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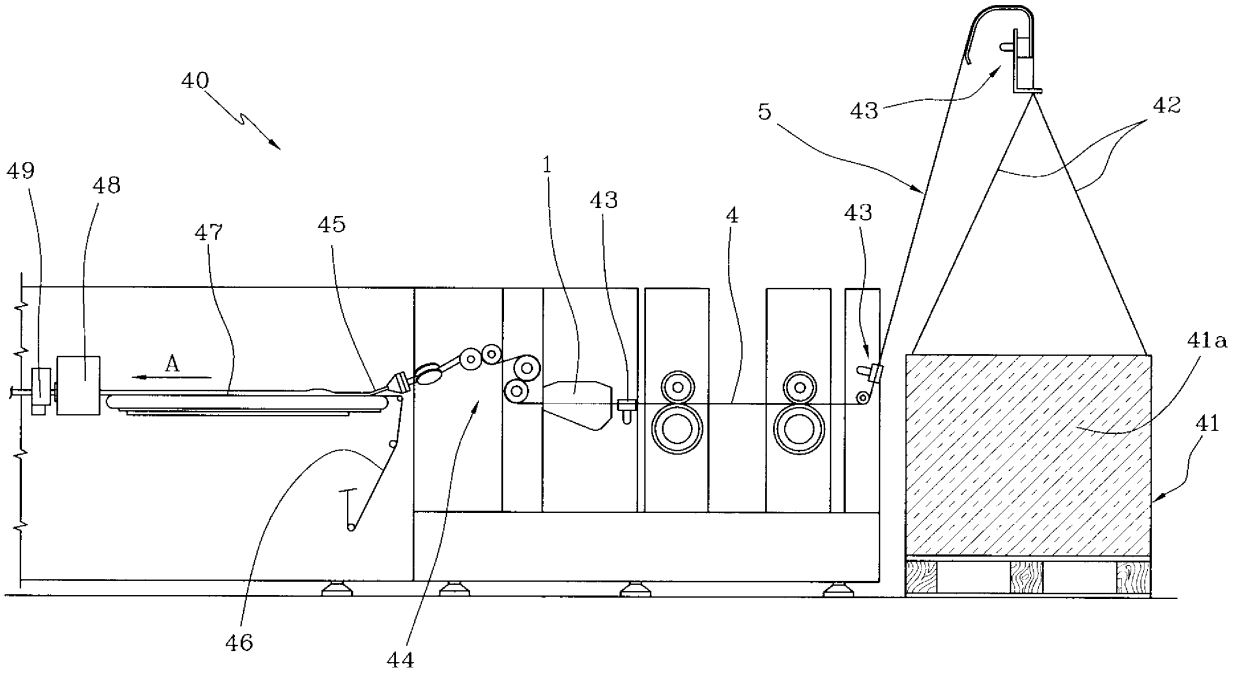
(54) **A device for the treatment of filter material used in tobacco products**

(57) Filter tips for cigarettes are shaped and cut from continuous streams (F) of fibrous tow directed initially along respective feed lines (L) into a device (1) equipped with a rotary assembly (8) by which a flow of plasticizer fluid is generated and directed at the continuous streams (F) of fibrous material. Also forming part of the device (1) is an obstruction element (21) by which the flow of plasticizer fluid directed at the continuous streams (F) of fibrous material can be cut off in a controlled manner, so as to isolate the streams (F) during transients in operation of the device (1), typically when a malfunction or breakdown occurs.

FIG 1



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Description

[0001] The present invention relates to a device for the treatment of filter material utilized in tobacco products, typically cigarettes.

[0002] In particular, the invention finds application in cigarette filter making machines.

[0003] Conventionally, the manufacture of filter tips for cigarettes, be it with simple or composite type filter plugs, involves processing a filter material consisting for instance in a ribbon or stream of fibrous cellulose acetate tow.

[0004] The fibrous tow material in question is drawn from compacted bales and passed through processing stations where it is stretched initially, then impregnated with plasticizers, and finally folded or bunched around the longitudinal axis of the ribbon or stream to form a continuous rod, which is enveloped in a paper plugwrap.

[0005] Conventionally, the impregnating step takes place as the stretched ribbon is directed through special devices designed to invest the advancing material with a flow of plasticizer, typically triacetin, a substance which at the normal operating temperature and pressure of the devices in question will remain in the liquid state.

[0006] The ribbon is thus sprayed with a flow of liquid consisting in particles of predetermined quantity and size, in such a way that a prescribed quantity of the triacetin will be absorbed.

[0007] Prior art devices utilized to perform the step described above comprise adjustable nozzles from which a flow of triacetin is directed toward the ribbon being impregnated. Devices of this type have a high maintenance requirement, however, given the need for cleaning and adjustment of the nozzles.

[0008] Other prior art type devices used to implement the step in question comprise a container, or bath, holding a predetermined quantity of triacetin, and a revolving brush partly immersed in the triacetin, which when set in rotation at a normal operating speed will project a flow of liquid droplets toward a ribbon of cellulose acetate advancing in close proximity.

[0009] It has been noted that there is an optimum speed at which the brush should rotate when part-immersed in the triacetin. In reality, whilst the angular velocity of the brush directly influences the size of the droplets of triacetin projected onto the ribbon, it does not directly influence the quantity of triacetin actually transferred to the ribbon; this, by contrast, depends directly on the depth to which the brush is immersed in the bath of liquid. Accordingly, use is made generally of feed means by which the triacetin is maintained at a constant level in the container during the operation of the device, for example a pump connected to a tank and in fluid communication with the container.

[0010] In the event of a malfunction occurring, devices of conventional type will cause the brush to cease rotation, so that no further triacetin is pumped into the container.

[0011] It has been found, however, that when the device is restarted and the brush resumes rotation, the initial movement has the effect of inducing a wave in the mass of liquid, affecting its correct flow toward the ribbon of filter material and causing the material to be impregnated non-uniformly. Whilst the effect disappears once normal operating conditions are restored, the portions of ribbon treated previously must be discarded as they will have been sprayed by droplets of triacetin in less than optimum conditions. The portions of ribbon in question are impregnated non-uniformly and may be of appreciable proportions, given that the starting transient can be somewhat lengthy.

[0012] The prior art also embraces devices that operate by removing the triacetin from the container when a stoppage occurs, whereupon the brush is restarted dry and the container then replenished gradually with triacetin as the brush rotates at the optimum speed. Such devices in any event do not solve the problem of having to discard substantial portions of the ribbon of filter material, given that in the course of the transient during which the container is refilled, the level of triacetin remains lower than optimum and therefore impacts negatively on the quantity of the liquid utilized to condition the ribbon, with the consequence that the requisite impregnation properties of the filter material are not established. Moreover, the process of emptying and filling the container takes time and involves constructional complexities connected with the recirculation of the plasticizer fluid.

[0013] Accordingly, the object of the present invention is to provide a device for the treatment of filter material used in tobacco products, substantially unaffected by the drawbacks mentioned above.

[0014] In particular, the object of the invention is to provide a device for treating filter material used in tobacco products, such as will allow of limiting the quantity of ribbon discarded during transients in operation.

[0015] A further object of the invention is to provide a device for the treatment of filter material used in tobacco products that does not require a bath of plasticizer fluid to be emptied systematically in the event of malfunction or breakdown.

[0016] The stated objects are realized according to the invention in a device for the treatment of filter material used in tobacco products, of which the features are recited in the appended claims.

[0017] 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 filter making machine, equipped with a device according to the present invention;
- figure 2 is a sectional view of a device according to the present invention;
- figure 3 is a sectional view showing a portion of the device in figure 2.

[0018] With reference to the accompanying drawings, numeral 1 denotes a device, in its entirety, for treating filter material used in tobacco products, in accordance with the present invention.

[0019] The device 1 is applicable to machines 100 used in the manufacture of filters for tobacco products, and for cigarettes in particular, substantially of the type illustrated in figure 1.

[0020] Such machines 100 comprise a magazine 101 holding filter material, and more exactly containing two bales 102 of filter material of which one only is illustrated in figure 1. Two respective tows 103 are drawn from the bales 102 and directed by means of conventional guide devices toward a station at which the filter material is processed.

[0021] In detail, the filter material passes through a processing station comprising at least one blower device 104 of conventional type, by which the two tows 103 are expanded and formed into continuous streams F of predetermined width. In a preferred embodiment, the processing station will comprise three such blower devices 104, placed along a feed line L as illustrated in figure 1. The processing station further comprises a device 1 according to the invention for treating the filter material, located downstream of the blower devices 104, by which the aforementioned continuous streams F are taken up and plasticized by the application of a suitable plasticizer fluid.

[0022] The treated streams F advance thereafter toward a stabilizing device 105 by which they are taken up on the infeed side, and from which they emerge on the outfeed side in the form of ropes 106, each advancing above a corresponding web 107 of paper coated previously with a bead of gum, and finally enveloped by these same webs 107 so as to fashion respective rods 108 of filter material.

[0023] The rods 108 obtained in this way are fed toward a device 109 that serves to verify their density, thence to a cutter head 110 by which the selfsame rods 108 are divided transversely into respective successions of plugs, not illustrated.

[0024] The device 1 according to the present invention for treating filter material utilized in tobacco products will now be described with reference to figure 2, which shows a preferred embodiment.

[0025] The device 1 comprises a fixed structure 2 that presents a top portion 3 and a bottom portion 4. The top portion 3 of the fixed structure 2 affords guide means 5 accommodating at least one continuous stream F or ribbon of filter material. In the case of the preferred embodiment illustrated, the guide means 5 are associated with a pair of continuous streams F of filter material advancing side by side along a given feed direction A, having entered the device 1 along relative feed lines L from upstream operating stations. More exactly, the guide means 5 comprise respective sliding surfaces 6, disposed preferably horizontal and placed so as to support the aforementioned continuous streams F of filter material. Alternatively, in a further embodiment (not illustrated), the guide means 5 might comprise a plurality of rollers affording a rolling surface on which to support the continuous streams F.

[0026] The bottom portion 4 of the fixed structure 2 forms a reservoir 7 serving to hold a plasticizer material, preferably a fluid, which is applied by the treatment device 1 disclosed to the continuous streams F of filter material by methods of familiar type, referred to hereinafter in the interests of providing a full description. The plasticizer fluid includes additives designed to condition the filter material by compacting and stably drawing together the constituent fibres, thereby improving their filtration properties. One component of the fluid, preferably, will be triacetin.

[0027] Also forming part of the treatment device 1 are means 8, preferably rotary, by which a flow of the aforementioned plasticizer fluid is generated and directed at the streams F of filter material. In the example of figure 3, such generating means 8 comprise a revolving brush 9 rotatable about a preferably horizontal axis X disposed substantially perpendicular to the feed direction A followed by the streams F of filter material.

[0028] The revolving brush 9 is composed of a shaft 9a rotatable about the aforementioned axis X, and a set 9b of bristles 9c carried by the shaft 9a, disposed one alongside another.

[0029] The single bristles 9c extend radially from the shaft 9a, each presenting a first end denoted 9d, anchored to the shaft 9a, and a freely projecting second end denoted 9e. The free second ends 9e of the bristles 9c combine to create a substantially cylindrical active surface 10. In addition, the bristles 9c are fashioned of elastically deformable material, for reasons that will be explained in due course, and therefore flexible.

[0030] The revolving brush 9 is positioned internally of the reservoir 7 containing the plasticizer fluid, underneath the streams F of filter material, and partially immersed in the fluid. With the brush 9 set in rotation, accordingly, the bristles 9c are caused repeatedly to dip into the plasticizer fluid and, on emerging, to project droplets of the fluid at the streams F of filter material.

[0031] To improve the effectiveness of the bristles 9c, the rotary flow generating means 8 further comprise a counter element 11 anchored rigidly to the fixed structure 2 and placed so as to interact with the revolving brush 9. The counter element 11 is placed on the side of the revolving brush 9 remote from the continuous streams F of filter material, and presents a concave surface 12 offered directly to the brush 9. More exactly, the concave surface 12 is shaped substantially to match the cylindrical active surface 10 of the brush 9 and engages the set 9b of bristles 9c along a peripheral portion, as illustrated in figure 3.

[0032] Also associated with the counter element 11 is a counter blade 13 occupying an intermediate portion of the concave surface 12 and set parallel to the axis X of rotation of the revolving brush 9. The function of the coun-

ter blade 13 is to intercept the free second ends 9e of the bristles 9c dipped in the plasticizer fluid, which are thus caused to deform elastically as the brush 9 rotates. Once beyond the blade 13, the free second ends 9e of the bristles 9c tend to regain their undeformed state, thereby generating an elastic force that acts on the droplets of fluid attached to the ends 9e in the manner of a sling, throwing them toward the continuous streams F of filter material advancing above. Observing the particular layout of the device 1 shown in figure 2, the revolving brush 9 rotates in the anticlockwise direction, indicated by the arrow denoted R (figure 3), so as to produce the effect described above.

[0033] To maintain the plasticizer fluid at a constant level in the reservoir 7, the treatment device 1 further comprises feed means 14 serving to supply the plasticizer fluid, preferably associated with automatic means by which to monitor the level of the fluid in the reservoir 7. Such feed means 14 comprise one or more channels 15 by way of which the reservoir 7 is placed in fluid communication with a tank (not illustrated, being of conventional type), served possibly by pumps able to generate a head sufficient for the fluid to be drawn from the tank into the reservoir 7.

[0034] In order to direct the flow of plasticizer fluid onto a selected area of the continuous streams F of filter material, the device 1 also comprises a pair of ducts 16 oriented substantially in a vertical direction and of hood-like appearance; each duct 16 presents a bottom opening 16a associated with the revolving brush 9, and a top opening 16b offered directly to the respective stream F of material, in such a way that the advancing fibres skim across the mouth of the selfsame opening 16b.

[0035] The ducts 16 are also associated with collection means 17 designed to catch any drops of plasticizer fluid scattered by continuous streams F of filter material impregnated previously. Such collection means 17 comprise two pairs of basins 18, each pair associated with a relative duct 16 and a relative stream F of filter material; more exactly, each pair is composed of a forward basin 18a positioned downstream of the duct 16, relative to the feed direction A followed by the continuous stream F, and a rear basin 18b positioned upstream of the duct 16. For constructional purposes, each duct 16 can be made up from sheet metal panels 19 bent to shape and incorporating the two relative basins 18a and 18b. Thus, the duct 16 and the two basins 18a and 18b can be enclosed on either side by lateral sheet metal panels 20 extending parallel to the feed direction A of the continuous streams F and serving also to separate the two ducts 16 and the two pairs of basins 18 one from another.

[0036] To the end of overcoming the drawbacks associated with the prior art, advantageously, the treatment device 1 disclosed comprises obstruction means 21 by which the flow of plasticizer fluid through the duct 16 can be cut off in a controlled manner.

[0037] In particular, such obstruction means 21 comprise at least one movable component 22, displaceable through a plurality of operating positions between an open position, in which the plasticizer fluid is able to reach the continuous streams F of filter material, and a closed position in which the flow of plasticizer fluid directed toward the continuous streams F of filter material is cut off altogether.

[0038] In a preferred embodiment, obstruction means 21 will comprise two such movable components 22, each associated with a respective continuous stream F of filter material.

[0039] As discernible in figure 2, each of the movable components 22 presents a flat baffle 23 engaging a slot 24 afforded by the relative duct 16. The flat baffle 23 is slidable in a direction Y preferably parallel to the feed direction A followed by the two continuous streams F of filter material, and occupies a position between the rotary means 8 and the corresponding continuous stream F of filter material. The baffle 23 spans a full cross section of the duct 16, so that when in the closed position aforementioned, illustrated by phantom lines in figure 2, the plasticizer fluid projected from the revolving brush 9 is prevented from reaching the top opening 16b of the duct 16. To optimize this function, the bent metal panels 19 of the duct 16 are fashioned each with an abutment 25 disposed substantially parallel to the sliding direction Y of the flat baffle 23 and facing toward the top opening 16b of the duct 16. Adopting this type of configuration, even though the baffle 23 may not be perfectly positioned, it will still be impossible for any part of the flow of plasticizer fluid to reach the respective continuous stream F of filter material.

[0040] When the baffle 23 is retracted substantially in its entirety from the closed position, no longer fully occupying the cross section of the duct 16, it will assume the configuration indicated by the solid lines of figure 2, coinciding with the open position aforementioned, in which the plasticizer fluid projected from the revolving brush 9 is able to reach the top opening 16b of the duct 16.

[0041] To advantage, the operation of the flat baffle 23 allows transient starting phases of the device 1 to be completed without the continuous streams F of filter material being spattered with plasticizer fluid applied under non-optimal conditions, for example droplets of unsuitable size produced as a result of the brush 9 rotating too slowly, or a flow rate of the fluid different from the specified optimum flow rate, attributable to an incorrect level of plasticizer fluid in the reservoir 7.

[0042] In the example illustrated, the flat baffle 23 is cantilevered and associated with motion-inducing means 26 by which it is also supported and guided during the aforementioned sliding movement. The motion-inducing and support means 26 comprise at least one linear track 27 associated rigidly with the fixed structure 2 of the device 1 and coupled freely with the flat baffle 23 in such a way that the baffle can be guided along a rectilinear and, ideally, a substantially horizontal path P. In the example of figure 2, motion-inducing and support means 26 comprise a slide 28 coupled with a single linear track 27 and

anchored rigidly to a portion of the flat baffle 23 farthest from the duct 16. Likewise preferably, motion-inducing and support means 26 comprise an intermediate support 29, mounted rigidly to a portion of the curved sheet metal 19 and placed to coincide with the slot 24. The intermediate support 29 can include suitable means, not illustrated, by which the flat baffle 23 is carried in such a manner as to minimize wear or binding.

[0043] In an alternative solution, not illustrated, the motion-inducing and support means 26 could comprise two linear tracks 27 positioned one on either side of the flat baffle 23, by which the baffle can be guided along the sliding direction Y without any need to include an intermediate support 29.

[0044] The motion-inducing and support means 26 further comprise a mechanism 30, for example of rod and crank type, mounted to the fixed structure 2 and coupled to the flat baffle 23, also drive means 31 of familiar type, such as a hydraulic cylinder 32 or alternatively an electric motor (not indicated). In detail, and as discernible from the example of figure 2, the mechanism 30 comprises a cylindrical pivot 33 rotatable about a fixed vertical axis W, associated with a bottom arm 34 and a top arm 35 each lying in a horizontal plane and presenting a respective free end 34a and 35a. The free end 34a of the bottom arm 34 is hinged to the hydraulic cylinder 32, whereas the free end 35a of the top arm 35 is connected to a respective baffle 23.

[0045] The arms 34 and 35 rotate as one about the axis W of the cylindrical pivot 33, and are spaced apart one from the other substantially by a right angle, in such a way that when the free end 34a of the bottom arm 34 shifts in a direction substantially perpendicular to the sliding direction Y of the flat baffle 23, in response to a movement of the hydraulic cylinder 32 in the same direction, the free end 35a of the top arm 35 will shift in a direction substantially parallel to the sliding direction Y of the flat baffle 23, hence guiding its movement along the relative rectilinear path P.

[0046] Moreover, the free end 35a of the top branch 35 and the relative flat baffle 23 are connected by way of a slide coupling 36 comprising a block 37, also an auxiliary support 38 connected rigidly to the flat baffle 23 and affording a recess 39 in which the block 37 is slidably insertable. More particularly, the recess 39 extends horizontally and perpendicular to the sliding direction Y of the flat baffle 2, so as to take up any movement of the sliding block 37 in a direction perpendicular to the sliding direction Y of the baffle 23, being subject only to pushing forces parallel to this same direction Y.

[0047] In addition, the cylindrical pivot 33 is mounted straddling the fixed structure 2, so that the top arm 35 can be accommodated within the reservoir 7 containing the plasticizer fluid, whilst the bottom arm 34 and the drive means 31, advantageously, are located outside the reservoir 7.

[0048] A mechanism 30 of the type above is associated with each of the flat baffles 23, and consequently with each continuous stream F of filter material entering the device 1.

[0049] Starting from an operating configuration in which the flat baffle 23 occupies the aforementioned open position, indicated by the solid lines in figure 2, with the continuous streams F advancing along the feed direction A while being impregnated with the plasticizer fluid, the occurrence of a malfunction or a breakdown causes the device 1 to shut down. In particular, the motion of the continuous streams F will cease, the rotary means 8 will come to a halt, and the feed means 14 supplying plasticizer fluid to the reservoir 7, which are associated with the rotary means 8, will be deactivated.

[0050] Thereafter, the drive means 31 are activated to move the baffle 23 into the closed position, shown by phantom lines in figure 2. In particular, the hydraulic cylinder 32 retracts and induces motion in the free end 34a of the bottom arm 34, which in turn displaces the free end 35a of the top arm 35 correspondingly along the sliding direction Y of the baffle 23. This same movement causes the flat baffle 23 to slide along the rectilinear path P toward the closed position.

[0051] Only at a later stage is it possible to restore the feed motion of the continuous streams F and to restart the rotary means 8. Once the rotary means 8 regain normal operating speed, the drive means 31 will be able to return the flat baffle 23 to the open position. At this juncture, the continuous streams F of filter material can be impregnated in accordance with the optimum conditions specified by the design.

[0052] In a variation on the procedure described above, the reservoir 7 might be emptied during the break in operation of the device 1, for example so that cleaning operations can be carried out. In this instance, the plasticizer fluid drained from the reservoir 7 could be recycled, perhaps after being filtered, then returned to the reservoir 7 by way of the feed means 14.

[0053] Without prejudice to the spirit of the invention, it will be appreciated that the device 1 described by way of example in the foregoing with reference to a twin track machine, in other words a machine capable of turning out two rods of filter material, can be applied equally well to a single track type machine turning out just one filter rod. In other words, the means by which to obstruct the flow of plasticizer fluid can be associated equally well with a single continuous stream of filter material, so as to bring about a controlled interruption of the flow of plasticizer fluid directed toward the selfsame stream.

Claims

1. A device for the treatment of filter material used in tobacco products, toward which at least one continuous stream (F) of filter material is fed from a respective line (L) supplying the selfsame material, comprising rotary means (8) by which a flow of plasticizer fluid is generated and directed at the continuous

stream (F) of filter material
characterized
in that it further comprises obstruction means (21) by which the flow of plasticizer fluid directed at the continuous stream (F) of filter material can be cut off in a controlled manner.

2. A device as in claim 1, wherein flow obstruction means (21) comprise at least one movable component (22) displaceable between an open position, in which the flow of plasticizer fluid is able to reach the stream (F) of filter material, and a closed position in which the flow of plasticizer fluid directed toward the continuous stream (F) of filter material is cut off altogether.

3. A device as in claim 2, wherein the movable component (22) consists in a flat baffle (23) slidable between the open position and the closed position.

4. A device as in claim 2 or 3, further comprising a fixed structure (2) serving to guide one or more continuous streams (F) of filter material along respective feed directions (A), and affording a reservoir (7) in which the plasticizer fluid is collected.

5. A device as in claims 2 to 4, wherein the movable component (22) is positioned between the rotary means (8) and the continuous stream or streams (F) of filter material.

6. A device as in claim 4 where dependent on claim 3, wherein the flat baffle (23) is associated with at least one linear track (27) fastened rigidly to the fixed structure (2).

7. A device as in claim 6, wherein the at least one track (27) establishes a substantially rectilinear path (P).

8. A device as in claim 7, wherein the rectilinear path (P) is substantially horizontal.

9. A device as in claims 6 to 8, comprising one linear track (27) and a slide (28) supported slidably by the linear track (27), wherein the flat baffle (23) is connected rigidly to the slide (28).

10. A device as in claims 3 to 9, wherein the flat baffle (23) is associated slidably with a slidable block (37) constituting a portion of a rod and crank mechanism (30) by which the flat baffle (23) is caused to move between the open and closed positions.

11. A device as in claim 4, comprising feed means (14) supplying the plasticizer fluid, by which the level of plasticizer fluid in the reservoir (7) is maintained constant.

12. A device as in preceding claims, wherein the rotary means (8) generating the flow of plasticizer fluid comprise a revolving brush (9), partially immersed in the selfsame fluid and designed to generate the flow when set in rotation.

13. A device as in claim 12, wherein the revolving brush (9) is furnished with a plurality of flexible bristles (9c) located one beside another, each presenting a first end (9d) anchored permanently to a shaft (9a) of the brush (9), and a free second end (9e).

14. A device as in preceding claims, wherein the plasticizer fluid includes triacetin.

15. A machine for manufacturing cigarette filters, in which one or more continuous streams (F) of filter material are fed by respective lines (L) supplying the selfsame material, each designed to advance a respective continuous stream (F) of filter material toward a station at which the stream (F) of filter material is processed,
characterized
in that the processing station comprises a device (1) for the treatment of filter material used in tobacco products, as recited in one or more of the preceding claims.

FIG 1

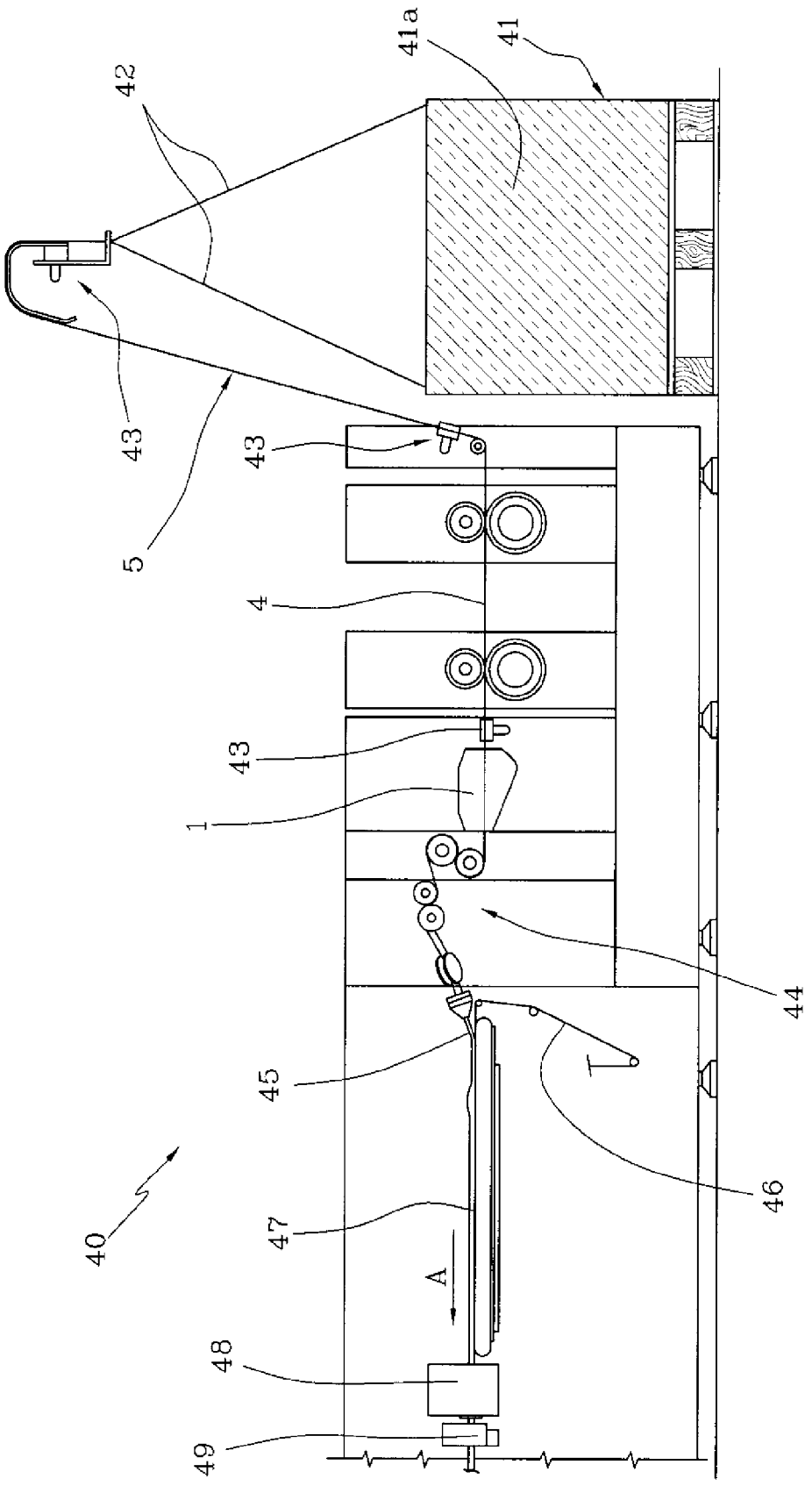

FIG 2

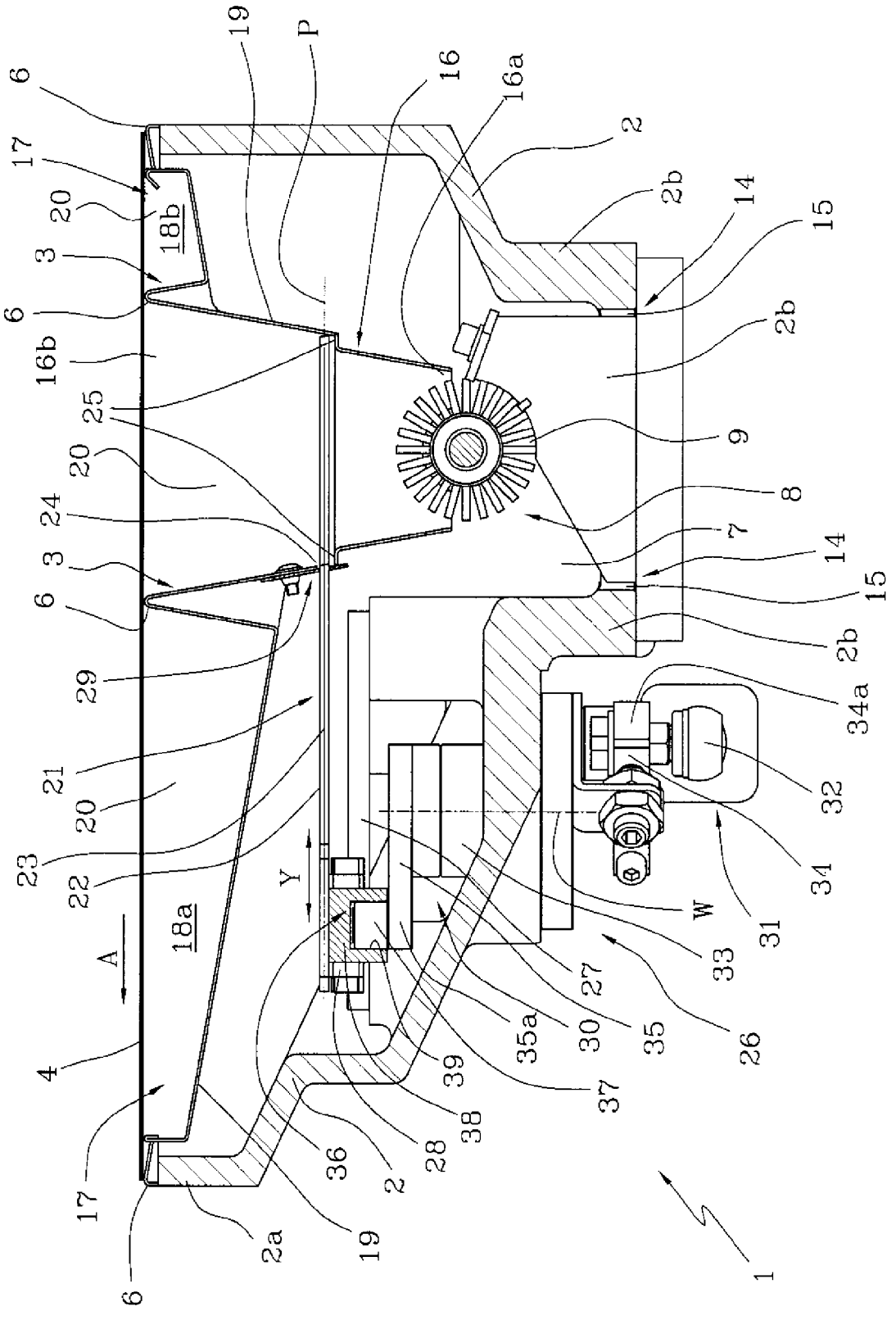
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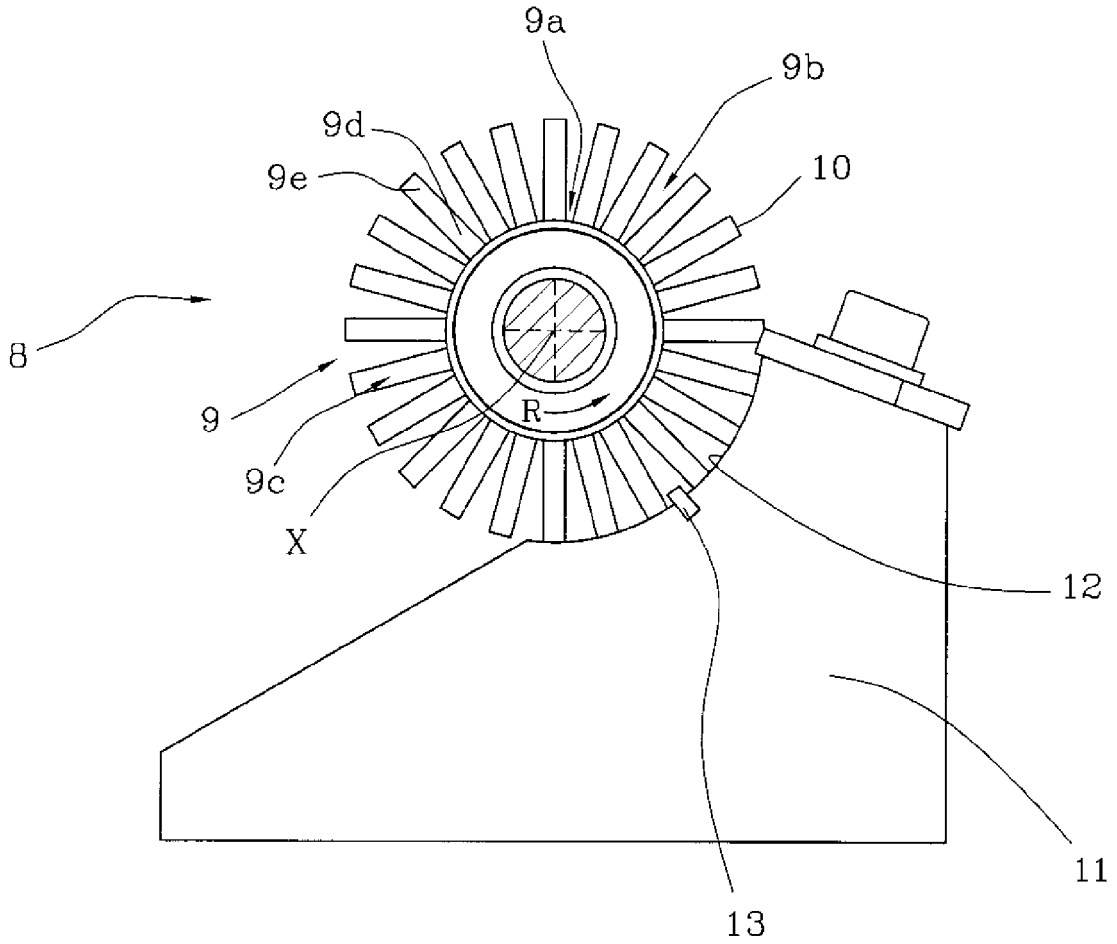
FIG 3



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EUROPEAN SEARCH REPORT

Application Number
EP 07 10 6369

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	US 4 040 385 A (TOST HEINRICH) 9 August 1977 (1977-08-09) * column 2, line 1 - line 23; figures *	1-10,12 15	INV. A24D3/02 B05B3/02
A	GB 2 090 774 A (MOLINS LTD) 21 July 1982 (1982-07-21) * page 1, line 116 - page 2, line 9 *	1-15	
A	GB 2 109 273 A (BROWN & WILLIAMSON TOBACCO) 2 June 1983 (1983-06-02) * abstract; figures *	1,15	
A	US 5 342 657 A (BUDJINSKI JOSEPH F [US] ET AL) 30 August 1994 (1994-08-30) * column 3, line 43 - column 4, line 21; figures *	1,15	
A	GB 2 078 559 A (HAUNI WERKE KOERBER & CO KG) 13 January 1982 (1982-01-13) * the whole document *	1,15	

TECHNICAL FIELDS SEARCHED (IPC)

A24D
B05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	5 July 2007	MARZANO MONTEROSSO

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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3

EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 10 6369

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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05-07-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4040385 A	09-08-1977	DE 7613874 U1	30-09-1976
		GB 1518570 A	19-07-1978
GB 2090774 A	21-07-1982	NONE	
GB 2109273 A	02-06-1983	AR 229441 A1	15-08-1983
		AT 385181 B	25-02-1988
		AT 371082 A	15-08-1987
		AU 540134 B2	01-11-1984
		AU 8942582 A	16-06-1983
		BE 894735 A1	14-02-1983
		BR 8206489 A	27-09-1983
		CA 1192393 A1	27-08-1985
		CH 660853 A5	29-05-1987
		DE 3238996 A1	26-05-1983
		DK 507382 A	17-05-1983
		EG 15784 A	30-07-1987
		ES 8403335 A1	16-06-1984
		FI 823848 A	17-05-1983
		FR 2516407 A1	20-05-1983
		GR 77776 A1	25-09-1984
		HK 1186 A	17-01-1986
		IN 156612 A1	21-09-1985
		IT 1153978 B	21-01-1987
		JP 1709093 C	11-11-1992
		JP 3071183 B	12-11-1991
		JP 58089964 A	28-05-1983
		LU 84425 A1	13-06-1983
		MW 4382 A1	11-12-1985
		MY 38387 A	31-12-1987
		NL 8204218 A	16-06-1983
		NO 823810 A	18-05-1983
		NZ 202125 A	31-07-1985
		PL 239060 A1	20-06-1983
		RO 87349 A1	30-01-1987
		SE 454000 B	21-03-1988
		SE 8206096 A	27-10-1982
		SU 1109042 A3	15-08-1984
		US 4497276 A	05-02-1985
		YU 249282 A1	30-04-1985
		ZA 8207512 A	31-08-1983
		ZW 23182 A1	02-03-1983
US 5342657 A	30-08-1994	NONE	
GB 2078559 A	13-01-1982	IT 1137099 B	03-09-1986

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 07 10 6369

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

05-07-2007

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
GB 2078559 A		JP 1640810 C	18-02-1992
		JP 3004194 B	22-01-1991
		JP 57026582 A	12-02-1982
		US 4368688 A	18-01-1983
		US 4414253 A	08-11-1983

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82