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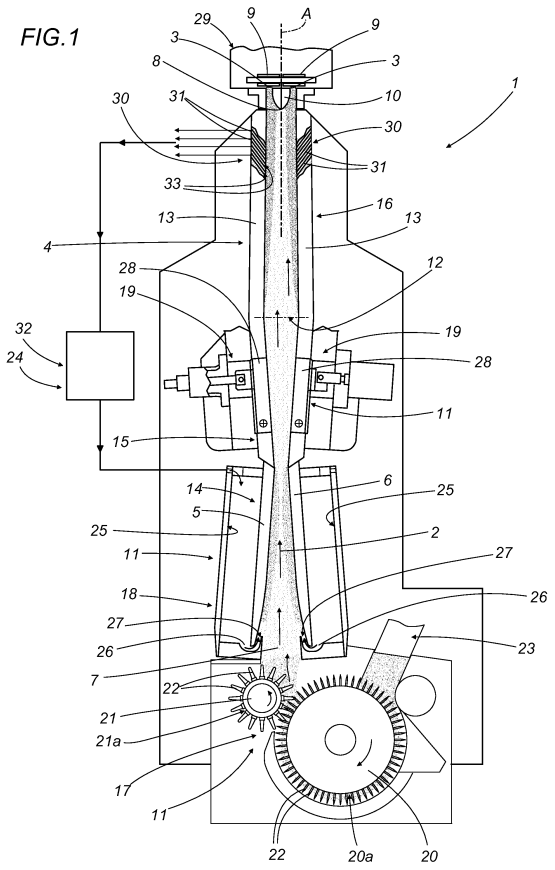
(54) A unit for feeding a rising flow of cut tobacco of a twin-rod cigarette making machine

(57) Described is a unit for feeding a rising flow of cut tobacco of a twin-rod cigarette making machine comprising a channel (4) for feeding the flow (2), which is delimited by two major walls (5, 6), facing each other and substantially vertical; the channel (4) has in turn a lower cross-section (7) for the tobacco infeed, an upper cross-section (8) for the tobacco outfeed, at which two suction belts (9) for transporting the tobacco are positioned, separated from each other by a baffle (10), and an intermediate cross-section (12), through which the tobacco is conveyed with a substantially uniform distribution; the walls (5, 6) of the channel (4) converge on each other, from the intermediate cross-section (12) to the upper cross-section (8) and form deflector elements (13) of the flow (2) towards the belts (9).

FIG.1



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Description

[0001] The present invention relates to a unit for feeding a rising flow of cut tobacco of a twin-rod cigarette making machine.

[0002] The prior art feeding units comprise a vertical duct inside of which a flow of air is generated from the bottom upwards.

[0003] More specifically, the particles, or fibres, of cut tobacco are fed inside the duct from the bottom and, by means of the rising flow of air, are pushed upwards, in the direction of the outfeed, at which two suction belts are positioned, designed to form respective cords of tobacco.

[0004] A separator element, which subdivides the flow of tobacco particles between one conveyor belt and the other, is interposed between the two conveyor belts.

[0005] It is preferable to obtain as even a subdivision as possible of the flow of tobacco particles between one conveyor belt and the other, so as to obtain cords of tobacco with similar densities and dimensions.

[0006] However, the separator element does not guarantee a correct subdivision of the flow, as the latter reaches the vicinity of the separator element with a non-homogeneous distribution of the particles of tobacco.

[0007] The aim of this invention is to provide a unit for feeding a rising flow of cut tobacco of a twin-rod cigarette making machine that overcomes the aforementioned drawbacks of the prior art.

[0008] The aim is achieved by a unit for feeding a rising flow of cut tobacco of a twin-rod cigarette making machine having the features described in the independent claim 1 appended hereto.

[0009] Further features and advantages of the invention are more apparent in the approximate and hence non-limiting description of a preferred, non-exclusive embodiment of a unit for feeding a rising flow of cut tobacco of a twin-rod cigarette making machine illustrated in the accompanying drawings in which:

- Figure 1 is a cross section, with some parts shown schematically and others cut away for clarity, of a feeding unit according to this invention; and
- Figure 2 is an enlarged view of a detail of the unit of Figure 1.

[0010] With reference to Figure 1, the numeral 1 denotes in its entirety a unit for feeding a rising flow 2 of cut tobacco.

[0011] In this description reference will be made to a feeding unit installed on cigarette making machines 1 of the twin line type, which are therefore able to operate on two cords 3 of tobacco at the same time.

[0012] As shown in Figure 1, the unit 1 for feeding a rising flow 2 of cut tobacco comprises a channel 4 for feeding the flow 2, the channel 4 being delimited by a first 5 and a second major wall 6, facing each other and substantially vertical, and having a lower cross-section 7 for the tobacco infeed and an upper cross-section 8 for the tobacco outfeed. At the upper outfeed cross-section 8 there are two suction belts 9 for transporting the tobacco, separated from each other by a baffle 10.

[0013] The suction belts 9, preferably parallel to each other, are movable in a direction of motion perpendicular to the plane of Figure 1 and transversal to the axis A of longitudinal extension of the channel 4. Preferably, the belts 9 are made from fabric material which is permeable to air.

[0014] The baffle 10 interposed between the two belts 9 faces towards the inside of the channel 4 and it comprises a bar parallel to the longitudinal extension of the suction belts 9.

[0015] The unit 1 also comprises means 11 for generating the flow 2 designed for conveying the tobacco with a substantially uniform distribution through an intermediate cross-section 12 of the channel 4, which is interposed between the lower cross-section 7 and the upper cross-section 8. Moreover, the walls 5, 6 of the channel 4 converge on each other, from the intermediate cross-section 12 to the upper cross-section 8 and form, more specifically, deflector elements 13 of the flow 2 towards the belts 9. Looking in more detail, according to the preferred embodiment, the channel 4 is defined by a first stretch 14, a second stretch 15 and a third end stretch 16.

[0016] More specifically, the channel 4 has, from the bottom upwards, a first stretch 14 with converging walls, a second stretch 15 with diverging walls and a third stretch 16 with walls converging in the direction of the outfeed cross-section 8 of the channel 4.

[0017] The term "stretch" means a a defined portion of the channel 4, and specifically in this description the portions are connected to each other and consecutive in pairs.

[0018] Moreover, the third end stretch 16 extends, from the intermediate cross-section 12 to the upper cross-section 8 of the channel 4, for a length substantially equal to one third of the entire length of the channel 4. More specifically, the end stretch 16 of the channel 4 extends for a length, that is, is selected, between 250 mm and 300 mm. Further, the angle of inclination, relative to the longitudinal axis A of the channel 4, of the walls 5, 6 of the end stretch 16 of the channel 4 is, that is, is selected, between 1° and 1 °30', preferably 1 °2'.

[0019] The means 11 for generating the flow 2 comprise a mechanical needle-type device 17 for launching the cut tobacco located at the inlet to the channel 4, mixing means 18 of the flow 2 of cut tobacco located at the lower cross-section 7 and regulating means 19 designed to direct the rising flow 2 of tobacco.

[0020] The mechanical launching device 17 comprises a pair of rotary rollers with axes at right angles to the axis A of the channel 4 and operating in conjunction one with another. The first roller 20, the so-called conveyor roller, picks up the tobacco fed from a storage hopper 23, whilst the second roller 21, the so-called launching roller, projects the tobacco upwards, inside the channel 4. Each

roller 20, 21 has on the relative periphery 20a, 21 a a plurality of needles 22 extending radially from the periphery.

[0021] The mixing means 18 are formed by jets of compressed air introduced into the channel through each of the major walls 5, 6. The jets are generated by a source 24 of compressed air connected with a respective homogenisation chamber 25 for each wall 5, 6 of the channel 4. The homogenisation chambers 25 in turn communicate with the inside of the channel 4 through respective infeed ducts 26, which lead inside the channel 4 through perforations 27 of the major walls 5, 6 so as to strike the rising flow 2 of tobacco in a direction facing the belts 9. More specifically, the jets can be supplied and regulated independently from one another.

[0022] On the other hand, the means 19 for regulating the flow 2 of cut tobacco comprise a pair of walls 28 movable inside the channel 4, commonly known by the term "flaps". Preferably, the walls 28 are movable independently from one another. The means 19 for regulating the flow 2 regulate opportunely the trajectory of the rising flow 2 so as to have an adequate correction, for example, if there is a greater concentration of tobacco on one belt 9 rather than the other.

[0023] In the preferred embodiment, the walls 28 are located at the second diverging stretch 11 of the channel 4.

[0024] According to alternative embodiments, not illustrated, the walls 28 can be located at other stretches of the channel 4.

[0025] As shown in Figure 1, the walls 28 are movable so as to produce a smaller divergence of the second stretch 15 when moved. A manual registration of the position of the walls 28 is possible, either assisted or automatic.

[0026] The feed unit 1 comprises a chamber 29 for extracting the air present in the channel 4 through the upper outfeed cross-section 8 of the channel 4. More in detail, the chamber 29 creates a negative pressure inside the channel 4 which is able to draw the tobacco, from the bottom upwards, in the direction of the outfeed cross-section 8.

[0027] Moreover, there are also means 30 for accelerating the flow 2 of cut tobacco at the end stretch 16 of the channel 4 (Figure 2). The accelerator means 30 are positioned at each of the major walls 5, 6 of the channel 4, close to the outfeed cross-section 8.

[0028] The accelerator means 30 comprise a plurality of ducts 31 connected to a suction unit 32, positioned outside the channel 4, and leading inside the channel 4 through a plurality of holes 33, made in the walls 5, 6. Preferably, the external suction unit 32 coincides with the source 24 of compressed air of the mixing means 18, described above.

[0029] Also, more preferably, the holes 33, made on the major walls 5, 6 of the channel 4, have inclined axes.

[0030] The function of the accelerator means 30 is to increase the negative pressure inside the channel 4 regulating and facilitating the rise of the cut tobacco and the feeding to the suction belts 9.

[0031] According to an embodiment not illustrated, the unit 1 also comprises pneumatic means for forming and introducing a flow of air rising along the channel 4.

[0032] The flow of air, the source of which preferably coincides with the source 24 of compressed air, is introduced at the lower cross-section 7 of the channel 4. The tobacco is therefore facilitated in its rising in the direction of the suction belts 9 under the pushing action of the flow of air.

[0033] As described above, the walls 5, 6 of the channel 4, from the intermediate cross-section 12 to the upper outfeed cross-section 8, act as deflector elements 13 for the rising cut tobacco.

[0034] In more detail, in order to guarantee a balanced subdivision of the rising tobacco between each suction belt 9, so as to guarantee feeding of an equal quantity of tobacco to each belt 9, the channel 4 has the relative end stretch 16 with converging walls.

[0035] Moreover, in order to obtain an effective result, it is desirable that the flow 2 of tobacco entering the end stretch 16, at the intermediate cross-section 12, is characterised by a homogeneous and uniform distribution of the tobacco.

[0036] The walls of the end stretch 16 act as deflector elements 13 since they direct the tobacco present in the outermost area 34 of the rising flow 2 towards the innermost area 35 of the flow 2. In this way, a greater concentration of cut tobacco is obtained at the outermost area 34 of the flow 2, whilst the distribution density at the innermost area 35 remains unaltered and equal to that obtained, using the above-mentioned generation means 11, at the intermediate cross-section 12.

[0037] With a greater concentration of tobacco in the outermost area 34 a greater quantity of tobacco can be conveyed, and equally shared, to each belt 9. At the same time, advantageously, the quantity of tobacco which impacts on the separator baffle 10 reduces. A homogenisation of the tobacco at the intermediate cross-section 12 allows the quantity of tobacco which impacts on the baffle 10 to be minimised, thereby preventing possible deviations to the rising flow 2 close to the suction belts 9 and favouring a more equal sharing of the tobacco.

[0038] In use, the cut tobacco, fed from the storage hopper 23, is introduced inside the channel 4 by the mechanical needle-type launching device 17.

[0039] The rising of the tobacco takes place not only by means of the inertia imparted by the launching device 23 but also by means of a negative pressure present inside the channel 4, made using the extraction chamber 29 and the accelerator means 30, which draws the tobacco, from the bottom upwards, in the direction of the outfeed cross-section 8 of the channel 4.

[0040] During the rising, in the direction of the suction belts 9, the cut tobacco is redistributed, so as to obtain a homogeneous distribution of the flow 2 at the intermediate cross-section 12 of the channel 4. More specifically,

the mixing jets, positioned at the infeed of the channel 4, create a re-mixing of the flow 2 which favours a homogeneous distribution of the tobacco at the intermediate cross-section 12.

[0041] This aspect is particularly advantageous since, as described above, during the transit through the end stretch 16, the tobacco is thickened in the outermost area 34 of the rising flow 2.

[0042] As described above, the tobacco firstly reaches the intermediate cross-section 12 with a homogeneous distribution in the flow 2, and then touches the converging walls of the end stretch 16, undergoing a mechanical action of deviation towards the innermost area 35 of the flow 2 and a consequent accumulation with the tobacco innermost to the flow 2.

[0043] In this way, a better sharing of the rising tobacco is obtained between the suction conveyor belts 9 and at the same time there is a reduction in the quantity of tobacco which, impacting against the separator baffle 10, would create deviations in the lifting flow 2, and, therefore, an incorrect distribution of the tobacco.

[0044] Further, in order to improve and guarantee an equal distribution of the tobacco, the trajectory of the rising flow 2 is regulated.

[0045] The trajectory of the flow 2 of tobacco is regulated using the movable walls 28 of the regulating means 19 so as to compensate for any incorrect distribution between the two suction belts 9.

[0046] Lastly, the cut tobacco is transferred, held by the suction belts 9, in the form of two continuous cords 3 of tobacco.

[0047] The invention described offers important advantages.

[0048] Firstly, an optimum distribution of the tobacco is obtained between each suction conveyor belt 9. More specifically, the unit 1 allows a better balancing of the quantity of tobacco distributed to each belt 9 limiting the quantity of tobacco which impacts on the separator baffle 10.

[0049] The feed unit 1 as describes has overall a simple constructional geometry and it is easy and fast to make and install.

[0050] This latter aspect therefore limits both the construction costs and the costs in the case of modifying existing units.

[0051] The invention described above is susceptible of industrial application and may be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by technically equivalent elements.

Claims

1. A unit for feeding a rising flow of cut tobacco of a twin-rod cigarette making machine; the unit (1) comprising a channel (4) for feeding the flow (2), which is delimited by two major walls (5, 6), facing each other and substantially vertical, and has a lower cross-section (7) for the tobacco infeed and an upper cross-section (8) for the tobacco outfeed, at which two suction belts (9) for transporting the tobacco are positioned, separated from each other by a baffle (10); the unit being **characterised in that** it comprises means (11) for generating the flow (2) designed for conveying the tobacco with a substantially uniform distribution through an intermediate cross-section (12) of the channel (4), which is interposed between the lower cross-section (7) and the upper cross-section (8); and **in that** the walls (5, 6) of the channel (4) converge on each other, from the intermediate cross-section (12) to the upper cross-section (8) and form deflectors elements (13) of the flow (2) towards the belts (9).

2. The feed unit according to claim 1, **characterised in that** the means (11) for generating the flow (2) comprise a mechanical needle-type device (17) for launching the cut tobacco located at the inlet to the channel (4), mixing means (18) of the flow (2) of cut tobacco located close to the lower cross-section (7) of the channel (4) and regulating means (19) designed to direct the rising flow (2) of tobacco.

3. The feed unit according to claim 2, **characterised in that** the mechanical needle-type launching device (17) is formed by a pair of rotary rollers (20, 21) operating in conjunction one with another; each roller (20, 21) having on the relative periphery (20a, 21 a) a plurality of needles (22) extending radially from the periphery (20a, 21 a).

4. The feed unit according to claim 2 or 3, **characterised in that** the mixing means (18) are formed by jets of compressed air introduced through each of the major walls (5, 6) of the channel (4).

5. The feed unit according to claim 4, **characterised in that** the jets are supplied and regulated independently from one another.

6. The feed unit according to any one of claims 2 to 5, **characterised in that** the regulating means (19) of the flow (2) of cut tobacco comprise a pair of walls (28) movable inside the channel (4).

7. The feed unit according to claim 6, **characterised in that** the walls (28) are movable independently from one another.

8. The feed unit according to any preceding claim, **characterised in that** the section of channel (4), from the intermediate cross-section (12) to the upper cross-section (8), extends for a length substantially equal to one third of the entire length of the channel

(4).

9. The feed unit according to any preceding claim, **characterised in that** the section of channel (4), from the intermediate cross-section (12) to the upper cross-section (8), extends for a length of between 250 mm and 300 mm.

10. The feed unit according to any preceding claim, **characterised in that** the angle of inclination of the walls (5, 6) of the channel (4), from the intermediate cross-section (12) to the upper cross-section (8), is between 1 ° and 1 °30', preferably 1 °2', relative to a longitudinal axis of extension (A) of the channel (4).

FIG.1

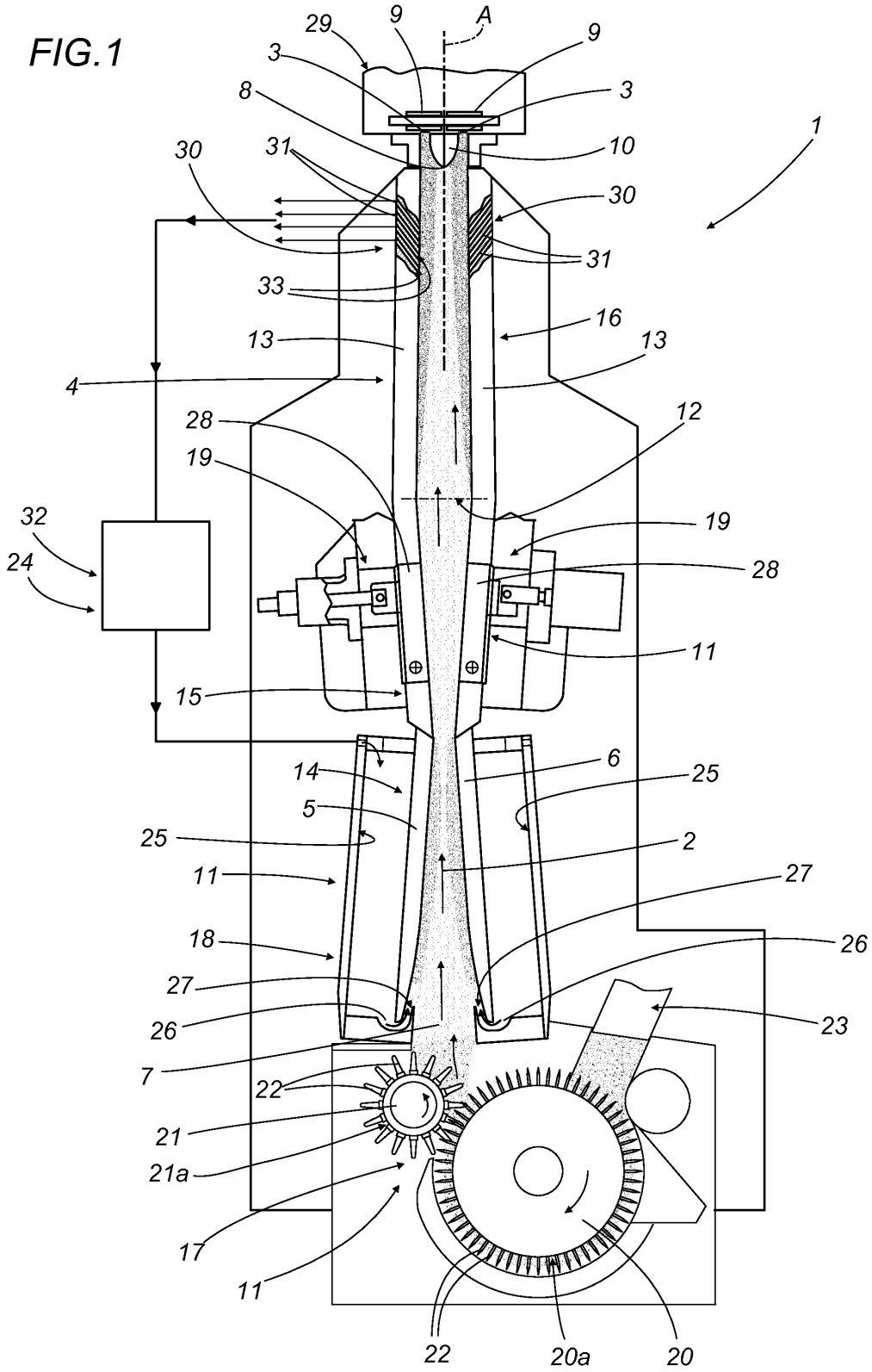
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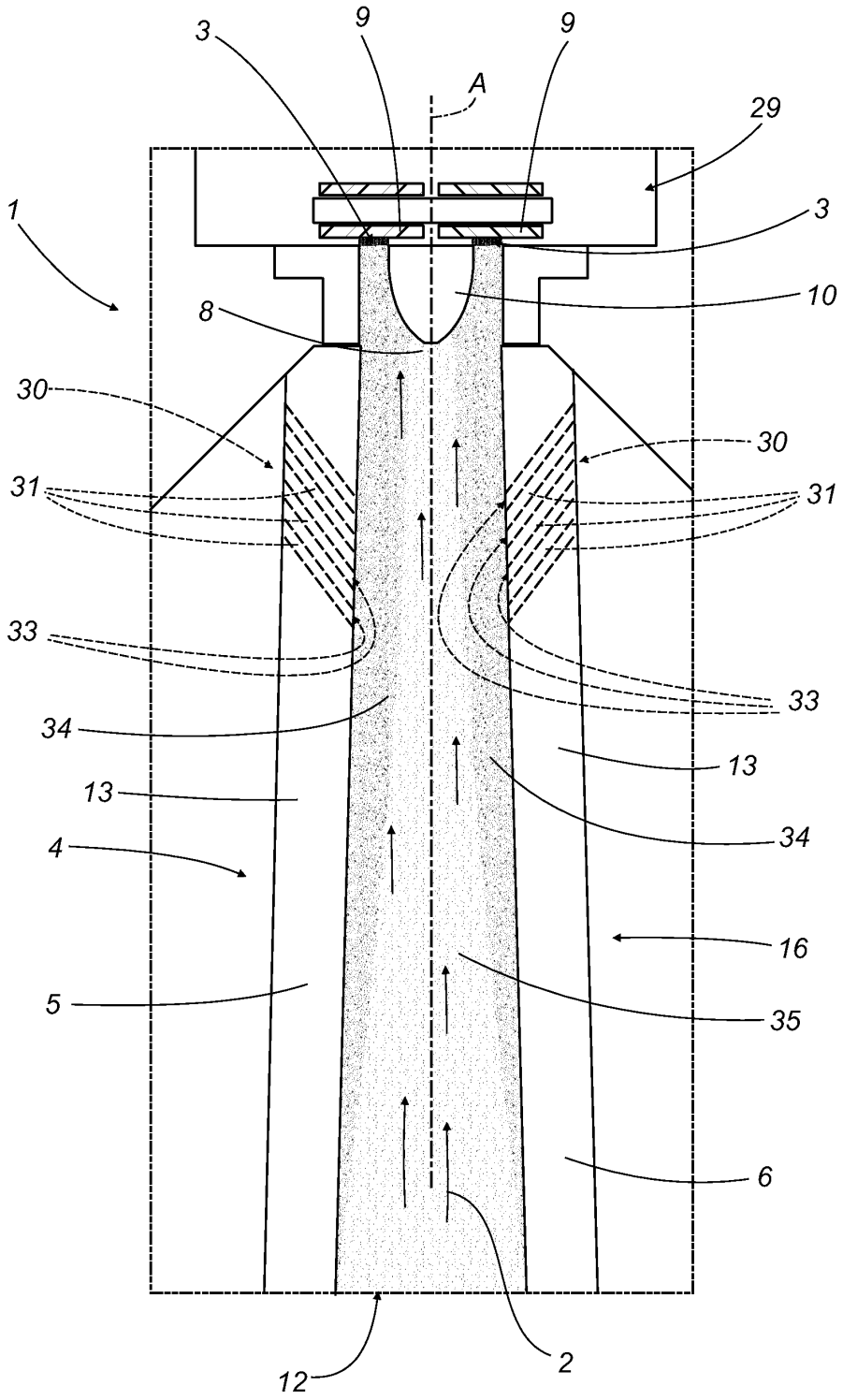
FIG.2



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EUROPEAN SEARCH REPORT

Application Number
EP 12 19 7156

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	12 March 2013	Marzano Monterosso

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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