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(71) Applicant: **G.D S.p.A.**
40133 Bologna (IT)

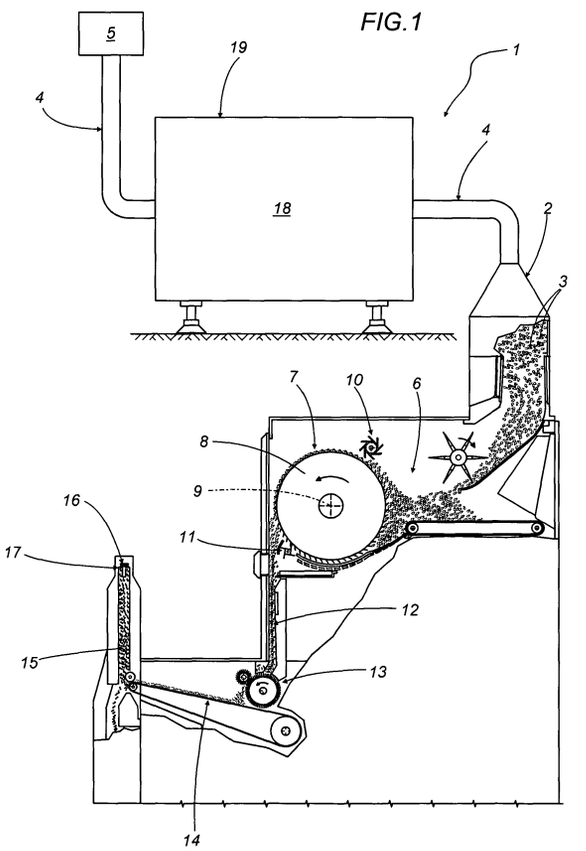
(72) Inventors:
- **Draghetti, Fiorenzo**
  40059 Medicina (Bologna) (IT)
- **Esposti, Marco**
  40033 Caselecchio di Reno (Bologna) (IT)

(74) Representative: **Lanzoni, Luciano**
c/o BUGNION S.p.A.
Via Goito, 18
40126 Bologna (IT)

(54) A cigarette maker

(57) A cigarette maker is equipped with an infeed hopper (2), a pneumatic feed duct (4) carrying a flow of shredded tobacco (3) to the hopper (2), a carding unit (7), a descending channel (12), and an ascending channel (15) by which the tobacco (3) is directed up and onto aspirating conveyor belt (16). A separator device (18) installed upstream of the infeed hopper (2) and designed to remove foreign matter from the flow of shredded tobacco (3) is packaged as a module (19), coupled into the feed duct (4), comprising a first section (20) isolated from pneumatic pressure in the duct (4), and a second section (21) in which pneumatic pressure is reinstated; tobacco (3) advancing through the first section (20) is thinned on a conveyor belt (25) and loosened on a vibrating tray (27) in such a way as to disentangle the constituent particles and stems and redistribute the flow as a layer of relatively limited thickness, thereby favouring separation of the foreign matter.

FIG.1



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Description

[0001] The present invention relates to a cigarette maker.

[0002] In a typical cigarette making machine, shredded tobacco is directed normally along a feed duct to an infeed hopper, from which it is taken up by a picking or carding unit and fed into a descending channel or chute.

[0003] At the bottom end of the chute, the tobacco is transferred by a toothed outfeed unit onto a feed conveyor and then carried by this same conveyor toward the bottom end of an ascending channel or riser, of which the top end is enclosed by an air-permeable transport belt.

[0004] An air current set up in the ascending channel, generated at least in part by suction through the permeable belt, ensures that the lighter particles of tobacco consisting in dust and relatively minute shreds are directed upwards, whereas any heavier particles such as scraps and stems, stones, metal or plastic fragments and the like, are caused to drop by gravity into a collection vessel at the bottom end of the ascending channel, from where they are rejected.

[0005] Whilst the method outlined above is effective enough, it can present certain drawbacks inasmuch as the carding unit is susceptible to damage from the heavier particles, and in particular the metal or plastic foreign matter.

[0006] The object of the present invention is to provide a cigarette maker that will be unaffected by the drawbacks in question, and will also be of simple and economic embodiment.

[0007] The stated object is realized according to the present invention in a cigarette maker of which the characterizing features are as recited in claim 1, and preferably as in any of the subsequent claims dependent on claim 1.

[0008] The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- figure 1 illustrates a cigarette maker equipped with a separator device embodied in accordance with the present invention, viewed schematically and in elevation and with parts in section;
- figures 2, 3 and 4 illustrate three embodiments of the separator device indicated in figure 1, viewed schematically and in elevation and with parts in section;
- figure 5 is a plan view of the device illustrated in figure 2.

[0009] Referring to figure 1 of the drawings, 1 denotes a cigarette maker, in its entirety, comprising a hopper 2 filled with a mass of shredded tobacco 3, and a pneumatic feed duct 4 through which tobacco is conveyed to the hopper from a storage unit or a shredder shown schematically as a block denoted 5.

[0010] The tobacco 3 is directed from the hopper 2 down into a feed chamber 6 occupied by a carding unit 7 equipped with a carding drum 8 driven in rotation about a horizontal axis 9 and turning anticlockwise as seen in figure 1. The carding roller 8 operates in conjunction with a proportioning roller 10 and an impeller roller 11 by which the tobacco 3 is projected, in the form of distinct particles, into a descending channel or chute 12 terminating at the bottom end adjacent to a toothed unit 13 such as will pick up the particles and direct them onto a transfer belt 14 advancing toward the bottom end of an ascending channel or riser 15.

[0011] The top end of the riser 15 is enclosed by an aspirating transport belt 16 made of air-permeable material such as will attract the tobacco particles and gather them progressively into a continuous stream 17 providing the filler for the manufactured cigarettes (not illustrated).

[0012] 18 denotes a separator device, shown in figure 1 as a unit or module 19 that can be installed along the aforementioned pneumatic feed duct 4 carrying the flow of shredded tobacco to the hopper.

[0013] More exactly, and with reference to figure 2, the separator device 18 establishes a predetermined feed path P to be followed by the flow of shredded tobacco, comprising a first feed section 20 along which the pneumatic pressure generated internally of the feed duct 4 is deactivated, and a second feed section 21 embodied as an ascending outfeed duct 22 along which the pneumatic pressure of the duct 4 is reinstated.

[0014] The first section 20 of the separator device 18, which is coupled directly to the feed duct 4, comprises means, denoted 23 in their entirety, by which to form and feed the tobacco as a carpet 24 of predetermined thickness S.

[0015] The forming and feeding means 23 of the first section 20 comprise a substantially horizontal looped conveyor belt 25 passing around two return pulleys 26, of which at least one is power driven, and a tray 27 caused to vibrate through the agency of respective actuator means shown schematically as a block denoted 28.

[0016] The vibrating tray 27 is inclined, presenting a transverse dimension that increases along the feed direction followed by the tobacco carpet 24, as discernible in figure 5, and occupies a position interposed between the runout end of the belt 25 and the entry point of descending conveyor means, denoted 29 in their entirety and constituting the downstream part of the first section 20.

[0017] In the embodiment of figure 2, the descending conveyor means 29 take the form of a substantially vertical duct 30 into which the tobacco 3 will drop and fall freely to a bottom outlet end coinciding with a vent 31a positioned to deliver a stream of air generated by blower means 31. The air stream serves to divert the flow of tobacco toward the substantially vertical outfeed duct 22, which is coupled to the pneumatic feed duct 4.

[0018] The bottom outlet end of the vertical duct 30 is connected to the inlet end of the ascending outfeed duct 22 by way of a bend 32 in which foreign matter is able to accumulate before dropping through a reject duct 33 into a collection vessel 34.

[0019] The embodiment of figure 3 differs from that of figure 2 in that the descending conveyor means 29 are afforded by an inclined plane 35 along which the tobacco carpet 24 slides downward by gravity.

[0020] Finally, the embodiment of figure 4 differs from that of figure 2 in that the descending conveyor means 29 consist in a duct 36 presenting walls of zigzag profile, along which the tobacco tumbles by gravity.

[0021] In operation, a relatively compacted mass of shredded tobacco 3 flowing from the upstream unit or machine 5 along the feed duct 4 at a first velocity V1 is deposited on the top branch of the conveyor belt 25, which will be driven at a second velocity V2 slower than the first V1. The tobacco 3 settles on the belt, spreading gradually to form a carpet 24 of relatively limited thickness S.

[0022] The carpet 24 runs off the belt 25 and onto the vibrating tray 27, whereupon the vibratory motion has the effect of advancing the tobacco 3 while loosening the constituent particles and stems, which are thereupon distributed transversely to the feed direction in such a way as to form a layer of thickness S1 reduced further from the thickness S of the carpet 24 formed initially.

[0023] In all of the embodiments illustrated, the fact of isolating the conveyor belt 25 and the vibrating tray 27 from the pneumatic pressure of the feed duct 4 is instrumental in enabling a reduction in the rate at which the tobacco 3 advances, from a given first velocity V1 to a predetermined second velocity V2.

[0024] In effect, the tobacco advances along the feed duct 4 at a relatively high velocity V1, determined by the associated pneumatic circuit, whereas during its passage along the belt 25 and thereafter along the tray 27, the first velocity V1 can be reduced to a lower velocity V2 in order to facilitate the removal of foreign matter. Together with the steps of gradually disentangling the tobacco and reducing the thickness S of the carpet 24 and the subsequent drop down the descending conveyor means 29, this slowing effect favours the separation of foreign bodies from the flow of tobacco 3 at the moment of its passage adjacent to the vent 31a of the blower means 31.

[0025] Finally, it will be self-evident that the unit or module 19 is easily deployed, whether as a first time installation or retrofitted to a cigarette maker 1 already in commission without any separator device 18.

[0026] The inclusion of the unit 19 by no means excludes the possibility of the machine 1 being equipped with a second separator device installed downstream of the carding unit 7. Indeed in this instance, the presence of a second separator will help to obtain an extremely thorough winnowing action on the flow of tobacco ascending through the riser 15.

Claims

1. A cigarette making machine comprising: an infeed hopper (2), a pneumatic feed duct (4) carrying a flow of shredded tobacco (3) to the hopper (2), a carding unit (7) by which the tobacco (3) is taken up from the hopper (2) and released as a flow of separated particles to be directed first through a descending channel (12) then through an ascending channel (15), toward an aspirating outfeed conveyor belt (16) placed at the top end of the ascending channel (15),**characterized in that** it includes a separator device (18) for the removal of foreign matter from the flow of shredded tobacco (3), comprising means (23) by which to form and feed a carpet (24) of tobacco, also descending conveyor means (29) into which tobacco is directed by the forming and feeding means (23) in free fall, an outfeed duct (22) interposed between the outlet of the descending conveyor means (29) and an inlet connecting with the hopper (2), and means (31) by which to generate a stream of air directed along the outfeed duct (22).

2. A machine as in claim 1, wherein means (23) by which to form and feed a carpet (24) of tobacco comprise a vibrating tray (27).

3. A machine as in claim 1, wherein means (23) by which to form and feed a carpet (24) of tobacco comprise a conveyor belt (25).

4. A machine as in claim 1, wherein means (23) by which to form and feed a carpet (24) of tobacco comprise a conveyor belt (25), also a vibrating tray (27) interposed between the conveyor belt (25) and the descending conveyor means (29).

5. A machine as in claims 1 to 4, wherein descending conveyor means (29) comprise an inclined plane (35).

6. A machine as in claims 1 to 4, wherein descending conveyor means (29) comprise a substantially vertical duct (30).

7. A machine as in claims 1 to 4, wherein descending conveyor means (29) comprise a duct with walls of zigzag profile (36).

8. A machine as in claims 5 to 7, wherein a bottom end of the descending conveyor means (29) communicates with a duct (33) through which to reject foreign matter.

9. A machine as in claims 1 to 8, wherein the descending conveyor means (29) and the outfeed duct (22) are connected by a section (32) coinciding with a vent (31a) forming part of the means (31) by which

to generate a stream of air.

10. A machine as in claim 9, wherein the outfeed duct (22) is an ascending channel and the connecting section (32) is a bend.

11. A machine as in claims 1 to 10, wherein the separator device (18) consists in a unit or module (19) installable along the feed duct (4) conveying the shredded tobacco (3).

12. A machine as in claims 1 to 11, wherein the separator device (18) comprises a first feed section (20) advancing the shredded tobacco (3), along which pneumatic pressure generated through the feed duct (4) is deactivated, and a second feed section (21) along which the selfsame pneumatic pressure is reinstated.

13. A machine as in claim 12, wherein the first section (20) of the separator device is composed of the means (23) of forming and feeding a carpet (24) of tobacco, and the descending conveyor means (29).

14. A machine as in claim 12, wherein the second section (21) is provided by the outfeed duct (22).

FIG.1

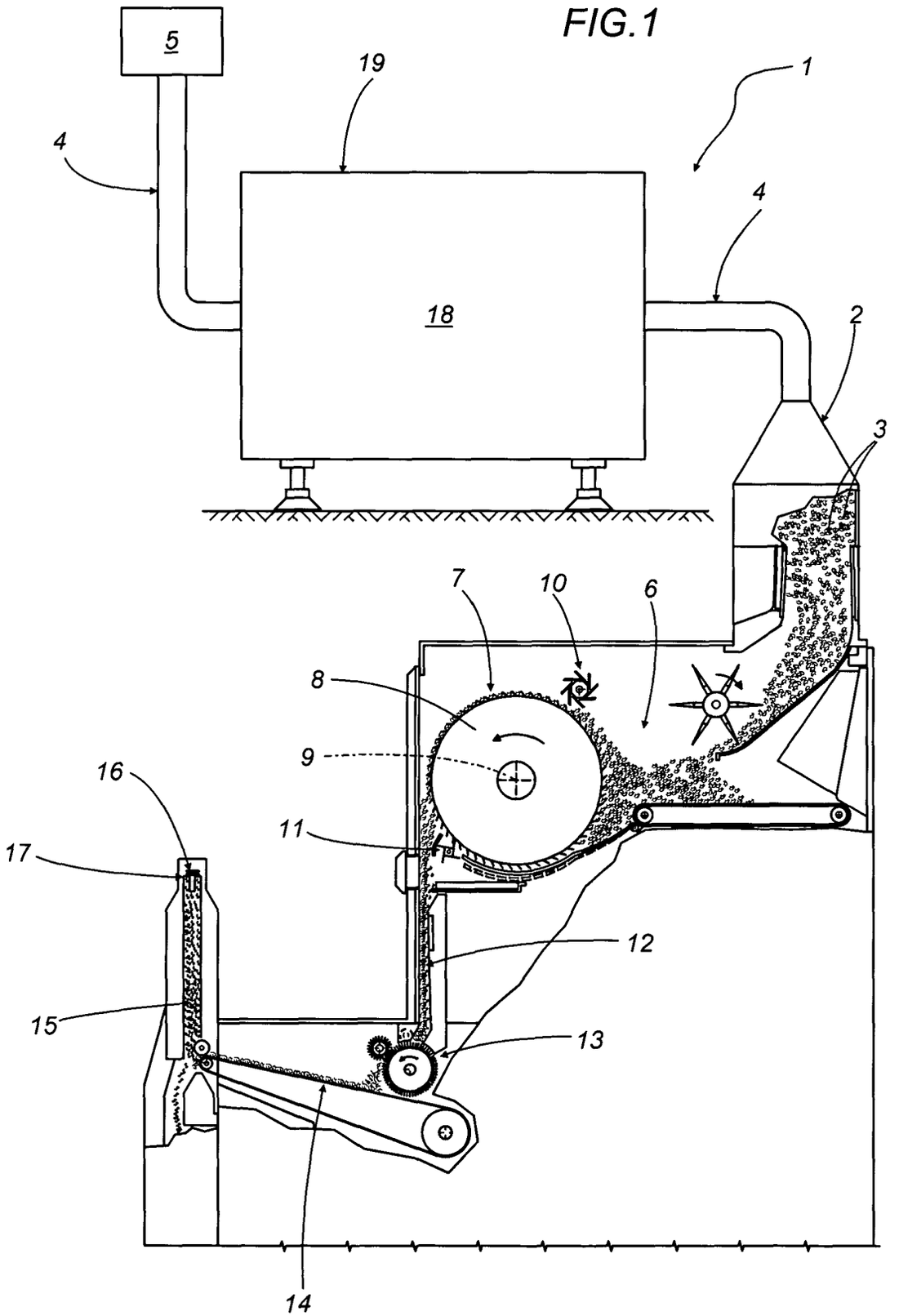

FIG.2

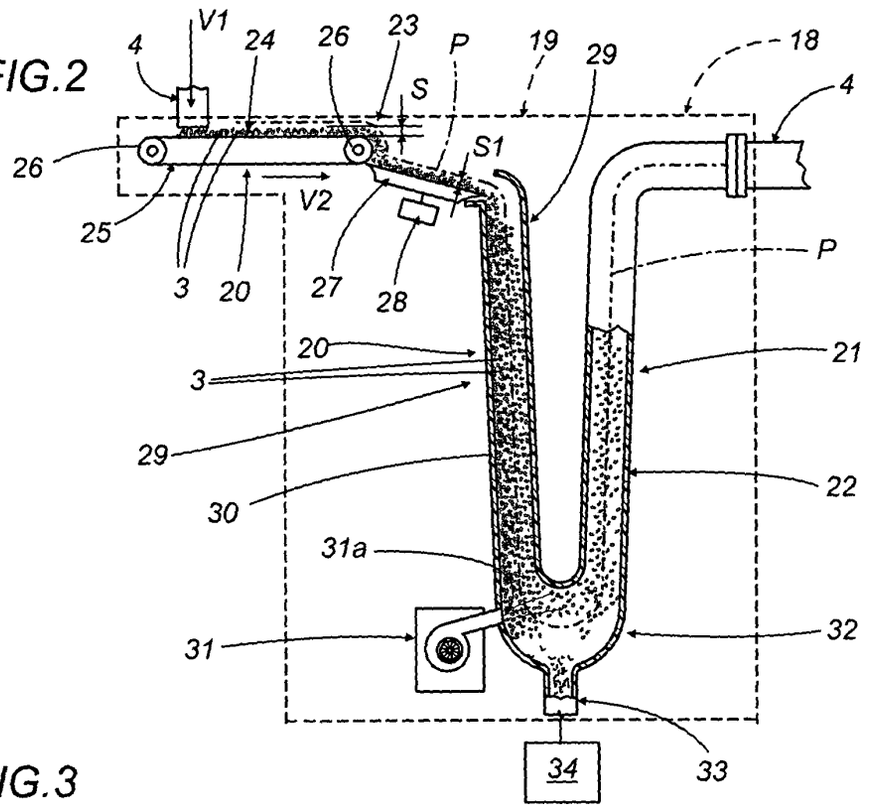
V1
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FIG.3

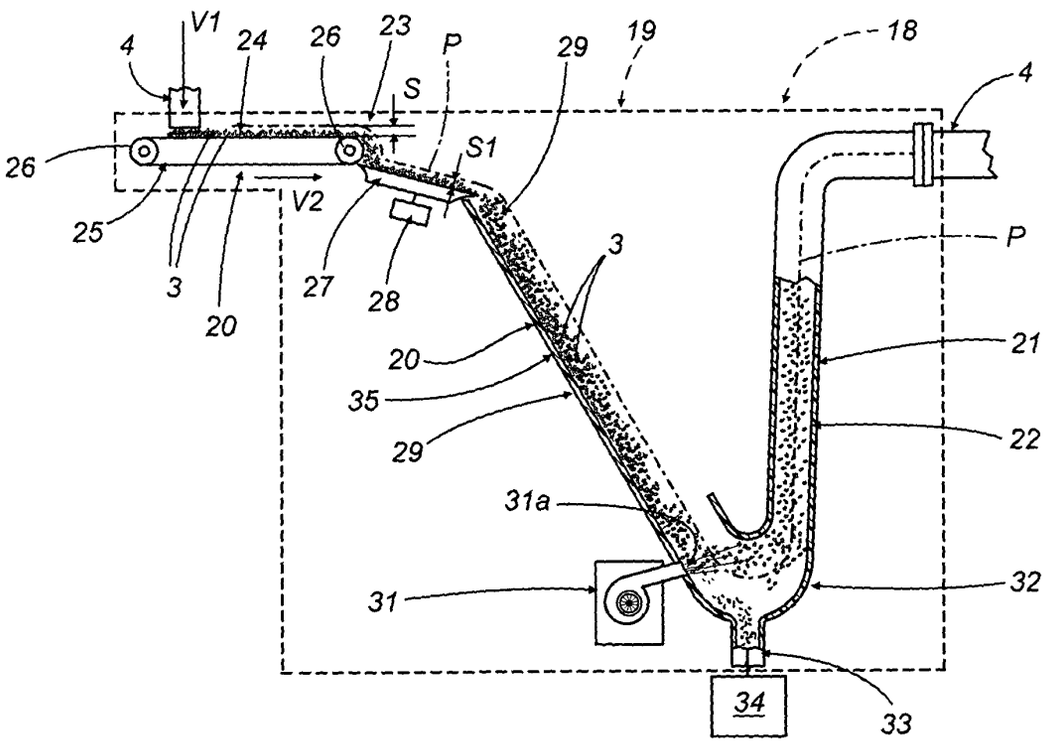
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FIG.4

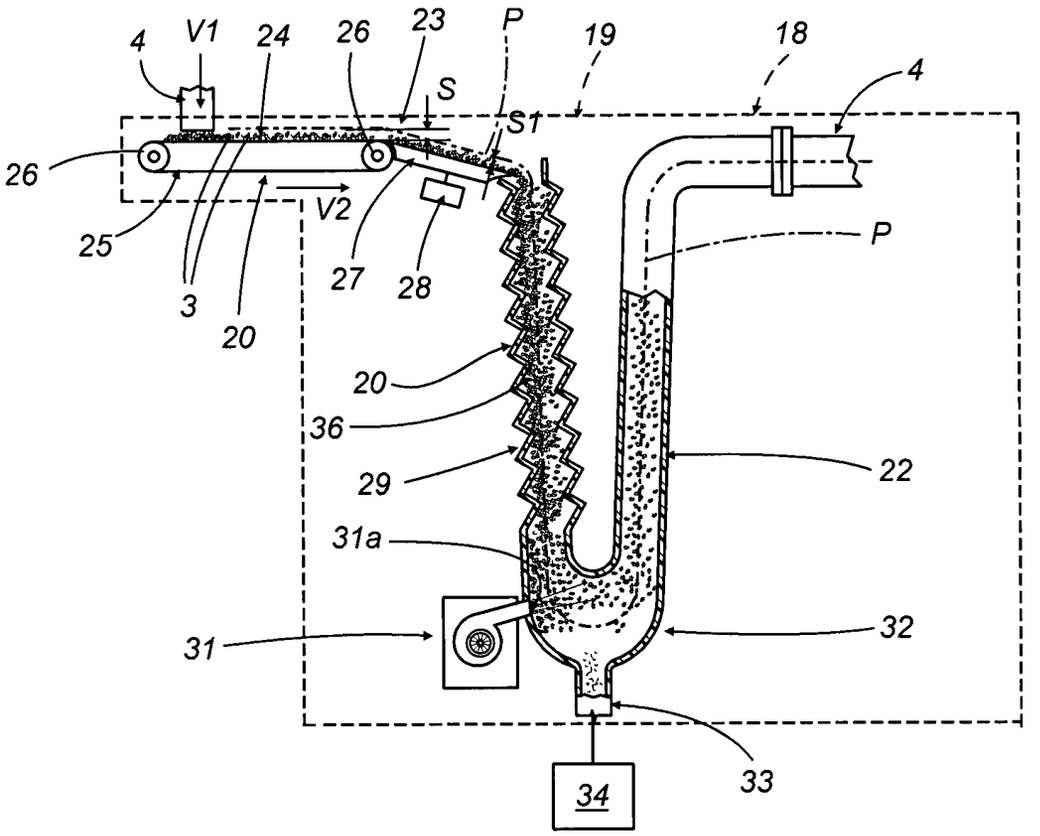
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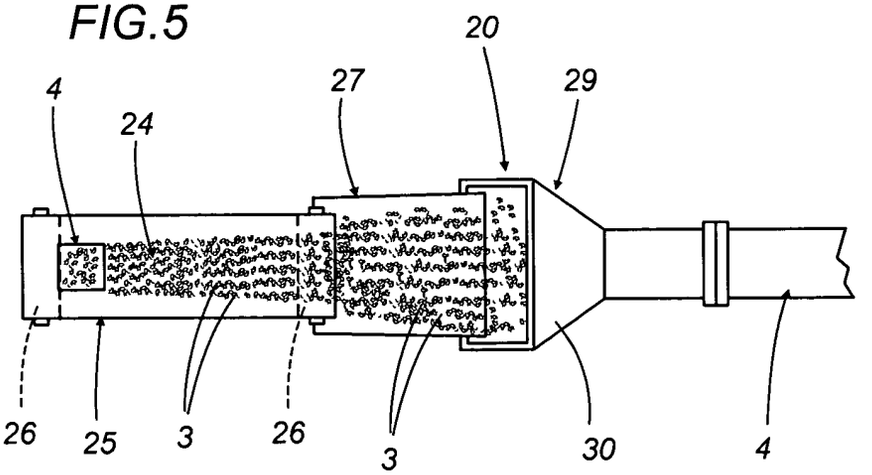
FIG.5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Application Number
EP 05 42 5400

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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	14 September 2005	MARZANO MONTEROSSO

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