CLAIMS

1. – Device (11; 111) for metering one or more powders (A, B) in order to produce a flow (23) of powder(s) and of a carrier gas at a given volume flow rate (V0), the device (11; 111) comprising:
- at least a first source (25) adapted to supply a first flow (27) including a first powder (A) and a first carrier gas (G1) at a volume flow rate substantially equal to the given volume flow rate (V0),
- a source (33) of a carrier gas adapted to supply an adjustment carrier gas flow (35) at a volume flow rate substantially equal to the given volume flow rate (V0),
- an outlet junction (49) for sending said flow (23) of powder(s) and of carrier gas,
- at least a first proportional valve (59) including an inlet (61) connected to the first source (25) to receive the first flow (27), a first outlet (63) for selectively sending a volume percentage X1 of the first flow (27) to the outlet junction (49), and a second outlet (65) adapted to send a volume percentage 100-X1 of the first flow (27), the percentage X1 being between 0% and 100% inclusive and representative of a setting of the first proportional valve (59),
- an adjustment proportional valve (75) including an inlet (77) connected to said source (33) of carrier gas by a first connecting line (G0) to receive at least a fraction of the adjustment carrier gas flow (35), a first outlet (79) adapted to send a volume percentage Y of said fraction, and a second outlet (81) adapted to send a volume percentage 100-Y of said fraction, the percentage Y being between 0% and 100% inclusive and representative of a setting of the adjustment proportional valve (59), and
- a control system (21) adapted to control at least the first proportional valve (59) and the adjustment proportional valve (75) and configured so that the flow (23) of powder(s) and of carrier gas has a volume flow rate substantially equal to the given volume flow rate (V0),
- at least a first recycling system (RA) for recycling at least a part of the first flow (27), and
- at least a first recycling junction (51) connected, upstream, to the second outlet (65) of the first proportional valve (59) to receive the percentage 1 -X1 of the first flow (27) and to the first outlet (79) of the adjustment proportional valve (75) to receive the percentage Y of said fraction and, downstream, to an inlet (53) of the first recycling system (RA), the control system (21) being configured so that the inlet (53) of the first recycling system (RA) receives a volume flow rate substantially equal to the given volume flow rate (V0),
the device (11; 111) also including an aspiration and filtration system (41) connected to an outlet of the first recycling system (RA) and a member (43) for regulating a head loss between the first recycling system (RA) and the aspiration and filtration system (41),
the regulator member (43) being adapted so that a pressure (PO) in the outlet junction (49) and a pressure (PA) in the first recycling junction (51) are substantially equal to one another.

2. – Device (11; 111) according to Claim 1, in which the first proportional valve (59) and the adjustment proportional valve (75) each include an internal diffuser (91) and a switch (93) mobile in rotation relative to the diffuser (91), respectively to divide:
- the first flow (27) into the percentage X1 and the percentage 100-X1, and
- the fraction of the adjustment carrier gas flow (35) into the percentage Y and the percentage 100-Y.

3. – Device (111) according to any one of Claims 1 or 2, in which the outlet junction (49) is moreover connected to the second outlet (81) of the adjustment proportional valve (75) to receive the volume percentage (100-Y) of said fraction,
the device (11; 111) being configured so that the percentage X1 and the percentage Y are substantially equal to one another and said fraction is equal to 100%.

4. – Device (11; 111) according to any one of Claims 1 to 3, further including:
- a second source (29) adapted to supply a second flow (31) including a second powder (B) distinct from the first powder (A) and a carrier gas (G2) at a volume flow rate substantially equal to the given volume flow rate (67), and

- a second proportional valve (67) including an inlet (69) connected to the second source (29) to receive the second flow (31), a first outlet (71) adapted selectively to send a volume percentage X2 of the second flow (31) to the outlet junction (49) and a second outlet (73) adapted to send a volume percentage 100-X2 of the second flow (31), the percentage X2 being between 0% and 100% inclusive and representative of a setting of the second proportional valve (67),
the control system (21) being further adapted to control the second proportional valve (67).

5. – Device (11; 111) according to claim 4, further comprising:
a second recycling system (RB) for recycling at least a part of the second stream (31), and
- a second recycling junction (55) connected, upstream, to the second outlet (73) of the second proportional valve (67) to receive the percentage 100-X2 of the second flow (31) and to the second outlet of (81) the proportional adjustment valve (75) to receive the proportion Y of said fraction and, downstream, to an inlet (57) of the second recycling system (RB),
the control system (21) being configured so that the inlet (57) of the second recycling system (RB) receives a volume flow rate substantially equal to the given volume flow rate (V0).

6. – Device (11; 111) according to claim 5, wherein the control system (21) is configured so that the percentage Y is substantially equal to the sum of the percentages X1 and X2 and said fraction is equal to 100%.

7. – Device (11; 111) according to any one of claims 1, 2, 4 or 5, including a second line (G4) connecting the first connecting line (G0) to the outlet junction (49) to deliver to the outlet junction (49) a fraction of the adjustment carrier gas flow (35).

8. – 3D printer (1) spraying one or more powder(s) (A, B), including:
- a device (11; 111) according to any one of Claims 1 to 7, and
- at least one nozzle (15) for ejecting said flow (23) of powder(s) and vector gas.