CLAIMS

1. A positive air pressure attenuation device (1) specifically adapted for use in a drainage system (D) of a building for draining at least draining liquid material, the device comprising:

- a housing (3) including a structure for connecting the housing (3) to the drainage system (D) and being associated to a pipe (3A) with an inlet (4), an outlet (5) different from the inlet (4), and an inner central portion (6) located within the housing (3), said inner central portion (6) forming a channel (7) for conducting draining liquid material from the inlet (4) towards the outlet (5), said channel (7) having a central axis (A); and
- an elastic flexible inflatable reservoir (8) associated to the inner central portion (6) of the pipe (3A), the reservoir (8) being operable on a positive air pressure transient within the drainage system (D), said flexible reservoir (8) defining a reservoir chamber (8A) with a variable inflatable volume, said flexible reservoir (8) being at least partly made to withstand a maximum positive air pressure transient of at least 5,000 Pa, advantageously comprised between 10,000 Pa and 2,000,000 Pa, preferably comprised between 10,000 Pa and 500,000 Pa, advantageously comprised between 10,000 Pa and 100,000 Pa,

whereby the inner central portion (6) of the pipe (3A) has a wall portion (60) extending within the reservoir chamber (8A), said wall portion (60) being provided with a plurality of openings (61) forming passages between the channel (7) and the reservoir chamber (8A), said wall portion (60) defining a total closed surface within the reservoir chamber (8A) and a total open surface between the channel (7) and the reservoir chamber (8A),

whereby said plurality of openings (61) comprises:

(a) one or more than one, preferably two or more than two lower elongated openings (61L) located in the inner central portion (6) adjacent to the outlet (5), said one or more lower elongated openings (61L) having a portion with an axis (B) substantially parallel to the central axis (A) of the inner central portion (6), and

(b) one or more than one, preferably two or more than two upper openings (61U) located in the inner central portion (6) adjacent to the inlet (4), said plurality of openings (61) defining a total open surface such that the ratio total open surface of the openings (61) / total closed surface of the wall (60) is comprised from 1 : 100 to 1 : 4, advantageously from 1:50 to 1:8, preferably 1:40 to 1:10,

and characterized in that

the inner central portion (6) is located within the housing (3) between said inlet (4) and outlet (5),

the housing (3) forms an external casing (9) covering at least partly the flexible reservoir (8) and having at least one air passage way (10) adapted for ensuring at least the portion of the flexible reservoir located into the housing (3) to be in contact with atmospheric air during operation of the device, and in that

the housing (3) has a central axis (C) parallel to the central axis (A) of the inner central portion (6), distant or eccentric from the central axis (A) from the inner central portion (6).

2. The positive air pressure attenuation device of claim 1, in which said plurality of openings (61) comprises also one or more intermediate openings (61I) located in the inner central portion (6) extending at a level comprised between the plane perpendicular to the central axis (A) comprising the upper point of the lower elongated opening(s) (61L), and the plane perpendicular to the central axis (A) comprising the lower point of the upper opening(s) (61U).

3. The positive air pressure attenuation device of claim 2, in which the one or more upper openings (61U) and /or the one or more intermediate openings (61I) is/are elongated opening(s) having a portion with an axis (B) substantially parallel to the central axis (A) of the channel (7).

4. The positive air pressure attenuation device of any one of the claims 2 to 3, in which the one or more lower openings (61L), the one or more upper openings (61U) and the one or more intermediate openings (61I) are each elongated openings.

5. The positive air pressure attenuation device of any one of the claims 1 to 4, which comprises at least one line of openings comprising a lower opening (61L), an upper opening (61U), and a plurality of intermediate openings (61I), whereby said line of openings or said lines of openings extend parallel to the central axis (A) of the channel (7).

6. The positive air pressure attenuation device of any one of the claims 1 to 5, in which the inner central portion (6) is provided with a plurality of slot intermediate openings (61I) located between the lower elongated openings (61L) and the upper openings, advantageously the upper elongated openings (61U), whereby two successive slot intermediate openings are dis-

tant from each other by a distance measured parallel to the central axis (A) in the range of 5mm to 100mm.

7. The positive air pressure attenuation device of the preceding claim, in which the slot intermediate openings (61I) and/or elongated slot lower opening(s) and/or elongated slot upper opening(s) have a length in the range of 5mm to 300mm, and an average breadth in the range of 5 to 30mm.

8. The positive air pressure attenuation device of any one of the preceding claims, in which the inner central portion (6) has a length in the range of 50cm to 300cm.

9. The positive air pressure attenuation device of any one of the claims 1 to 8, in which the flexible reservoir forms an elastic inflatable flexible containment in which the inner central portion (6) extends, said elastic inflatable flexible containment being made in a gas tight material.

10. The positive air pressure attenuation device of any one of the claims 1 to 9, in which the flexible reservoir (8) defines a free chamber (8A) outside the inner central portion (6), said free chamber (8A) having a maximum volume limited within the housing (3), whereby the free chamber has a maximum volume in the range of 0.5 to 10 times, advantageously in the range of 0.5 to 5 times the volume of the inner central portion (6).

11. The positive air pressure attenuation device of any one of the claims 1 to 10, in which the at least one or more lower elongated openings (61) has/have each an elongated portion (61LA) and a bottom portion (61LB) located downwards the elongated portion (61LA), whereby said bottom portion (61LB) has a breath or diameter comprised between 1.5 and 4 times the average breath of the elongated portion (61LA), said bottom portion (61LB) having preferably a substantially oval or circular form with a diameter or small diameter comprised between 1.5 and 4 times the average breadth of the elongated portion (61LA).

12. The positive air pressure attenuation device of any one of the claims 1 to 11, in which during the operation of the device, the lower end (81) of the reservoir chamber (8A) is adapted to form or is associated to an element (85) for forming a funnel shaped portion with a

bottom communicating with the at least one or more lower elongated openings (61L), so as to enable liquid material present in the reservoir chamber (8A) to flow through said at least one or more lower elongated openings (61L) back into the inner central portion (6).

13. The positive air pressure attenuation device of any one of the claims 1 to 12, in which the inner central portion (6) is provided with three or more than three lines of elongated openings (61), said lines being parallel to the central axis (A) of the inner central portion (6).

14. The positive air pressure attenuation device of any one of the claims 1 to 13, in which the flexible reservoir (8) defines outside the inner pipe of the housing a free volume varying in function of the pressure within the inner pipe from a minimum volume up to a maximum volume, whereby the minimum volume corresponds to a position of the flexible reservoir (8) with respect to the inner central portion (6) for which the flexible reservoir (8) is not inflated and has a flexible wall at least partly contacting the outer face of the central portion (6) of the pipe (3A), while the maximum volume corresponds to a position for which the flexible reservoir (8) is inflated and has a flexible wall at least partly contacting the external casing (9), whereby advantageously the flexible reservoir (8) is such that in its non inflated position, a portion of the wall of the flexible reservoir (8) is not contacting the outer face of the central portion (6) of the pipe (3A), whereby defining a minimum free chamber volume within the flexible reservoir (8), said minimum free chamber volume being advantageously comprised between about 2 to 10% of the maximum air volume of the inflated flexible reservoir (8) contacting the housing (3).

15. Drainage system for a building comprising a drainage stack with at least one substantially vertical drainage portion, whereby said substantially vertical drainage portion comprises or is a positive air pressure attenuation device of any one of the claims 1 to 14.

16. Use of a positive air pressure attenuation device of any one of the claims 1 to 14, in a drainage system of a building.