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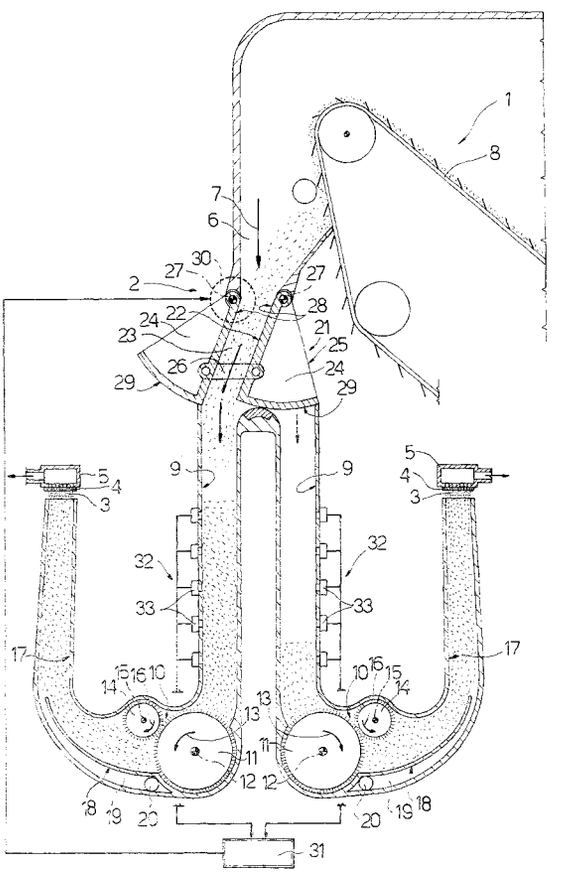
(54) Method and unit for simultaneously forming multiple tabacco mats

(57) A method and unit (2) for simultaneously forming multiple tobacco mats (3) on a multiple-rod cigarette manufacturing machine (1), whereby an input stream (7) of shredded tobacco is fed to a switch conduit (22) selectively alignable with the inputs of at least two downflow conduits (9), each of which communicates via a respective carding assembly (10) with a respective upflow conduit (17) closed by a respective conveyor belt (4) for a respective tobacco mat (3); the switch conduit (22) being switched between positions selectively aligned with the downflow conduits (9) in response to a command signal generated in function of the tobacco level in the downflow conduits (9).



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Description

[0001] The present invention relates to a method and unit for simultaneously forming multiple tobacco mats on a multiple-rod cigarette manufacturing machine.

[0002] As is known, for example, from US-4,336,812 and US-4,418,705, on multiple-rod machines in general, and dual-rod machines in particular, an input stream of shredded tobacco is fed to a downflow conduit, the bottom end of which has a wedge-shaped partition member defining the inputs of two conduits, each of which communicates, via a respective carding assembly, with a respective upflow conduit closed by a respective conveyor belt for a respective mat of tobacco.

[0003] In known multiple-rod machines of the type described above, the partition member normally divides the input stream of shredded tobacco into substreams equal in number to the upflow conduits to form an equal number of tobacco mats, which should theoretically be identical. In actual fact, however, identical mats, which presuppose a homogenous input stream of shredded tobacco across its whole section, are difficult to achieve, and cigarettes formed by cutting rods produced from different tobacco mats invariably differ slightly.

[0004] EP-1364588-A1 was filed before, but published after the date of filing of the present application and discloses an arrangement for the formation of at least two tobacco rods in a cigarette rod making machine. In particular, according to EP-1364588-A1 an input stream of shredded tobacco is fed to a switch conduit selectively alignable with the inputs of two downflow conduits, each of which communicates via a respective carding assembly with a respective upflow conduit closed by a respective conveyor belt for a respective tobacco mat; the switch conduit being switched between positions selectively aligned with the downflow conduits in response to a clock signal of predetermined frequency.

[0005] It is an object of the present invention to provide a method of forming mats of shredded tobacco on a multiple-rod cigarette manufacturing machine, in particular a dual-rod machine, designed to minimize the aforementioned drawback, and which provides for forming substantially identical mats of shredded tobacco.

[0006] According to the present invention, there is provided a method of forming mats of shredded tobacco on a multiple-rod cigarette manufacturing machine, as claimed in Claim 1 and, preferably, in any one of the following Claims depending directly or indirectly on Claim 1.

[0007] According to the present invention, there is also provided a unit for forming mats of shredded tobacco on a multiple-rod cigarette manufacturing machine, as claimed in Claim 4 and, preferably, in any one of the following Claims depending directly or indirectly on Claim 4.

[0008] The present invention will be described by way of example with reference to the accompanying drawing, which shows a schematic cross section of a preferred, nonlimiting embodiment.

[0009] Number 1 in the accompanying drawing indicates as a whole a dual-rod cigarette manufacturing machine, which comprises an input portion defined by a unit 2 for forming two mats 3 of shredded tobacco on the underside surface of respective parallel conveyor belts 4 made of material permeable to air, and which run directly beneath respective suction boxes 5 for retaining mats 3 on respective conveyor belts 4 by suction.

[0010] Unit 2 comprises a loading hopper 6 for an input stream 7 of shredded tobacco fed to the top of hopper 6 by a known tank conveyor 8. Beneath hopper 6, unit 2 comprises two side by side, substantially parallel downflow conduits 9 in a plane parallel to the drawing plane. Each downflow conduit 9 is closed at the bottom by a respective carding assembly 10 comprising a carding roller 11 rotating about an axis 12 in a direction 13, and a known thrower roller 14 substantially tangent to respective carding roller 11 and rotating about an axis 15 parallel to axis 12 in an opposite direction 16 to direction 13. When the relative carding assembly 10 is running, each downflow conduit 9 communicates, via relative carding assembly 10, with the bottom end of a relative upflow conduit 17 closed at the top output end by relative conveyor belt 4.

[0011] Along a curved input portion of each upflow conduit 17, a respective intermediate partition 18 defines, to the side of the input end of relative upflow conduit 17, a respective conduit 19, which flows at the top into relative upflow conduit 17 at a given distance from relative conveyor belt 4, and communicates at the bottom with a respective outlet of a compressed air supply circuit 20.

[0012] Flow of the shredded tobacco from hopper 6 to downflow conduits 9 is controlled by an oscillating switch device 21 comprising a switch conduit 22 alignable selectively with the inputs of the two downflow conduits 9. For which purpose, switch conduit 22 extends between two fixed walls 23 (only one shown) parallel to the plane of the accompanying drawing; and switch device 21 comprises two valve members 24 laterally defining switch conduit 22 and forming the cranks of an articulated parallelogram 25, which also comprises a connecting rod 26 connecting the two valve members 24. Each valve member 24, in section, is substantially in the form of an isosceles triangle, and is hinged at a top vertex to fixed walls 23, which define the frame of articulated parallelogram 25, to oscillate about a respective axis 27 parallel to axes 12 and 15. Valve members 24 are defined laterally by respective flat facing surfaces 28, which are maintained parallel by connecting rod 26 and define, between them and together with fixed walls 23, switch conduit 22. At the bottom end opposite respective axis 27, each valve member 24 is defined by a cylindrical surface portion 29, which, as switch device 21 oscillates, closes a respective downflow conduit 9 when switch conduit 22 is aligned with the other down-

flow conduit 9.

[0013] Switch device 21 is powered by a motor 30, which is connected to one of the two axes 27 to oscillate articulated parallelogram 25 between two positions aligning switch conduit 22 with one or the other of the two downflow conduits 9, and is controlled by a logic unit 31, which activates motor 30 to switch conduit 22 between said two positions following the emission of a "minimum level" signal and "maximum level" signal emitted by a level detecting device 32 comprising a number of sensors 33 along each downflow conduit 9.

[0014] In actual use, the switch is made when the level of shredded tobacco in the downflow conduit 9 not being supplied at the time reaches the "minimum level"; or after a given supply time of one of downflow conduits 9, providing the other downflow conduit 9 in the meantime does not reach the "minimum level"; or when the downflow conduit 9 being supplied reaches the "maximum level".

[0015] In connection with the above, it should be pointed out that the whole of input stream 7 is supplied by switch device 21 to either one of downflow conduits 9 at all times, and at no time undergoes any longitudinal division which might result in differences in the streams fed by upflow conduits 17 to respective conveyor belts 4.

Claims

1. A method of simultaneously forming multiple mats (3) of tobacco on a multiple-rod cigarette manufacturing machine (1); the method comprising the step of:

   - feeding an input stream (7) of shredded tobacco to a switch conduit (22) selectively alignable with the inputs of at least two downflow conduits (9), each of which communicates via a respective carding assembly (10) with a respective upflow conduit (17) closed by a respective conveyor belt (4) for a respective mat (3) of tobacco;
   - determining the tobacco level at least one said downflow conduit (9);
   - generating a command signal in function of the tobacco level; and
   - switching the switch conduit (22) between positions selectively aligned with the downflow conduits (9) in response to said command signal.

2. A method as claimed in Claim 1, wherein said command signal comprises a "minimum level" signal emitted upon a given minimum level being reached in one of said downflow conduits (9).

3. A method as claimed in Claim 1 or 2, wherein said command signal comprises a "maximum level" signal emitted upon a given maximum level being reached in one of said downflow conduits (9).

4. A unit for simultaneously forming multiple mats (3) of tobacco on a multiple-rod cigarette manufacturing machine (1); the unit (2) comprising an input hopper (6) for shredded tobacco, at least two downflow conduits (9), two upflow conduits (17), each connected to a respective said downflow conduit (9), a carding assembly (10) interposed between each downflow conduit (9) and the relative upflow conduit (17), and a conveyor belt (4) for a respective mat (3) of tobacco, located at an output end of each upflow conduit (17); the unit (2) being **characterized by** comprising a switch device (21) interposed between said input hopper (6) and the downflow conduits (9), and in turn comprising a switch conduit (22) selectively alignable with respective inputs of the downflow conduits (9); control means (31) being provided to switch the switch conduit (22) between positions selectively aligned with said downflow conduits (9) in response to a command signal; and detecting device (32) being provided for determining the tobacco level at least one said downflow conduit (9) and for generating the command signal in function of the tobacco level.

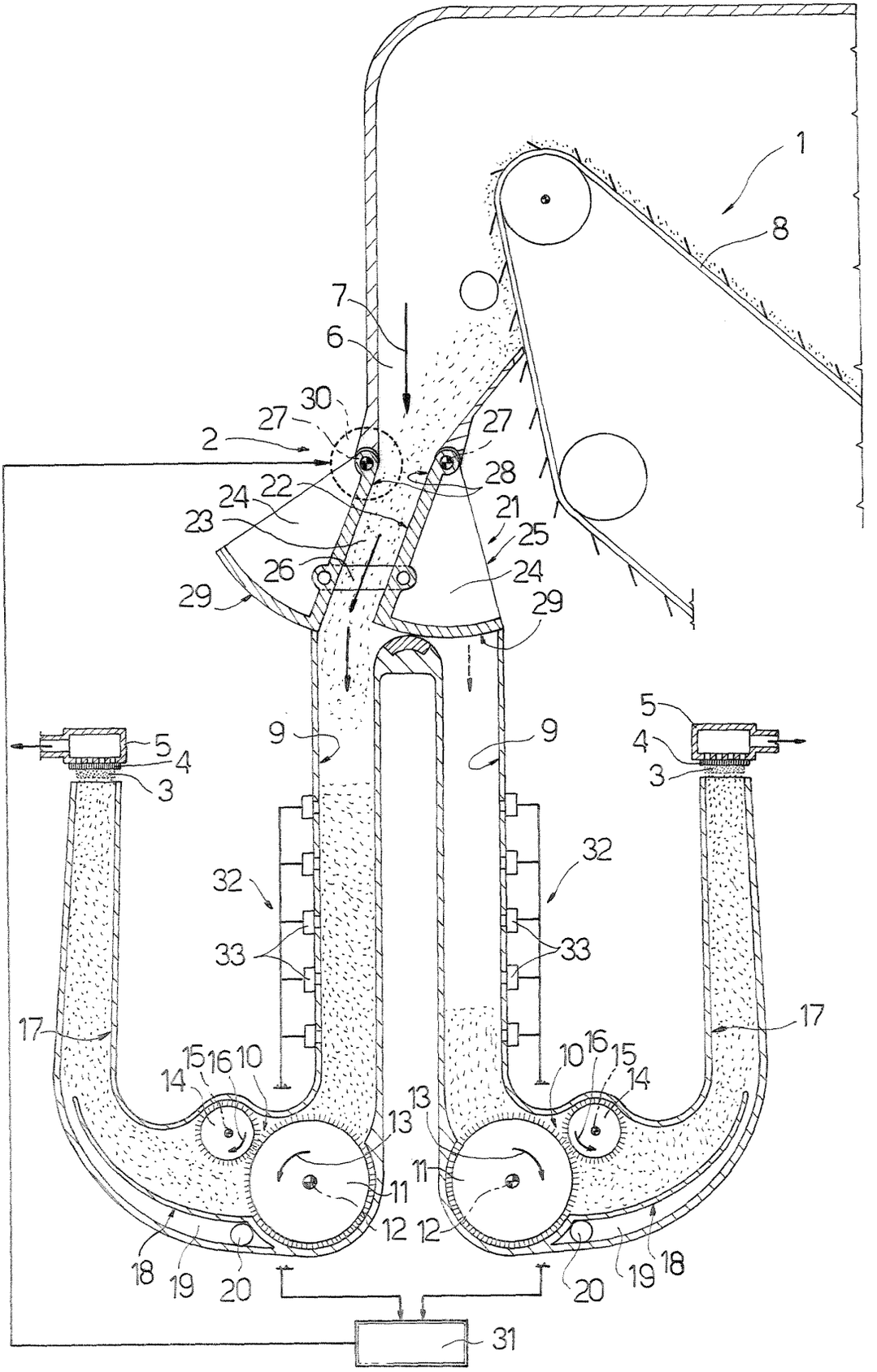
5. A unit as claimed in Claim 4, wherein said switch device (21) comprises two side by side valve members (24), which together define said switch conduit (22) and are mounted to oscillate about respective parallel axes (27) to switch said switch conduit (22) between said positions selectively aligned with said downflow conduits (9), and at the same time to close whichever one of said downflow conduits (9) is not aligned with the switch conduit (22).

6. A unit as claimed in Claim 4 or 5, wherein said switch device (21) comprises two side by side valve members (24), which together define said switch conduit (22) and constitute the cranks of an articulated parallelogram (25) also comprising a connecting rod (26) connecting said two valve members (24); said two valve members (24) being mounted to oscillate, under the control of drive means (30), about respective parallel axes (27).

7. A unit as claimed in Claim 5 or 6, wherein each said valve member (24), in section, is substantially in the form of an isosceles triangle mounted with one vertex facing upwards and to oscillate about the respective said axis (27) located at said vertex; each valve member (24) being bounded, on the opposite side to said vertex, by a cylindrical surface portion (29) which, as said switch device (21) oscillates, closes a respective downflow conduit (9) when said switch conduit (22) is aligned with the other said downflow conduit (9).

8. A unit as claimed in one of Claims 4 to 7, wherein for each said downflow conduit (9) the detecting device (32) is able to emit a "minimum level" signal of the tobacco level.

9. A unit as claimed in one of Claims 4 to 8, wherein for each said downflow conduit (9) the detecting device (32) is able to emit "maximum level" signal of the tobacco level.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EUROPEAN SEARCH REPORT

Application Number
EP 04 10 0914

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	US 5 022 415 A (BELVEDERI BRUNO ET AL) 11 June 1991 (1991-06-11) * column 3, line 37 - column 4, line 37; figures *	1,4	A24C5/18
A	US 5 009 238 A (HEITMANN UWE) 23 April 1991 (1991-04-23) * the whole document *	1,4	
A	US 2002/017307 A1 (BARKMANN RALF ET AL) 14 February 2002 (2002-02-14) * paragraph [0050]; figures *	1,4	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	22 June 2004	MARZANO MONTEROSSO

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 04 10 0914

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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22-06-2004

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5022415 A	11-06-1991	IT 1225358 B	13-11-1990
		BR 8906269 A	31-07-1990
		DE 3940357 A1	07-06-1990
		FR 2639798 A1	08-06-1990
		GB 2226226 A ,B	27-06-1990
		JP 2190175 A	26-07-1990
US 5009238 A	23-04-1991	DE 3937151 A1	23-05-1990
		GB 2225207 A ,B	30-05-1990
		IT 1237504 B	08-06-1993
		JP 2190174 A	26-07-1990
		JP 3138266 B2	26-02-2001
US 2002017307 A1	14-02-2002	DE 10035692 A1	31-01-2002
		CN 1334049 A	06-02-2002
		EP 1174046 A2	23-01-2002
		JP 2002065234 A	05-03-2002
		PL 348791 A1	28-01-2002

EPO FORM P0459

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