as filtering space for bag filters. The improved utilization of the available space entails that it is either possible to increase the capacity of a filter unit with unchanged length of the bag filters, or reduce the length of the bag filters. In case it is chosen to reduce the length of the bag filters, the inventive concept thus alleviates the disadvantages of the prior art arrangements in that it is possible to obtain a reduced weight of each bag filter and without the need for joints, in addition to reducing the problems associated with pressure drop and vibrations.

In a preferred embodiment, the distance between the angled duct and the end of the internal duct adjacent the filtering chamber exceeds the length of the plurality of bag filters.

In a preferred embodiment, said at least one inlet duct section is arranged substantially in parallel with the central vertical axis such that the gas entering the filter unit is allowed to flow substantially downwards. This configuration increases the advantages of the invention and contributes in particular to the reduction of detrimental flow conditions in the filtering chamber.

In a development of this preferred embodiment, said at least one inlet duct section is substantially coaxial with the central vertical axis such that the gas is allowed to enter the filtering chamber substantially along the central vertical axis. This increases the advantages even further.

In another preferred embodiment, the bag filters are no longer than 6 m, preferably no longer than 5 m.

In a second aspect of the invention, a method of operating a filter unit of such a powder system is devised.

Further presently preferred embodiments and further advantages will be apparent from the following detailed description and the appended dependent claims.

Brief description of the drawings

The invention will be described in more detail below by means of non-limiting examples of presently preferred embodiments and with reference to the schematic drawings, in which:

Fig. 1 shows a schematic view of the main components of a powder drying system in an embodiment of the invention;

Fig. 2 shows a schematic cross-sectional view of a filter unit in an embodiment of the invention;

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 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),

in which the filtering chamber (401) is provided with an inlet (410) configured to allow entry of processed 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,

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 adjacent the filtering chamber (401) and arranged substantially centrally in the top portion (402) of the filter unit (400) and wherein said at least one inlet duct section comprises an internal duct (415) adjacent the filtering chamber (401), a transitional duct (413) and an angled duct (411) extending at substantially right angles to the internal duct (415), wherein said internal duct (415) is arranged substantially coaxial with the central vertical axis (405) such that the gas entering the filter unit (400) is allowed to flow substantially downwards along the central vertical axis,

wherein the distance between the angled duct (411) and the end of the internal duct (415) adjacent the filtering chamber (401) exceeds the length of the plurality of bag filters (407).

2. A powder drying system according to claim 1, wherein the internal duct (415) at the end adjacent the filtering chamber (401) has a hexagonal shape.

3. 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).

4. A powder drying system according to claim 3, wherein the outlet (420) comprises a transitional duct (421) and a straight duct (423),

5. A powder drying system according to claim 4, wherein the edges (421a) between the transitional duct (421) of the outlet and the exhaust chamber (403) and/or the edges (421b) between the transitional duct (421) of the outlet and the straight duct (423) are rounded.

6. A powder drying system according to claim 4 or 5, wherein the cross-section of the straight duct (423) is substantially circular and the cross-section of the transitional duct (421) of the outlet 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).

7. 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).

8. 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).

9. A powder drying system according to claims 2 and 8, wherein the number of bag filter segments (409) is six, corresponding to a respective side of the hexagonal end of the internal duct (415).

10. 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.

11. 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.

12. 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.

13. 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).

14. 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

15. A powder drying system according to claim 14, wherein further comprising a cleaning arrangement having a plurality of nozzles (431), 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.

16. 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).

17. 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 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) said inlet (410) being substantially coaxial with the central vertical axis,

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).