

CLAIMS

1. A fluid processing device (10) for a beverage preparation machine, said fluid processing device (10) being configured for processing a fluid substance to be introduced into a container (C) for the preparation of a beverage product by mixing of said fluid substance with an ingredient contained in said container (C), said fluid processing device (10) comprising a fluid processing body (12) provided with an inlet portion (14), said fluid processing device (10) being **characterized in that** said fluid processing body (12) comprises:
- at least one inlet means (18) for introducing said fluid substance into said container (C), said at least one inlet means (18) being provided at said inlet portion (14);
 - an outlet portion (16); and
 - at least one outlet means (20) for dispensing said beverage product from said container (C), said at least one outlet means (20) being provided at said outlet portion (16).
2. The fluid processing device (10) according to claim 1, characterized in that said fluid processing body (12) is a needle-shaped fluid processing body (12), comprising at least one end portion (26; 28) configured for perforating, and/or piercing and/or tearing a specific portion or wall of said container (C) before the introduction of said fluid substance into said container (C).
3. The fluid processing device (10) according to claim 1 or 2, characterized in that said fluid processing body (12) further comprises at least one sealing means (22) to be engaged with said container (C) for preventing leakage of said fluid substance and/or said beverage product from said container (C) at least when said fluid substance is introduced into said container (C).
4. The fluid processing device (10) according to claim to any claims 1 to 3, characterized in that said fluid processing body (12) further comprises:
- a first end portion (26) provided at said inlet portion (14), said first end portion (26) being configured for opening said portion or wall of said container (C);

- a second end portion (28) provided at said outlet portion (16); and
 - at least one first inlet conduit (30) arranged within said fluid processing body (12), said at least one first inlet conduit (30) being in fluid communication with said first end portion (26) and with an inlet port (36A) of said fluid processing device (10),
- 5 wherein said at least one inlet means (18) and said at least one outlet means (20) are separate one to another, wherein said at least one inlet means (18) comprises said at least one first inlet conduit (30) and said first end portion (26), wherein said at least one outlet means (20) comprises at least said second end portion (28).

10 5. The fluid processing device (10) according to claim 4, characterized in that said fluid processing body (12) is an elongated body, preferably a vertically oriented elongated body, wherein said first end portion (26), said second end portion (28) and said at least one sealing means (22) are coaxially arranged about a longitudinal axis (A), preferably a vertical axis (A), and wherein said first end portion (26) and/or

15 said second end portion (28) are point shaped portions respectively.

6. The fluid processing device (10) according claim 4 or 5, characterized in that said at least one outlet means (20) comprises at least one outlet conduit (32) which is distinct from said at least one first inlet conduit (30).

20 7. The fluid processing device (10) according to claim 6, characterized in that said at least one outlet conduit (32):

- is a grooved channel provided on the outer surface of said fluid processing body (12); and
- 25 - is in fluid communication with said second end portion (28).

8. The fluid processing device (10) according to claim 4, characterized in that said fluid processing body (12) comprises, between said first end portion (26) and said second end portion (28), an enlarged portion (22A) having a cross-sectional area which is larger than any cross-sectional areas of the portion of said fluid processing body (12) comprised between said first end portion (26) and said enlarged portion (22A), wherein said enlarged portion (22A) is configured for adhering against a wall of said container (C) at a portion of said container (C)

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opened by said first end portion (26), and wherein said at least one sealing means (22) comprises said enlarged portion (22A).

9. The fluid processing device (10) according to claim 8, characterized in that
5 said fluid processing body (12) is a vertically oriented elongated body, wherein said enlarged portion (22A) is provided between said first end portion (26) and said second end portion (28), and wherein said vertically oriented elongated body comprises:
- at least one outlet conduit (32) which is a grooved channel, said at least one
10 grooved channel being provided on an outer surface of said vertically oriented elongated body in said portion comprised between said first end portion (26) and said enlarged portion (22A);
 - a beverage guiding element (50) for guiding the beverage to said second end portion (28), said beverage guiding element (50) being provided between said
15 enlarged portion (22A) and said second end portion (28).

10. The fluid processing device (10) according to claim 9, characterized in that
said at least one grooved channel has a variable open cross section, which
increases or decreases from said first end portion (26) to said enlarged portion
20 (22A).

11. The fluid processing device (10) according to claim 9 or 10, characterized in
that said beverage guiding element (50) has a tapered cross-sectional area which
decreases from said enlarged portion (22A) to said second end portion (28), wherein
25 said beverage guiding element (50) has preferably a cone-shape, and wherein said beverage guiding element (50) has more preferably a truncated cone-shape.

12. The fluid processing device (10) according to any of the preceding claims,
characterized in that it further comprises at least one air or gas inlet bore (24) which
30 is in fluid communication with said at least one inlet means (18).

13. The fluid processing device (10) according to any of the preceding claims,
characterized in that it comprises a second fluid processing body (34) connected to
said fluid processing body (12), said second fluid processing body (34) being

internally provided with a second inlet conduit (36) and comprising a coupling portion (46) for removably coupling said fluid processing device (10) to said beverage preparation machine.

- 5 14. The fluid processing device (10) according to any of the preceding claims, characterized in that it comprises a second fluid processing body (34) connected to said fluid processing body (12), said second fluid processing body (34) being internally provided with a second inlet conduit (36), wherein said second inlet conduit (36) has a decreasing cross-sectional area towards said at least one first inlet conduit (30), wherein said second inlet conduit (36) is preferably provided with
10 at least a first conduit portion (38), having a first predefined cross-sectional area, and with a second conduit portion (40), having a second predefined cross-sectional area which is smaller than said first predefined cross-sectional area, wherein said second conduit portion (40) is placed downstream of said first conduit portion (38)
15 and is in fluid communication with said at least one first inlet conduit (30).

- 15 15. The fluid processing device (10) according to any of the preceding claims, characterized in that at least one through hole (42) is interposed between said at least one first inlet conduit (30) and a second inlet conduit (36), said at least one through hole (42) having an average cross-sectional area which is smaller than both
20 the average cross-sectional area of said at least one first inlet conduit (30) and the average cross-sectional area of said second inlet conduit (36).