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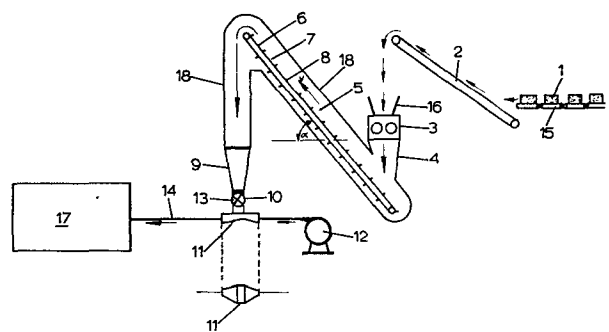
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Apparatus for metering and blowing a combustible material into a furnace.

Apparatus for metering and blowing combustible material into a furnace, a rotating compartment valve (10) for the material which opens downwardly into a venturi (11) which is energized by a fan (12) and is connected to a conduit (14) for transport of the material to the furnace and blowing it into the furnace. To make the apparatus capable of handling a wide range of materials, including fluff (sheet material from domestic refuse) there is provided a volume-metering device (5) which supplies the material to the rotating compartment valve (10). Preferably the volume flow capacity of the rotating compartment valve (10) is substantially greater than that of the volume-metering device (5).



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APPARATUS FOR METERING AND BLOWING A COMBUSTIBLE
MATERIAL INTO A FURNACE

The invention relates to apparatus for
5 metering and blowing a combustible material into a
furnace, e.g. a cement kiln. Particularly but not
exclusively the combustible material may be a
material reclaimed from domestic refuse (RDF) for
example a loose non-compressed combustible material
10 reclaimed from domestic refuse, mainly comprising
paper and plastics, known as "fluff".

According to its type and composition,
several kinds of RDF (refuse derived fuel) are
known. In the case of pellets, the combustible
15 material is compressed to a granular material of a
relatively high density. Fluff is loose material,
mainly comprising paper and plastics with a maximum
size, e.g. 200 mm, determined by a grinding process
preceding the reclamation thereof. Fluff has a low
20 density and forms a resilient mass which can be
compressed to bales.

It has already been suggested to burn RDF in
a furnace. In the case of a cement kiln, the ashes
of the RDF can be incorporated in the cement without
25 reducing the quality thereof. Fuel is saved by

burning RDF.

One possible method of feeding combustible material, in this case pulverized coal, into a furnace is illustrated in US-A-2 011 133 where the coal is metered from a hopper by a rotating compartment feeder opening below into a venturi which is energized by a fan and connects directly into a pneumatic conveying line leading to the furnace. The hopper includes agitators to ensure that the compartments of the feeder are filled.

FR-A-2 500 122 shows in Fig. 1 an inclined conveyor which lifts combustible material in the form of lumps, e.g wood, maize cobs, straw balls, into a chute down which they feed by gravity into a furnace. The conveyor has projecting bars to catch the material. To meter the material into the furnace, a rotating compartment valve may be provided in the chute.

The object of the invention is to provide apparatus for metering and blowing combustible material into a furnace, which can handle a variety of materials, especially but not exclusively the fluff described above.

The invention is set out in claim 1.

With the apparatus according to the

invention, a regular supply of the RDF or other material to the furnace takes place. The risk of clogging of the apparatus is avoided or minimized.

5 Preferably, the volume metering device for the combustible material comprises an upwardly inclined belt conveyor carrying compartments for the removal of the combustible material from a storage container, e.g. bin or bunker. Preferably, in that case, the compartments are formed by catch plates at
10 right angles to the belt direction and the belt runs at an angle α in the range 30° to 80° to the horizontal. Although pellets can be metered by this preferred embodiment, it is especially suitable for volume metering of combustible material in the form
15 of fluff. When metering apparatuses already known are used, such as for instance a horizontal conveyor belt and a wiping device, like a doctor blade, by which the level of the combustible material on the conveyor belt is controlled, the quantity of fluff
20 which is metered is to a large extent dependent on the instantaneous properties of the fluff such as its density and compressibility.

The combustion value of RDF is, as a rule, not constant but varies depending on the kind of
25 RDF, and also on its origin, the season of the year

etc. Preferably, therefore, the speed of the belt conveyor is adjustable, so that the supply rate of RDF to the furnace can be controlled.

5 Preferably, the capacity of the rotating compartment valve is considerably larger than the capacity of the volume metering device. As a consequence, clogging is prevented.

10 For good design of the apparatus, the venturi has its axis located at right angles to the axis of rotation of the rotating compartment valve. This improves the regularity of supply of RDF to the furnace.

15 The invention provides advantages in particular in the metering and blowing of fluff into a cement kiln, but is not limited thereto, and an apparatus of the invention can be capable of handling a variety of materials. For instance, the invention can just as well be applied to the alternating burning of fluff and RDF pellets in a
20 cement kiln, or to the burning of RDF pellets only, or to the burning of another combustible material such as peat or lignite. The invention can also be applied to the burning of a combustible material in a different kind of furnace, for instance a
25 travelling grate furnace or a fluidized bed furnace.

An embodiment of the invention will be described below by way of example with reference to the accompanying drawing in which Figure 1 shows schematically a side view of the apparatus embodying the invention.

On the right-hand side in Figure 1, the supply of the combustible material is indicated, for the specific case in which fluff compressed in bales is processed. The bales move on a supply roller conveyor 15 and are subsequently lifted by means of an inclined belt 2 from which they pass into a mill 3 via a hopper 16. If there is only a short distance between a refuse separation apparatus and the furnace, the fluff reclaimed from domestic refuse can alternatively be supplied in bulk.

The loose material obtained from the mill 3 is collected in a storage bin or bunker 4 and removed therefrom with a volume metering device 5 which comprises an upwardly inclined plate belt 6, on which compartments 7 are mounted. The compartments are formed by catch plates 8 arranged at right angles to the plate belt and thus to the direction of movement of the upward run of the plate belt, which is an angle α in the range 30° to 80° to the horizontal. The quantity of combustible

material removed from the bin 4 by each compartment and thus the rate of removal, corresponds to the size of the compartments and the angle of repose of the combustible material.

5 The material removed from the bin 4 by the volume metering device 5 is discharged into a hopper 9, from which a rotating compartment valve or rotor lock 10 is fed. The volume metering device has a casing 18 connected to the hopper 9. Below the
10 rotor lock 10, there is a venturi 11 in open connection with the outlet side of the rotor lock 10. The venturi 11 is energized by a fan 12. Each time one of the compartments 13 of the rotor lock 10 comes in open communication with the venturi, the
15 combustible material is carried with an air flow generated by the fan 12 into a pipeline 14 coupled to the venturi. This pipeline 14 runs to the furnace 17, which is indicated schematically. In this way, pneumatic transport and blowing into the
20 furnace 17 of the combustible material take place.

 The speed v of the plate belt 6 and the size of the compartments 7 which together determine the capacity of the volume metering device 5 and the rotating speed of the rotor lock 10 and the size of
25 the compartments 13 are chosen so that the capacity

of the rotor lock 10 is, at all times, considerably larger than the capacity of the volume metering device 5. As a consequence, clogging is prevented.

5 The speed of the plate belt 6 is adjustable by a control, so that the rate of supply of combustible material to the furnace can be controlled.

10 The axis of the venturi 11 is arranged at right angles to the axis of rotation of the rotor lock 10, so that a regular supply of combustible material to the furnace is obtained. Also, the rotor lock 10 discharges vertically above the venturi 11, which promotes the falling of combustible material into the air flow.

CLAIMS

1. Apparatus for metering and blowing
combustible material into a furnace, having a
rotating compartment valve (10) for the material
5 which opens downwardly into a venturi (11) which is
energized by a fan (12) and is connected to a
conduit (14) for transport of the material to the
furnace and blowing it into the furnace
characterized by
10 a volume-metering device (5) for the material which
supplies the material to the rotating compartment
valve (10).
2. Apparatus according to claim 1 wherein the
volume-metering device is an inclined belt conveyor
15 (6) carrying compartments (7) for the removal of the
combustible material from a storage container (4)
therefor.
3. Apparatus according to claim 2 wherein the
compartments (7) are formed by catch plates (8)
20 which extend at right angles to the direction of
movement of the belt conveyor, and the belt conveyor
(6), at least in its run which conveys the material
out of the storage container (4), is inclined at an
angle in the range 30° to 80° to the horizontal.
- 25 4. Apparatus according to claim 2 or claim 3

wherein the speed of the belt conveyor (6) is adjustable.

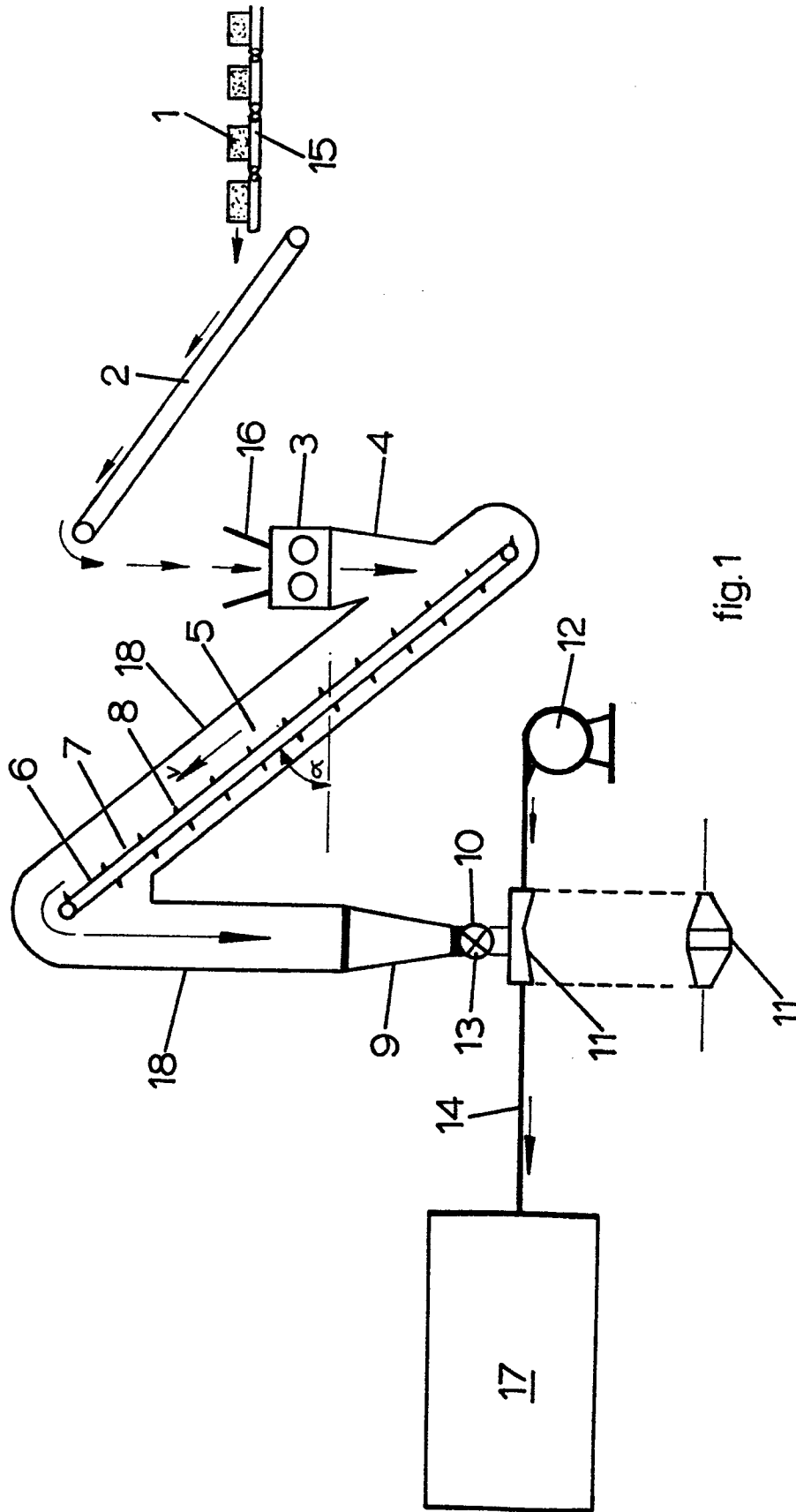
5 5. Apparatus according to any one of the preceding claims wherein the volume flow capacity of the rotating compartment valve (10) is arranged to be substantially greater than that of the volume-metering device (5).

10 6. Apparatus according to any one of the preceding claims wherein the axis of the venturi (11) is perpendicular to the rotation axis of the rotating compartment valve (10).

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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.4)
D,Y	US-A-2 011 133 (YOSS) * Page 1, right-hand column, line 45 - page 2, left-hand column, line 50; page 2, right-hand column, lines 46-70; figures 1,3-5 *	1,6	F 23 K 3/02 F 23 G 5/44
Y	--- US-A-3 387 574 (MULLEN) * Column 5, lines 5-27,32-58; figure 2 *	1,6	
A	---	2	
A,D	--- FR-A-2 500 122 (HERON) * Page 1, lines 1-11; page 4, line 26 - page 5, line 30; page 6, lines 5-19; figures 1,3 *	1,2,4	
A	--- PATENTS ABSTRACTS OF JAPAN, vol. 7, no. 50 (M-197) [1195], 26th February 1983; & JP - A - 57 198 919 (ISHIKAWAJIMA HARIMA JUKOGYO K.K.) 06-12-1982	2,3	TECHNICAL FIELDS SEARCHED (Int. Cl.4) F 23 K F 23 G B 65 G
A	--- GB-A-1 067 194 (KOPPERS)		
A	--- US-A-1 422 867 (KARYCHEFF)		
A	--- US-A-4 377 117 (KOLZE)		
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The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 09-12-1985	Examiner PHOA Y.E.

EPO Form 1503 03 82

CATEGORY OF CITED DOCUMENTS

- X : particularly relevant if taken alone
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- 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

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.4)
A	AU-B- 86 331 (PRENTICE) (A.D. 1966) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 09-12-1985	Examiner PHOA Y.E.
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			