(19) Europäisches Patentamt
European Patent Office
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(11) EP 1 454 543 A1

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
08.09.2004 Bulletin 2004/37

(51) Int Cl.[7]: **A24C 5/35**

(21) Application number: **04100911.9**

(22) Date of filing: **05.03.2004**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IT LI LU MC NL PL PT RO SE SI SK TR
Designated Extension States:
AL LT LV MK

(30) Priority: **06.03.2003 IT BO20030120**

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(54) Method and hopper for supplying tobacco articles

(57) A method and hopper (1) for supplying tobacco articles (2), in particular for feeding filters to a filter-tipped cigarette production line of a filter assembly machine, whereby the articles (2) are fed, inside the hopper (1), along a channel (14), one wall (18) of which is defined by a conveying branch (18) of an endless belt (15); the conveying branch (18) is Z-shaped and defined by two parallel end portions (23, 24), and by an intermediate portion (25) defined by two pulleys (19, 20), which are moved in an adjusting direction (33) parallel to the two end portions (23, 24) to vary the volume of the hopper (1).

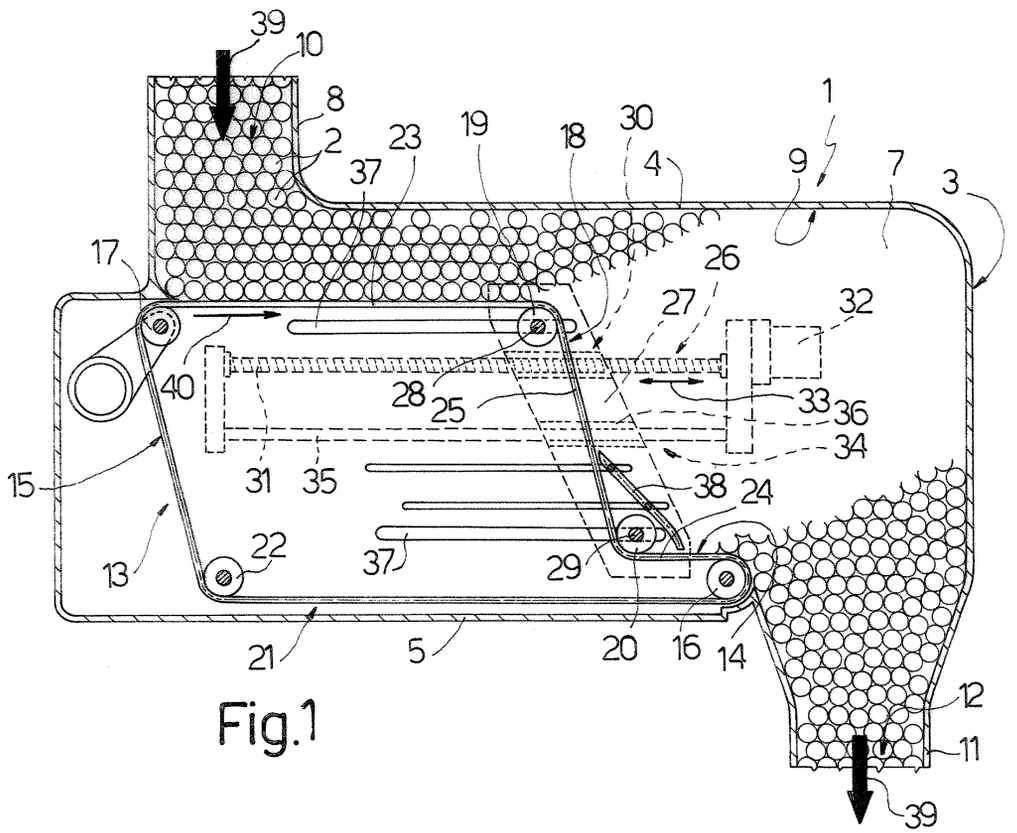

Fig.1

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Description

[0001] The present invention relates to a method and hopper for supplying tobacco articles.

[0002] The present invention may be used to particular advantage for feeding filters to a filter-tipped cigarette production line of a filter assembly machine, to which the following description refers purely by way of example.

[0003] As is known, filter assembly machines comprise at least two inputs, one of which receives normally double cigarette portions, while the other receives filter portions, which in length are normally a multiple of that of a double filter, and are cut into a number of parts before reaching the filter-tipped cigarette production line.

[0004] During production, a variation in the speed of the cigarette production line must obviously correspond to a like variation in the speed of the filter feed line. And, since synchronous variations of the two speeds are substantially impossible to achieve, the filter feed line must be fitted with a compensating store which, in known filter assembly machines, greatly increases the cost and size of the machine.

[0005] It is an object of the present invention to provide a method of supplying tobacco articles, which is cheap and easy to implement, and which provides, effectively and in relatively little space, for compensating any difference in the inflow and outflow of such articles to and from a hopper.

[0006] According to the present invention, there is provided a method of supplying tobacco articles, 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 hopper of supplying tobacco articles, as claimed in Claim 5 and, preferably, in any one of the following Claims depending directly or indirectly on Claim 5.

[0008] A non-limiting embodiment of the present invention will be described by way of example with reference to the accompanying drawings, in which Figures 1 and 2 show schematic cross sections of a preferred embodiment of the hopper according to the present invention in two different operating configurations.

[0009] Number 1 in the accompanying drawings indicates as a whole a hopper for filter portions 2, comprising a casing 3 defined by a horizontal top wall 4, a horizontal bottom wall 5, two vertical lateral walls 6, and two vertical end walls 7 (only one shown). Hopper 1 also comprises an input conduit 8 extending through top wall 4 to feed an input stream 10 of portions 2 into a chamber 9 in casing 3; and an output conduit 11 extending through bottom wall 5 to permit outflow of an output stream 12 from chamber 9.

[0010] Chamber 9 houses a regulating device 13 defining, inside chamber 9, a channel 14 connecting input conduit 8 to output conduit 11, and which, in use, provides for adjusting the volume of channel 14 to compensate any difference between input stream 10 and output stream 12.

[0011] Regulating device 13 comprises a belt 15 looped about a drive pulley 16 adjacent to bottom wall 5 and output conduit 11, and about a tensioning pulley 17 adjacent to top wall 4 and to the side of input conduit 8. Pulleys 16 and 17 define, on belt 15, a top conveying branch 18 formed substantially into a Z by two guide pulleys 19 and 20; and a bottom return branch 21 formed substantially into an L by a guide pulley 22.

[0012] Along top conveying branch 18, which forms a lateral wall of channel 14, the two guide pulleys 19 and 20 define a substantially horizontal top portion 23 extending between pulleys 17 and 19; a bottom portion 24 parallel to top portion 23 and extending between pulleys 20 and 16; and a transverse intermediate portion 25 connecting portions 23 and 24 and extending between pulleys 19 and 20.

[0013] Regulating device 13 also comprises an actuating unit 26, in turn comprising a slide 27, which is fitted through with the shafts 28 and 29 supporting guide pulleys 19 and 20, and is connected, by a screw-nut screw coupling 30, to a screw 31 parallel to top and bottom portions 23 and 24 of top conveying branch 18, and connected to the output of a fixed reversible motor 32 to move slide 27 either way in an adjusting direction 33 along a guide device 34 comprising a fixed bar 35 extending parallel to screw 31 and in sliding manner through a sleeve 36 fitted through slide 27. For each end wall 7 and each shaft 28, 29, guide device 34 comprises a slot 37 formed through end wall 7 and engaged in transversely sliding manner by a relative end of relative shaft 28, 29.

[0014] Shaft 28 and relative guide pulley 19 are fitted to slide 27 inwards of belt 15, while shaft 29 and relative guide pulley 20 are fitted to slide 27 outwards of belt 15 and are prevented from directly contacting portions 2 in channel 14 by a plate 38 fitted to slide 27.

[0015] In actual use, once fed into channel 14 along input conduit 8, portions 2 are fed along channel 14 in a travelling direction 39 towards output conduit 11 by a combination of gravity and the thrust imparted to the mass of portions 2 inside channel 14 by belt 15, the top conveying branch 18 of which is moved by drive pulley 16 in an operating direction 40 concordant with travelling direction 39.

[0016] In normal conditions, input stream 10 and output stream 12 are equal and motor 32 remains idle. Conversely, in the event of a variation in pressure inside channel 14 (detected immediately by known sensors (not shown) and indicating a difference between input stream 10 and output stream 12), motor 32 is activated to eliminate the variation in pressure, i.e. to move slide 27 leftwards in the accompanying drawings, so as to increase the volume of channel 14 in the event of a positive variation in pressure, or rightwards in the accompanying drawings, so as to reduce the volume of chan-

nel 14 in the event of a negative variation in pressure.

[0017] In connection with the above, it should be pointed out that, whatever the position of slide 27 along guide device 34, the deformable wall of channel 14 defined by top conveying branch 18 of belt 15 is always the same length, in that intermediate portion 25 is of fixed length, while the lengths of top and bottom portions 23 and 24 vary in complementary manner as slide 27 moves in adjusting direction 33.

Claims

1. A method of supplying tobacco articles, whereby said articles (2) are fed, inside a hopper (1) having an input (8) for an input stream (10) of said articles (2) and an output (11) for an output stream (12) of said articles (2), along a channel (14) having a substantially Z-shaped wall (18) comprising at least three portions (23-25), of which a first and a second portion (23, 24), parallel to each other and having respective lengths, are located on opposite sides of an intermediate third portion (25) substantially crosswise to the other two; said third portion (25) being moved in an adjusting direction (33) parallel to said first and second portion (23, 24) to vary said lengths in complementary manner, and also to adjust a volume of said channel (14) to compensate any difference between said input stream (10) and said output stream (12).

2. A method as claimed in Claim 1, wherein said wall (18) is defined by a branch (18) of a belt (15), wherein said third portion (25) is defined by two pulleys (19, 20) which are moved one way or the other in said adjusting direction (33) to vary said lengths in complementary manner.

3. A method as claimed in Claim 2, wherein said belt (15) is an endless belt (15), which is moved along said branch (18) in an operating direction (40) concordant with a travelling direction (39) of said articles (2) towards said output (11).

4. A method as claimed in Claim 2 or 3, wherein said two pulleys (19, 20) are fitted to a slide (27) movable in said adjusting direction (33).

5. A hopper for supplying tobacco articles, the hopper (1) comprising an input (8) for an input stream (10) of said articles (2); an output (11) for an output stream (12) of said articles (2); and a channel (14) between said input (8) and said output (11); and being **characterized in that** said channel (14) comprises a substantially Z-shaped wall (18) comprising at least three portions (23-25) , of which a first and a second portion (23, 24), parallel to each other and having respective lengths, are located on opposite sides of an intermediate third portion (25) substantially crosswise to the other two; actuating means (26) being provided to move said third portion (25) in an adjusting direction (33) parallel to said first and second portion (23, 24) to vary said lengths in complementary manner, and also to adjust a volume of said channel (14) to compensate any difference between said input stream (10) and said output stream (12).

6. A hopper as claimed in Claim 5, wherein said wall (18) is defined by a branch (18) of a belt (15), wherein said third portion (25) is defined by two pulleys (19, 20); said actuating means (26) moving said two pulleys (19, 20) one way or the other in said adjusting direction (33) to vary said lengths in complementary manner.

7. A hopper as claimed in Claim 6, wherein said belt (15) is an endless belt (15); drive means (16) being provided to move said belt (15) along said branch (18) in an operating direction (40) concordant with a travelling direction (39) of said articles (2) towards said output (11) .

8. A hopper as claimed in Claim 6 or 7, wherein said actuating means (26) comprise a guide device (34) extending in said adjusting direction (33); and a powered slide (27) supporting said two pulleys (19, 20) and movable along said guide device (34).

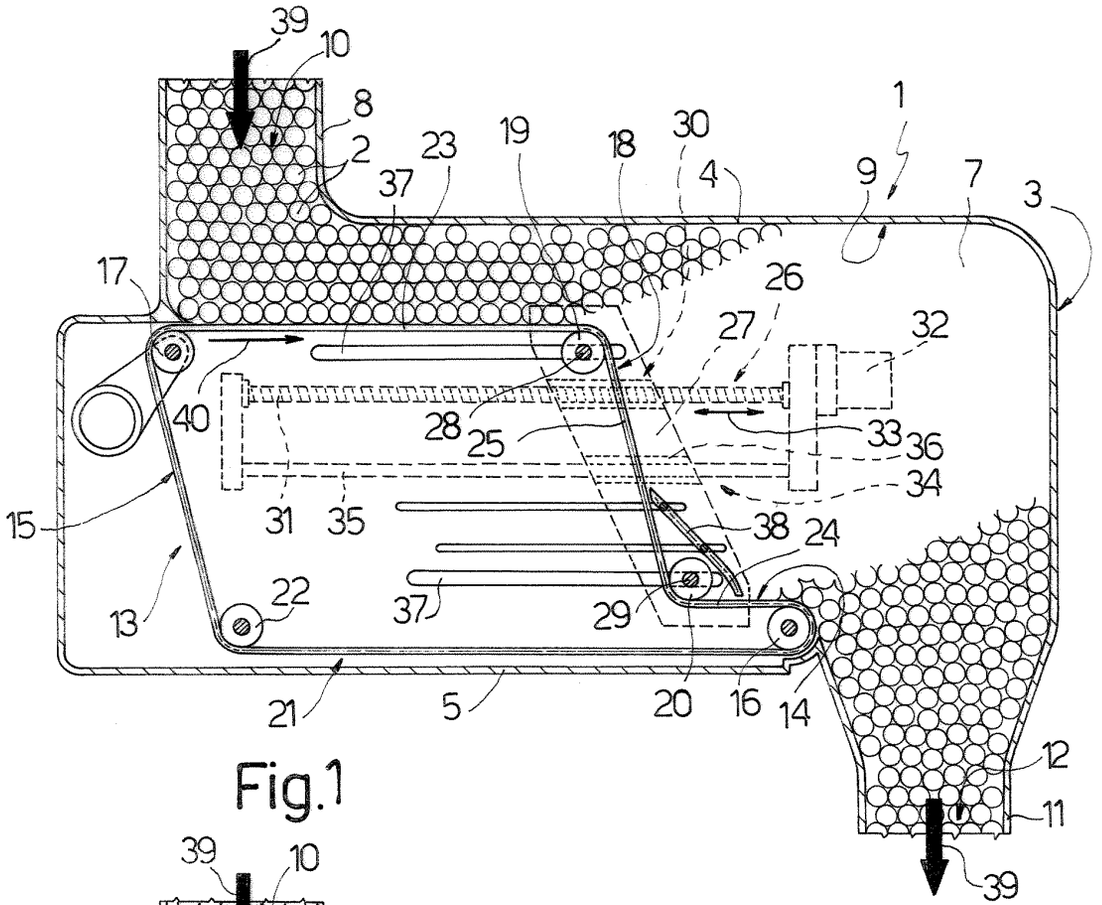
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Fig.1

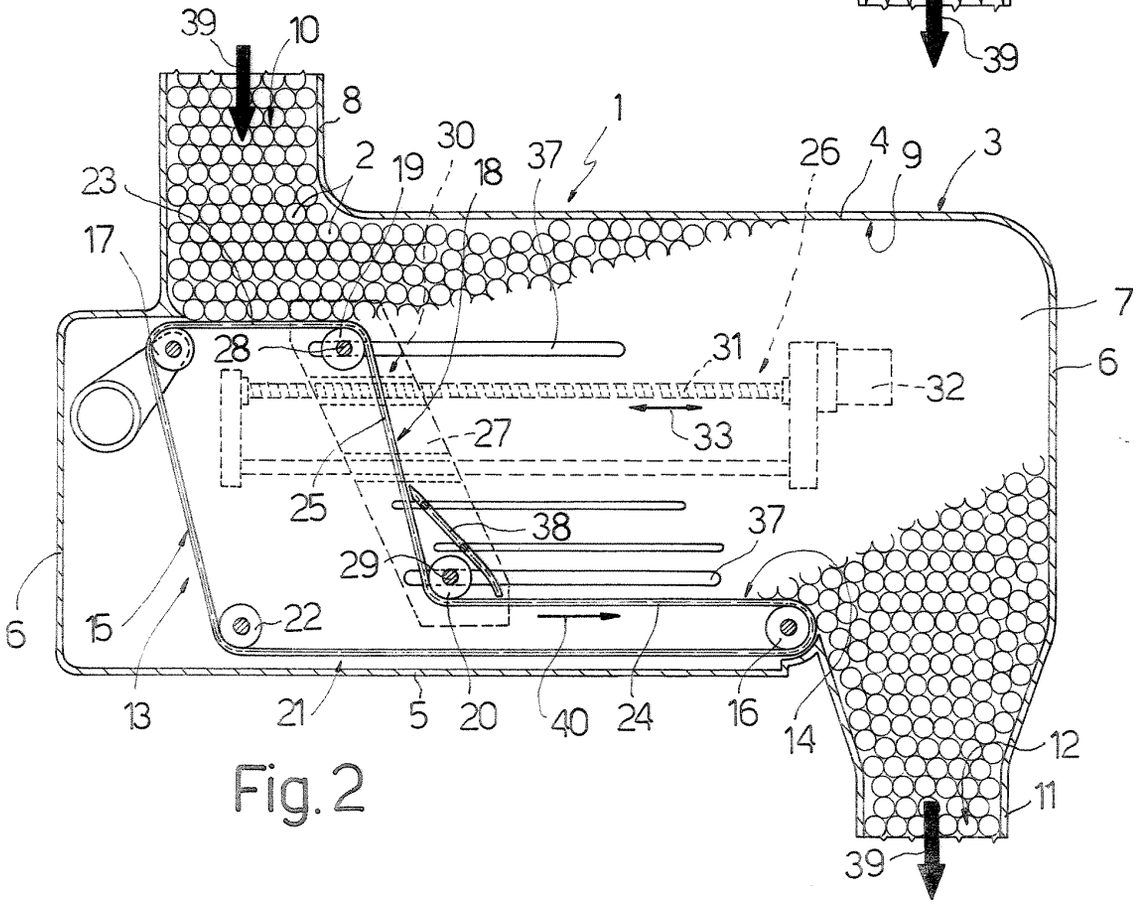
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Fig.2

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EUROPEAN SEARCH REPORT

Application Number
EP 04 10 0911

DOCUMENTS CONSIDERED TO BE RELEVANT

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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A24C
B65G
B65B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	15 June 2004	MARZANO MONTEROSSO

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