flow, which is substantially free of particles, are combined or aggregated, the temperature of the aggregate gas flow and other quantities bearing an effect on the process can be made favourable in view of a proper function of the process. Particularly, if tem-

perature of the aggregate gas flow exceeds a temperature corresponding to the dew point of the gas flow, the sulphur retaining reactions occur in the entire gas flow.

~~The annexed non-independent claims set forth preferred embodiments for a method of the invention.~~

The invention relates also to an apparatus for wetting a gas flow which contains particles. The apparatus is principally characterized by comprising

- means for wetting a first particles-bearing gas flow and
- means for combining the first particles-bearing, wetted gas flow and a second gas flow which is substantially free of particles.

The use of an apparatus of the invention serves to offer the benefits of the invention.

The annexed non-independent apparatus claims set forth preferred embodiments for the apparatus.

The invention will now be described in more detail in the following specification, a few preferred embodiments of the method being described in more detail with reference made to the accompanying drawings. In the drawings

fig. 1 is a schematic view of a first apparatus for use in the application of a method of the invention and

fig. 2 is another schematic view of a second apparatus for use in the application of a method of the invention.



In figs. 1 and 2, reference numeral 1 indicates generally an overall gas flow from which is separated a first gas flow 2, which contains substantially all particles of the overall gas flow, and a second gas flow 3 which is substantially free of particles. Furthermore, reference numeral 4 indicates means in connection with the first gas flow passage for wetting the first gas flow. Moreover, an aggregate gas flow comprising a combination of the overall gas flow and the wetting medium is shown with reference numeral 5.




Fig. 1 illustrates an embodiment of the apparatus, wherein the separating means comprises a so-called grid separator 6 and fig. 2 illustrates an embodiment of the apparatus, wherein the separating means comprises a cyclone separator 7. Both separator means operate on dynamic principle. The degree of separation can range from 50 % to 95 %. The share of the first gas flow from the overall gas flow can range from 5 % to 50 %.

Especially the grid separator 6 shown in fig. 1 comprises plates 8 or the like mounted successively in the direction of flow within the area defined by the cross-section of a flow channel 9, said plates defining a preferably converging passage in the centre of the flow channel for the first, particles bearing gas flow. In this context, the grid separator refers to the above plate-like structure which is a so-called dynamic separator whose separating effect is based on a diversion occurring in the gas flow. The second gas flow comprises a flow occurring through the area defined between plates 8 or the like mounted successively in the direction of flow, said second flow being substantially free of particles as a result of the fact that said second gas flow 3 is created as a combination of partial flows running against the

direction of flow. In order to achieve a wetting process, a means 4 for wetting the first gas flow is placed in a suitable position in the passage of said first gas flow 2. The injection of a wetting medium, such as water, can be effected by means of one or a plurality of nozzles. The atomization of a wetting medium can be effected by the pressure of a wetting medium or by means of the medium. The first 2 and second 3 gas flows are combined in flow channel 9 downstream of the ~~beam~~^{grid} separator, the wetted particles being scattered in aggregate gas flow 5.

Fig. 2 illustrates an embodiment of the method operating also on dynamic principle by means of a cyclone separator 7 and based on the fact that the bottom section 10 of a cyclone separator is used for discharging a first gas flow 2 which is wetted by using a means 4 located in a flow channel 11 communicating with the bottom section of a cyclone separator. The central tube 12 of a cyclone separator is used for discharging upwards from the cyclone separator a second gas flow 3 along a flow channel 13. The first 2 and second 3 gas flows are combined e.g. in a joint 14 at the bottom section of cyclone separator 7 and advanced further to the following process steps.

The apparatus is based on passing first 2 and second 3 gas flow separated from the overall gas flow separately from each other to the location of building an aggregate gas flow 5. In the case of a grid separator, between flow channel 9 and plates 8 passes a second 3 gas flow while the first one 2 runs between plates 8 past a wetting means 4. In the case of a cyclone separator, a second 3 gas flow is passed to joint 14 along central tube 12 and flow channel 13 while a first 2 gas flow passes into joint 14 from the bottom section of a cyclone separator.



THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A method for wetting the particles contained in a gas flow, characterized in that a first and a second gas flow is separated from a common overall gas flow upstream of wetting, the first gas flow substantially including the particles of overall gas flow which particles are wetted at a wetting stage, and that said first and second gas flows are combined into an aggregate gas flow downstream of wetting stage.

2. A method as set forth in claim 1, characterized in that the first gas flow is wetted at wetting stage with an amount of water which is larger than the amount of water resulting in a temperature below a temperature corresponding to the dew point of first gas flow and that the second gas flow is selected in terms of its volume flow and temperature in a manner that a temperature corresponding to the dew point of aggregate gas flow is exceeded.

3. A method as set forth in claims 1 and 2, characterized in that the first gas flow takes up from 5 % to 50 % of aggregate gas flow.

4. An apparatus for wetting a particles-bearing gas flow, characterized by comprising:

- means for wetting a first, particles-bearing gas flow and

- means for aggregating said first, particles-bearing, wetted gas flow and a second gas flow which is substantially free of particles.



5. An apparatus as set forth in claim 4, c h a r a c -
t e r i z e d in that the apparatus further includes a
separator means for separating first . . and
second gas flow from an overall flow arriving
at separator means and that the separator means
is on the one hand connected to means for wetting
the first gas flow and on the other hand connected
to a means for aggregating the second , and
first gas flows.

6. An apparatus as set forth in claims 4 and 5, c h a r -
a c t e r i z e d in that said means for wetting
the first gas flow comprises one or a plurality of
nozzles.

7. An apparatus as set forth in claim 5, c h a r a c -
t e r i z e d in that said separator means , com-
prises a dynamic separator.

8. An apparatus as set forth in claim 7, c h a r a c -
t e r i z e d in that the separator means comprises a
grid separator .

9. An apparatus as set forth in claim 7, c h a r a c -
t e r i z e d in that the separator means comprises a
cyclone separator .

DATED THIS 21st DAY OF January 1992

OY TAMBELLA AB

By its Patent Attorneys:

GRIFFITH HACK & CO.

Fellows Institute of Patent
Attorneys of Australia.



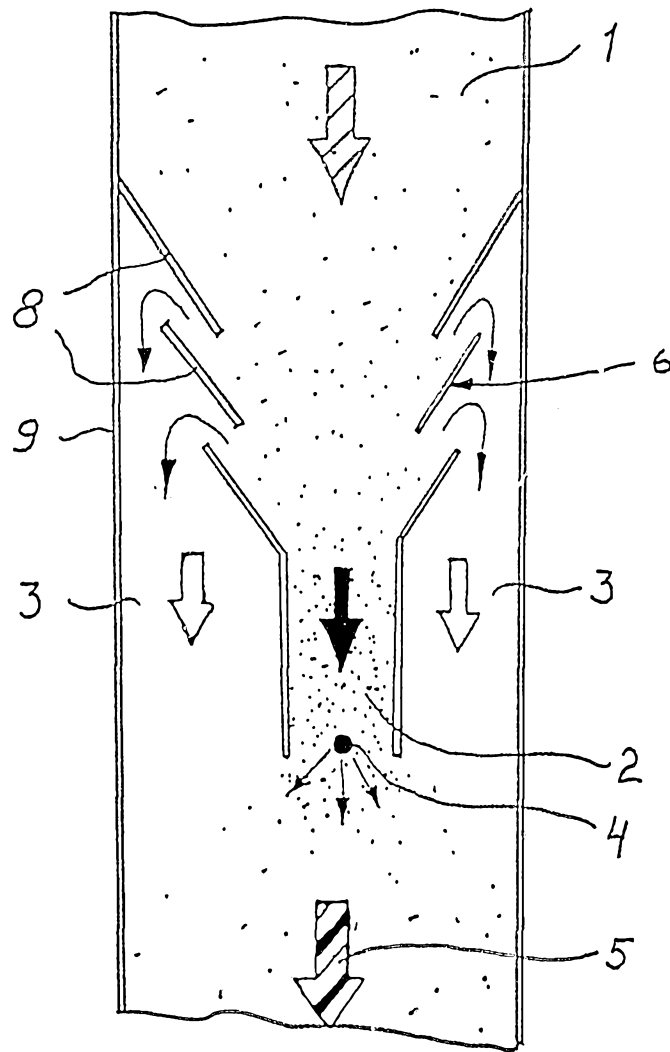


Fig 1

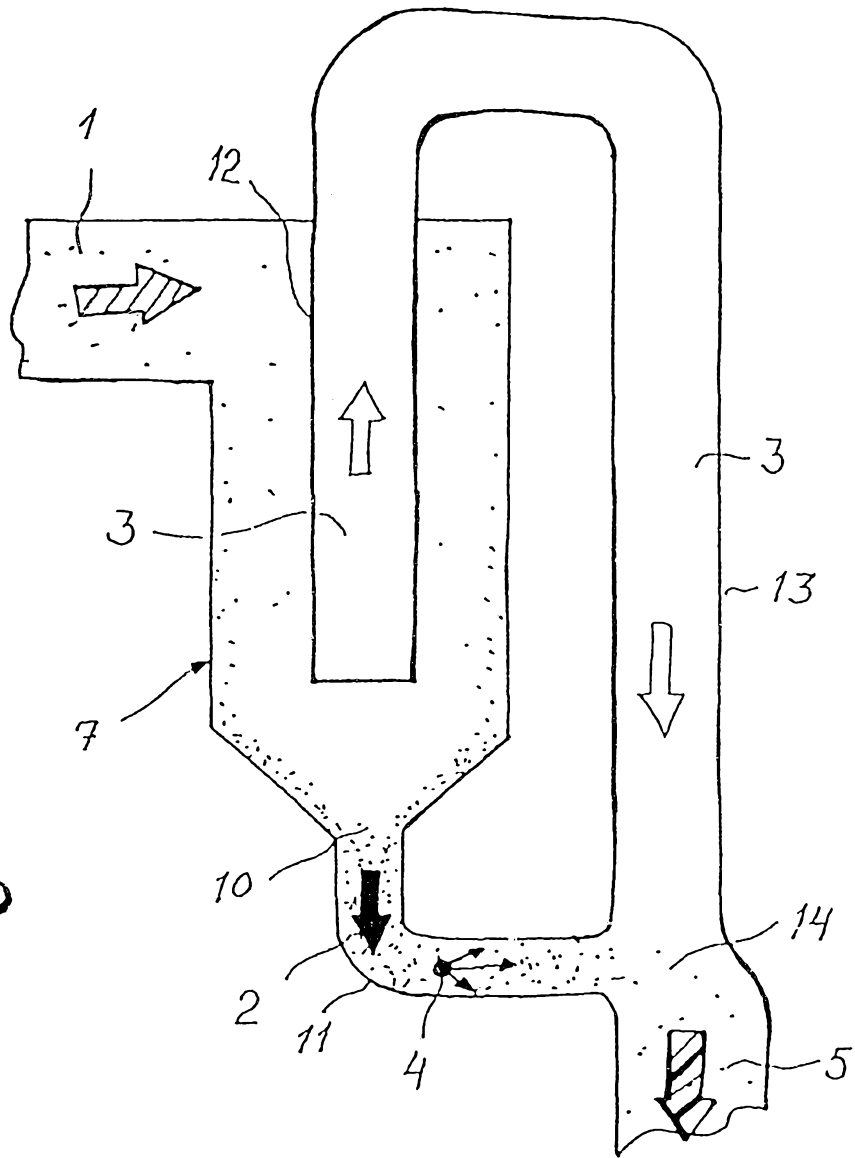


Fig 2