

P A T E N T C L A I M S

1. A powder drying system comprising
at least one powder processing unit (1), and
at least one filter unit (400) defining a central vertical axis (405) and
5 including
a filtering chamber (401) accommodating a plurality of bag filters
(407), each having a bag filter wall and a top opening,
a top portion (402), and
an exhaust chamber (403) at or near the top portion (402),
10 in which the filtering chamber (401) is provided with an inlet (410)
configured to allow entry of powder carrying gas to be filtered by passing
through the bag filter wall of the bag filters (407), and the exhaust chamber
(403) has an outlet (420) configured to allow exhaust of filtered gas flowing
upwards from the bag filters through the top opening thereof,
15 **characterized in that**
the inlet (410) of the filtering chamber (401) is positioned at the top
portion (402) of the filter unit (400), and that said inlet (410) includes at least
one inlet duct section (415) adjacent the filtering chamber (401) and arranged
substantially centrally in the top portion (402) of the filter unit (400).
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2. A powder drying system according to claim 1, wherein said at least
one inlet duct section (415) is arranged substantially in parallel with the
central vertical axis (405) such that the gas entering the filter unit (400) is
allowed to flow substantially downwards.
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3. A powder drying system according to claim 2, wherein said at least
one inlet duct section (415) is substantially coaxial with the central vertical
axis (405) such that the gas is allowed to enter the filtering chamber (401)
substantially along the central vertical axis (405).
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4. A powder drying system according to claim 2 or 3, wherein said at
least one inlet duct section comprises an internal duct (415) adjacent the

filtering chamber (401) and extending substantially in parallel with the central vertical axis (405), a transitional duct (413) and an angled duct (411) extending at substantially right angles to the internal duct (415).

5 5. A powder drying system according to claim 4, wherein the distance between the angled duct (411) and the end of the internal duct (415) adjacent the filtering chamber (415) exceeds the length of a bag filter (407).

10 6. A powder drying system according to claim 4 or 5, wherein the internal duct (415) at the end adjacent the filtering chamber (401) has a hexagonal shape.

15 7. A powder drying system according to any one of the preceding claims, wherein the outlet (420) is connected horizontally to the exhaust chamber (403) at the top portion (402) of the filter unit (400).

8. A powder drying system according to claim 7, wherein the outlet (420) comprises a transitional duct (421) and a straight duct (423),

20 9. A powder drying system according to claim 8, wherein the edges (421a) between the transitional duct (421) and the exhaust chamber (403) and/or the edges (421b) between the transitional duct (421) and the straight duct (423) are rounded.

25 10. A powder drying system according to claim 8 or 9, wherein the cross-section of the straight duct (423) is substantially circular and the cross-section of the transitional duct (421) is variable from a substantially rectangular cross-section at the connection to the exhaust chamber (403) and substantially circular at the end adjacent the straight duct (423).

30 11. A powder drying system according to any one of the preceding claims, wherein said plurality of bag filters (407) comprises at least 50 bag

filters (407), preferably at least 100 bag filters (407), and more preferably at least 200 bag filters (407), and even more preferably at least 400 bag filters (407).

5 12. A powder drying system according to any one of the preceding claims, further comprising a number of bag filter segments (409), wherein each includes a plurality of bag filters (407).

10 13. A powder drying system according to claims 6 and 12, wherein the number of bag filter segments (409) is six, corresponding to a respective side of the hexagonal end of the internal duct (415).

15 14. A powder drying system according to any one of the preceding claims, wherein the bag filters are no longer than 6 m, preferably no longer than 5 m.

20 15. A powder drying system according to any one of the preceding claims, wherein the bag filters have a diameter (D) in the range of 10 to 25 cm, preferably in the range 15 to 20 cm, and even more preferably in the range 17 to 19 cm.

25 16. A powder drying system according to any one of the preceding claims, wherein the distance (S) between bag filters is no more than 5 cm, preferably no more than 4.5 cm.

 17. A powder drying system according to any one of the preceding claims, wherein the powder processing unit of the powder drying system (1) comprises a spray dryer with a drying chamber (2).

30 18. A powder drying system according to any one of the preceding claims, wherein the filter unit (400) further comprises a cleaning arrangement (430) including at least one nozzle (431) associated to a respective bag filter

(407) for cleaning thereof

19. A powder drying system according to claim 18, wherein further comprising a cleaning arrangement having a plurality of nozzles (431),
5 wherein the nozzles have nozzle inlet diameter (i), a nozzle throat diameter (t), a nozzle exit diameter (e), and a length (L), and wherein the ratio between the nozzle throat diameter (t) and the length (L) lies in the range 0.02 to 0.2, preferably 0.05 to 0.15, and even more preferably 0.07 to 0.13.

10 20. A powder drying system according to any one of the preceding claims, wherein said plurality of bag filters (407) is located in the space between the periphery of the filter unit (400) defined by a central portion (406) of the filter unit (400) and the periphery of the extension of inlet duct section (415) adjacent the filtering chamber (401).

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21. A method of operating a filter unit (400) of a powder drying system, said filter unit (400) defining a central vertical axis (405) and including a filtering chamber (401) accommodating a plurality of bag filters (407), each having a bag filter wall and a top opening, a top portion (402), and an exhaust
20 chamber (403) with an outlet (420) at or near the top portion (402), comprising the steps of:

providing the filter unit (400) with an inlet (410) at the top portion (402) of the filter unit (400),

25 supplying gas to be filtered to the filtering chamber (401) via the inlet (410),

allowing the gas to pass through the bag filter wall and upwards in the plurality of bag filters (407) and into the exhaust chamber (403) via the top opening of the respective bag filters of said plurality of bag filters (407), and discharging the filtered gas through the outlet (420).

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