



(12) **EUROPEAN PATENT APPLICATION**  
published in accordance with Art. 153(4) EPC

(43) Date of publication:  
**18.10.2017 Bulletin 2017/42**

(51) Int Cl.:  
**A24D 1/02 (2006.01) A24C 5/47 (2006.01)**

(21) Application number: **15884616.2**

(86) International application number:  
**PCT/JP2015/057342**

(22) Date of filing: **12.03.2015**

(87) International publication number:  
**WO 2016/143128 (15.09.2016 Gazette 2016/37)**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**MA**

(71) Applicant: **Japan Tobacco, Inc.**  
**Tokyo 105-8422 (JP)**

(72) Inventor: **UMETSU, Toshitaka**  
**Tokyo 130-8603 (JP)**

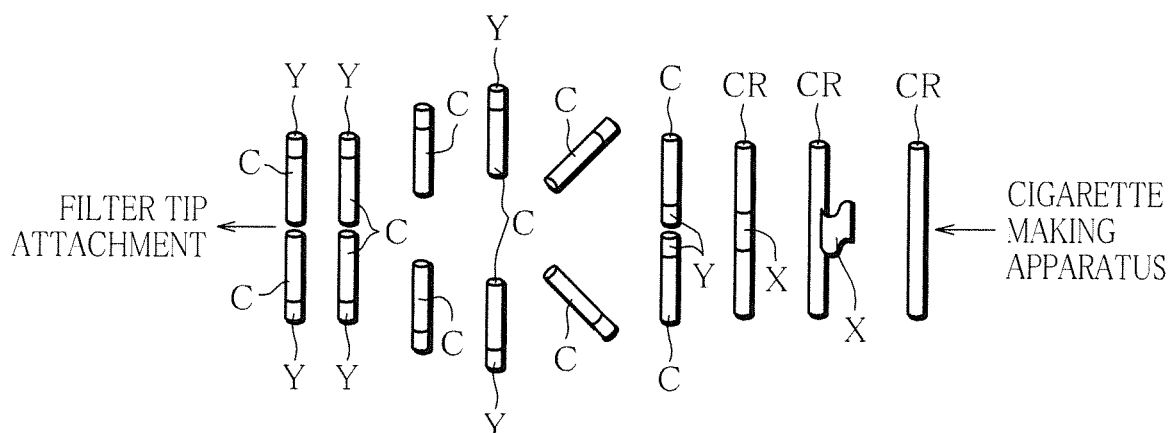
(74) Representative: **Isarpatent**  
**Patent- und Rechtsanwälte Behnisch Barth**  
**Charles**  
**Hassa Peckmann & Partner mbB**  
**Friedrichstrasse 31**  
**80801 München (DE)**

(54) **METHOD FOR MANUFACTURING FILTERED CIGARETTE**

(57) The method of making filtered cigarettes according to the present invention includes steps of: wrapping an outer wrapper (X) around a cigarette rod (CR) of twice the length of a cigarette at the center, then cutting the cigarette rod (CR) with the outer wrapper (X) into two

cigarettes (C), then turning the two cigarettes around, respectively, and then forming two filtered cigarettes using the turned-around two cigarettes (C) by a publicly-known process.

**FIG. 7**



## Description

### Technical Field

[0001] The present invention relates to a method of making filtered cigarettes each comprising a cigarette and a filter connected by a tip paper and having a double wrapper structure at part of the circumference of the cigarette.

### Background Art

[0002] A method of making filtered cigarettes of this type is disclosed, for example in Patent Document 1 identified below. The double wrapper structure obtained by the making method of Patent Document 1 comprises a wrapper of a cigarette itself and an inner patch attached to the inner side of the wrapper at a predetermined position to extend over part of the inner side. Such inner patch serves to add a special function to the filtered cigarette. In Patent Document 1, the inner patch is, for example paper containing activated carbon and menthol, and as a special function, adds a menthol flavor to the filtered cigarette. Incidentally, the activated carbon contained in the inner patch is used to keep menthol stably in the paper.

Prior Art Document

### Patent Document

[0003] Patent Document 1: International Application Japanese Translation Publication No. 2007-524418

### Summary of the Invention

#### Problems to be solved by the Invention

[0004] In the making method of Patent Document 1, while a web for forming wrappers is caused to travel toward a cigarette making apparatus, inner patches are attached to the web at regular intervals along the length of the web. The cigarette making apparatus makes cigarettes at high rate, and the web is supplied to the cigarette making apparatus at extremely high travel speed. Provided that the cigarette making apparatus makes 4000 cigarettes per minute and that the individual cigarettes are 54mm long, the travel speed of the web reaches as high as 216m/min(= (54mm×4000)/1000). It is very difficult to attach inner patches to such high-speed traveling web at desired positions accurately.

[0005] Further, the web is allowed appropriate extension. Such extension enables high-speed traveling of the web, and prevents the web from breaking when pulling force is applied to the web in replacement of the bobbin from which the web is fed. The extension of the web is greatly affected by the magnitude of pulling force and also ambient temperature, which increases the difficulty

of attaching inner patches accurately. Accordingly, when filtered cigarettes are made using a web with inner patches attached, variation in position of the inner patch is inevitable, and it is difficult to keep quality of filtered cigarettes within an acceptable range.

[0006] An object of the present invention is to provide a method of making filtered cigarettes having the above-described double wrapper structure which can stabilize quality of the filtered cigarettes.

### Means for Solving the Problems

[0007] The above object is achieved by the method of making filtered cigarettes according to the present invention, which comprises

a step of forming a cigarette rod of twice the length of a cigarette of a filtered cigarette, the cigarette rod comprising a wrapper and a smokable filler which fills within the wrapper,

a wrapping step of wrapping at least one outer wrapper around the cigarette rod,

a first cutting step of cutting the cigarette rod with the outer wrapper wrapped around into two equal lengths, thereby forming two cigarettes each having a double wrapper structure,

a turning-around step of turning the two cigarettes around, respectively,

a step of placing a filter plug of twice the length of a filter of the filtered cigarette between the turned-around two cigarettes and bringing the turned-around two cigarettes into close contact with the filter plug,

a step of wrapping a double tip paper of twice the width of a tip paper around the turned-round two cigarettes with the filter plug between, the width of the tip paper being a dimension along the length of the filtered cigarette, thereby forming a double filtered-cigarette of twice the length of the filtered cigarette, and

a second cutting step of cutting the double filtered-cigarette into individual filtered cigarettes.

[0008] In the above making method, the double wrapper structure of the filtered cigarette is provided by wrapping an outer wrapper around the circumference of a cigarette rod, and comprises a wrapper of the cigarette itself and the outer wrapper or part of the outer wrapper. In this case, when the outer wrapper is wrapped around the cigarette rod, the wrapper is not subjected to pulling force applied axially of the cigarette rod. Wrapping of the outer wrapper is therefore not affected adversely by extension of the wrapper caused by such pulling force.

### Advantageous Effects of the Invention

[0009] Accordingly, the making method according to the present invention enables the outer wrapper to be wrapped around the cigarette rod at a desired position, and thus, can stabilize quality of filtered cigarettes having a double wrapper structure.

[0010] Other advantages of the present invention will

become clear from the accompanying drawings and the description of embodiments given below.

### Brief Description of the Drawings

#### [0011]

FIG. 1 is a block diagram schematically showing a manufacture system which carries out a making method according to the present invention.

FIG. 2 is a diagram showing a filler supply apparatus and a cigarette making apparatus included in the manufacture system more specifically.

FIG. 3 is a diagram showing flow of handling in a filter tip attaching apparatus included in the manufacture system.

FIG. 4 is a diagram showing alternative flow of handling in the filter tip attaching apparatus.

FIG. 5 is a diagram showing a wrapper addition apparatus included in the manufacture system more specifically.

FIG. 6 is a diagram showing arrangement of bands of an additive applied to an outer web.

FIG. 7 is a diagram showing flow of handling in the wrapper addition apparatus.

FIG. 8 is a diagram showing a process added to the flow of handling shown in FIG. 7.

FIG. 9 is a perspective view showing an example of filtered cigarette having a double wrapper structure.

FIG. 10 is a cross-sectional view of the filtered cigarette of FIG. 9.

FIG. 11 is a cross-sectional view of a variation of the filtered cigarette.

FIG. 12 is a cross-sectional view of another variation of the filtered cigarette.

FIG. 13 is a perspective view of another example of filtered cigarette having a double wrapper structure.

FIG. 14 is a diagram showing two outer webs used in manufacture of the filtered cigarette of FIG. 13.

### Mode for Carrying out the Invention

[0012] Referring to FIG. 1, a manufacture system which carries out the making method according to the present invention comprises a filler supply apparatus 10, a cigarette making apparatus 12 and a filter attaching apparatus called "filter tip attachment 14". Although these apparatuses are publicly known, a brief description thereof will be given below.

[0013] FIG. 2 shows the filler supply apparatus 10 and the cigarette making apparatus 12 more specifically. The filler supply apparatus 10 receives a smokable filler once in a receiver 16. The filler comprises tobacco shreds, which are a mixture of shreds obtained by shredding laminae and stems of tobacco, reconstituted tobacco, etc. The filler in the receiver 16 is sucked onto an endless tobacco band 18 to form a layer 20 on the tobacco band 18. As the tobacco band 18 travels, the filler layer 20 is

supplied to the cigarette making apparatus 12.

[0014] The cigarette making apparatus 12 comprises an endless garniture tape 22. The garniture tape 22 receives a web W which is to form wrappers for cigarettes.

5 The filler layer 20 is transferred from the tobacco band 18 onto the web W on the garniture tape 22 via a shoe 24. As the garniture tape 22 travels, the web W travels with the filler layer 20. While traveling in this manner, the web W encloses the filler layer 20 to take a rod shape with the help of the garniture tape 22. Thus, a tobacco rod TR is formed continuously. In addition to a forming bed (not shown) which guides the garniture tape 22, a tongue 26, a former 28, a dryer 30 and others are used in forming of the tobacco rod TR.

15 [0015] The tobacco rod TR then passes a cutter 32, where it is cut into cigarette rods CR or cigarettes C. The cigarette rod CR is twice the length of the cigarette C.

[0016] If the cigarette making apparatus 12 is directly connected to the filter tip attachment 14, the filter tip attachment 14 receives cigarette rods CR or cigarettes C from the cigarette making apparatus successively and transports them in a direction perpendicular to their axes. Specifically, the filter tip attachment 14 comprises a drum train (not shown) which defines a transport path for cigarette rods CR or cigarettes CR. The drum train comprises multiple fluted transport drums arranged along the transport path. The transport drum at the starting end of the drum train is formed as a catcher drum.

25 [0017] FIG. 3 relates to the case where the filter tip attachment 14 receives cigarette rods CR, and shows flow of handling of cigarette rods CR within the filter tip attachment 14. As seen in FIG. 3, a cigarette rod CR is first cut into two equal lengths, thus formed into two cigarettes C. The two cigarettes are then separated axially to provide a predetermined space between them.

30 [0018] Then, a filter plug FP is placed between the two cigarettes C, and the two cigarettes are brought into close contact with the opposite ends of the filter plug FR, respectively (cigarette-filter plug contacting step). Then, the filter plug FP and the two cigarettes C are connected by wrapping a double tip paper DTP around them to form a double filtered-cigarette (double filtered-cigarette forming step). The double filtered-cigarette is then cut into two equal lengths to form two filtered cigarettes FC (second cutting step).

35 [0019] FIG. 4 relates to the case where the filter tip attachment 14 receives cigarettes C, and shows flow of handling of cigarettes C within the filter tip attachment 14. As seen in FIG. 4, on the transport path, cigarettes C are first arranged to form a zigzag formation along the transport path. Then, each two adjacent cigarettes C are aligned. Then, filtered cigarettes FC are formed in the same manner as in FIG. 3.

40 [0020] As shown in FIG. 1, the manufacture system further comprises a wrapper addition apparatus 34 to provide a double wrapper structure at part of the circumference of the cigarette C of the filtered cigarette FC. The wrapper addition apparatus 34 is arranged between the

cigarette making apparatus 12 and the filter tip attachment 14.

**[0021]** FIG. 5 shows a wrapper addition apparatus 34 according to a first embodiment of the present invention.

**[0022]** The wrapper addition apparatus 34 comprises a drum train 36 similar to the drum train in the filter tip attachment 14. The drum train 36 comprises a plurality of fluted transport drums. In order from the starting end of the drum train, these transport drums are called catcher drum 38, first transport drum 40, outer wrapper attachment drum 42, outer wrapper wrapping drum 44, cutting drum 46, turning-around drum 48, second transport drum 50 and third transport drum 52. They define a transport path for cigarette rods CR.

**[0023]** Near the attachment drum 42, a receiving drum 54 is arranged, and a knife drum 56 is provided adjacent to the receiving drum 56. The knife drum 56 has multiple knives on the circumference. The knives are equally spaced along the circumference of the knife drum 56. An outer web OW for forming outer wrappers is fed to the receiving drum 54 and sucked onto the circumference of the receiving drum 54 by suction. The receiving drum 54 is connected to a web roll WR by means of a feed path 58, for example, so that the outer web OW is fed from the web roll WR to the receiving drum 54 along the feed path 58. The feed path 58 is defined by multiple guide rollers.

**[0024]** A feed roller unit 60 is arranged on the feed path 58. The feed roller unit 60 feeds the outer web OW from the web roll WR at a constant speed. Further, an additive applicator 62 is arranged on the feed path 58. The applicator 62 is located downstream of the feed roller unit 60. The applicator 62 comprises a pan 64 to hold an additive, a gravure roll 66 and a transfer roller 68. The additive held in the pan 64 is applied to the inner side of the outer web OW via the gravure roll 66 and the transfer roller 68.

**[0025]** The application of the additive forms bands B of the additive on the outer web OW, periodically. As seen in FIG. 6, the bands B are distributed along the length of the outer web OW with a predetermined pitch P. For example, the pitch P is longer than the circumferential length of the cigarette by a predetermined length. In the present embodiment, the width Ww of the outer web OW is 20mm. The band B has a length Lb which is a dimension along the width of the outer web OW, and the length Lb is shorter than the width Ww of the outer web OW. Accordingly, a margin is left between each edge of the outer web OW and the band B. The margin is, for example 0.1mm. The band B has a width Wb which is a dimension along the length of the outer web OW, and the width Wb is, for example 6.0mm.

**[0026]** The receiving drum 54 and the knife drum 56 cooperate to cut the outer web OW with bands B formed on, periodically, at intervals equal to the pitch P, thereby forming individual outer wrappers on the receiving drum 54. Cutting lines at which the outer web OW is to be cut are indicated by dot-and-dash lines in FIG. 6. The cutting lines traverse the bands B longitudinally. Accordingly,

when viewed in the direction in which the outer web OW is fed, the outer wrapper formed has additive stripes at the head and the tail. The additive stripes result from cutting of the bands B. As seen from FIG. 6, the tail-side additive stripe is wider than the head-side additive stripe. The outer wrapper thus prepared is attached to the cigarette rod CR which is being transported along the transport path by means of the head-side additive stripe in a manner like a flag.

**[0027]** Specifically, FIG. 7 shows flow of handling of cigarette rods CR on the transport path. First, the transport path, specifically the catcher drum 38 receives a cigarette rod CR from the cigarette making apparatus 12. The cigarette rod CR received is transported to the attachment drum 42 via the first transport drum 40. Here, if the cigarette making apparatus 12 to which the wrapper addition apparatus 34 according to the present embodiment is applied is a type intended to make cigarettes C, the cigarette making apparatus 12 is altered to make cigarette rods CR instead of cigarettes C. The alteration is carried out, for example by changing the timing of cutting by the cutter 32 of the cigarette making apparatus 12.

**[0028]** While a cigarette rod CR on the attachment drum 42 is passing the receiving drum 54, the head of a leading one of outer wrappers on the receiving drum 54 comes in contact with the circumference of the cigarette rod CR by the head-side additive stripe, so that the outer wrapper X is attached to the cigarette rod CR at the center in a manner like a flag (earlier stage of the wrapping step). Here, on the first transport drum 40, the cigarette rod CR is positioned such that the center is at a position predetermined for attachment of the outer wrapper X. This allows the outer wrapper X to be wrapped around the cigarette rod CR at the center accurately.

**[0029]** The cigarette rod CR with the outer wrapper X attached is then transferred from the attachment drum 42 to the wrapping drum 44. The wrapping drum 44 comprises a rolling plate 70 (see FIG. 5) so that a rolling passage is defined between the rolling plate 70 and the circumference of the wrapping drum 44. The cigarette rod passes through the rolling passage rotating about the axis thereof, as a result of which, the outer wrapper X is wrapped entirely around the circumference of the cigarette rod CR (latter stage of the wrapping step). In this stage, the tail of the outer wrapper X is bonded to the outer surface of the head of the outer wrapper X by the adhesive strip to form a seam with the head.

**[0030]** The cigarette rod CR is then transferred from the wrapping drum 44 to the cutting drum 46. The cutting drum 46 comprises a rotary knife 72. While passing the rotary knife 72, the cigarette rod CR on the cutting drum 46 is cut at the center with the outer wrapper X into two equal lengths. As a result of this cutting, two cigarettes C each having a double wrapper structure are formed (first cutting step). The double wrapper structure is located at an end of the cigarette C and comprises the wrapper of the cigarette C itself and an outer wrapper Y which is a half of the outer wrapper X.

**[0031]** Then, the two cigarettes C are transferred from the cutting drum 46 to the turning-around drum 48. On the turning-around drum 48, the two cigarettes are turned through 180°, respectively (turning-around step). Thus, the two cigarettes C are changed in orientation such that their ends equipped with the double wrapper structure, originally facing each other, face away from each other. In order to enable the cigarettes C to be turned around this way, the turning-around drum 48 has multiple holders to receive cigarettes C. The holders each have an axis of rotation extending radially of the turning-around drum 48, and rotate about the axis of rotation while moving circumferentially of the turning-around drum 48.

**[0032]** The two cigarettes C turned around are then transported to the filter tip attachment 14 from the turning-around drum 48 via the second and third transport drums 50, 52. On the second transport drum 50, the two turned-around cigarettes C are brought into close contact with each other in a manner which looks like forming a single cigarette rod CR and then transferred from the second transport drum 50 to the third transport drum 52. The third transport drum 52 is arranged in rotating contact with a catcher drum of the filter tip attachment 14. This allows the two cigarettes C to be transferred from the third transport drum 52 to the catcher drum, or in other words, the wrapper addition apparatus 34 according to the present embodiment to be connected to the filter tip attachment 14.

**[0033]** If the filter tip attachment 14 is a type intended to receive cigarette rods CR, a rotary knife for cutting each cigarette rod CR into two equal lengths is removed from an associated transport drum. The two cigarettes C transported from the wrapper addition apparatus 34 to the filter tip attachment 14 are thus handled in the same manner as two cigarettes C obtained by cutting a cigarette rod CR within the filter tip attachment 14, shown in FIG. 3. As a result, filtered cigarettes FC each having a double wrapper structure are formed.

**[0034]** If the filter tip attachment 14 is a type intended to receive individual cigarettes C from the cigarette making apparatus 12, the second transport drum 50 is replaced with a grading drum. As shown in FIG. 8, the grading drum 50 receives two cigarettes C from the turning-around drum 48 and staggers them in the transport direction. The cigarettes C transported from the grading drum 50 to the filter tip attachment 14 in such staggered, or zigzag formation are handled in the same manner as two cigarettes C transported directly from the cigarette making apparatus 12, shown in FIG. 4. As a result, filtered cigarettes FC each having a double wrapper structure are formed.

**[0035]** In the making method according to the first embodiment, filtered cigarettes FC as shown in FIG. 9 are manufactured which have a double wrapper structure at an end of the cigarette. In the first embodiment, as seen from FIG. 10, the double wrapper structure is in an annular shape, thus extends over the entire circumference of the cigarette C, and has a width of 10mm from the end

of the cigarette C.

**[0036]** When the outer wrapper Y constituting the double wrapper structure has a special property, the filtered cigarette FC made by the making method according to the present invention exhibits a special function based on the property of the outer wrapper Y. The outer wrapper Y is not bonded over the circumference of the cigarette C; only the head of the outer wrapper is bonded to the tail thereof. This minimizes the amount of the adhesive required to wrap the outer wrapper X around the cigarette rod CR, and can therefore effectively suppress adverse influence of the adhesive on the special function.

**[0037]** The making method according to the present invention provides a double wrapper structure at part of the circumference of the cigarette C by attaching and wrapping the outer wrapper X around the cigarette rod CR. Thus, when the outer wrapper X is attached and wrapped, the wrapper of the cigarette rod CR is not subjected to pulling force applied axially of the cigarette rod CR. In this state, the wrapper of the cigarette rod CR does not experience extension caused by pulling force. This enables the outer wrapper X to be wrapped around the cigarette rod CR at a desired position accurately. The making method according to the present invention thus enables manufacture of filtered cigarettes FC having a double wrapper structure stable in quality.

**[0038]** As described above, the double wrapper structure according to the first embodiment is in an annular shape. The double wrapper structure may however be in a semicircular or a circular arc shape, as shown in FIGS. 11 and 12.

**[0039]** FIG. 13 shows a filtered cigarette FC having a double wrapper structure made by a making method according to a second embodiment. In this case, the filtered cigarette FC has a double wrapper structures not at the end of a cigarette C but at a predetermined distance from the end of a cigarette C.

**[0040]** In order to make the filtered cigarette FC according to the second embodiment, the wrapper addition apparatus 34 has, for example two feed paths 58 for an outer web OW. In this case, as shown in FIG. 14, two outer webs OW are fed to the receiving drum 54 along the respective feed paths, and during the feeding, bands 8 of an adhesive are formed on the respective outer webs OW in the same manner as described above. A distance D, for example, is held between the outer webs OW on the two feed paths.

**[0041]** In the making method according to the second embodiment, two outer wrappers X, each serving as an outer wrapper Y of a filtered cigarette, are obtained from the two outer webs OW, respectively, and those two wrappers are wrapped around the circumference of a single cigarette rod CR at an interval of distance D. From this cigarette rod CR, two filtered cigarettes FC shown in FIG. 13 are obtained. As understood from the above description, these filtered cigarettes FC each have a double wrapper structure at a distance D/2 from the end of the cigarette.

**[0042]** In the second embodiment, in order to apply the additive to the respective outer webs OW and cut the respective outer webs OW, the applicator 62 and the cutting unit comprising the receiving drum 54 and the knife drum 56 may be used in common. Alternatively, an applicator and a cutting unit may be provided for each of the outer webs.

**[0043]** Also in the second embodiment, the double wrapper structure may extend over at least part of the circumference of the cigarette C, as shown in FIGS. 11 and 12. Further, the filter cigarette according to the present invention may have two or more double wrapper structures spaced apart axially of the cigarette.

#### Explanation of Reference Signs

#### [0044]

|     |                                         |
|-----|-----------------------------------------|
| 10  | Filler supply apparatus                 |
| 12  | Cigarette making apparatus              |
| 14  | Filter tip attachment                   |
| 32  | Cutter (first and second cutting steps) |
| 34  | Wrapper addition apparatus              |
| C   | Cigarette                               |
| CR  | Cigarette rod                           |
| FC  | Filtered cigarette                      |
| OW  | Outer web                               |
| X   | Outer wrapper                           |
| Y   | Outer wrapper                           |
| DTP | Double tip paper                        |

#### Claims

1. A method of making filtered cigarettes each comprising a cigarette and a filter connected by a tip paper and having a double wrapper structure at part of the circumference of the cigarette, comprising:

a step of forming a cigarette rod of twice the length of the cigarette, the cigarette rod comprising a wrapper and a smokable filler which fills within the wrapper,

a wrapping step of wrapping at least one outer wrapper around the cigarette rod,

a first cutting step of cutting the cigarette rod with the outer wrapper wrapped around into two equal lengths, thereby forming two cigarettes each having a double wrapper structure,

a turning-around step of turning the two cigarettes around, respectively,

a step of placing a filter plug between the turned-around two cigarettes and bringing the turned-around two cigarettes into close contact with the filter plug,

a step of wrapping a double tip paper of twice the width of the tip paper around the turned-around two cigarettes with the filter plug be-

tween, the width of the tip paper being a dimension along the length of the cigarette, thereby forming a double filtered-cigarette of twice the length of the filtered cigarette, and

a second cutting step of cutting the double filtered-cigarette into individual filtered cigarettes.

2. The method of making filtered cigarettes according to claim 1, wherein  
in the wrapping step, one outer wrapper is wrapped around the cigarette rod at the axial center of the cigarette rod, and  
in the first cutting step, the cigarette rod is cut with the outer wrapper.

3. The method of making filtered cigarettes according to claim 1, wherein  
in the wrapping step, two outer wrappers are wrapped around the cigarette rod at positions equally distanced from the axial center of the cigarette rod, and  
in the first cutting step, the cigarette rod is cut at the axial center.

4. The method of making filtered cigarettes according to claim 2 or 3, wherein  
in the wrapping step, the outer wrapper is wrapped around the cigarette rod over the entire circumference thereof.

5. The method of making filtered cigarettes according to claim 4, wherein,  
in the wrapping step, the outer wrapper is held in an unbonded state to the cigarette rod.

FIG. 1

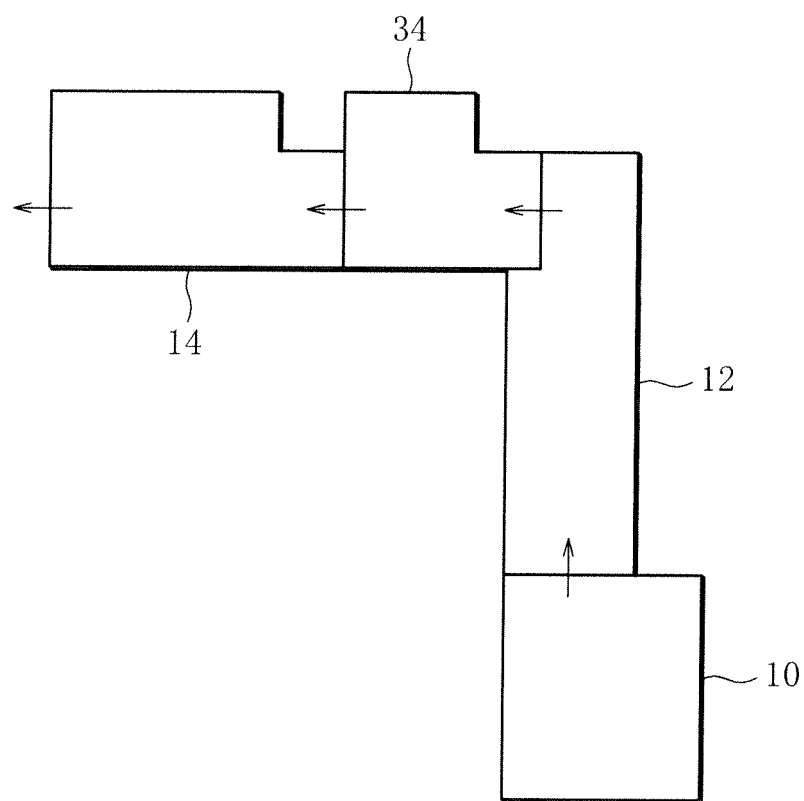


FIG. 2

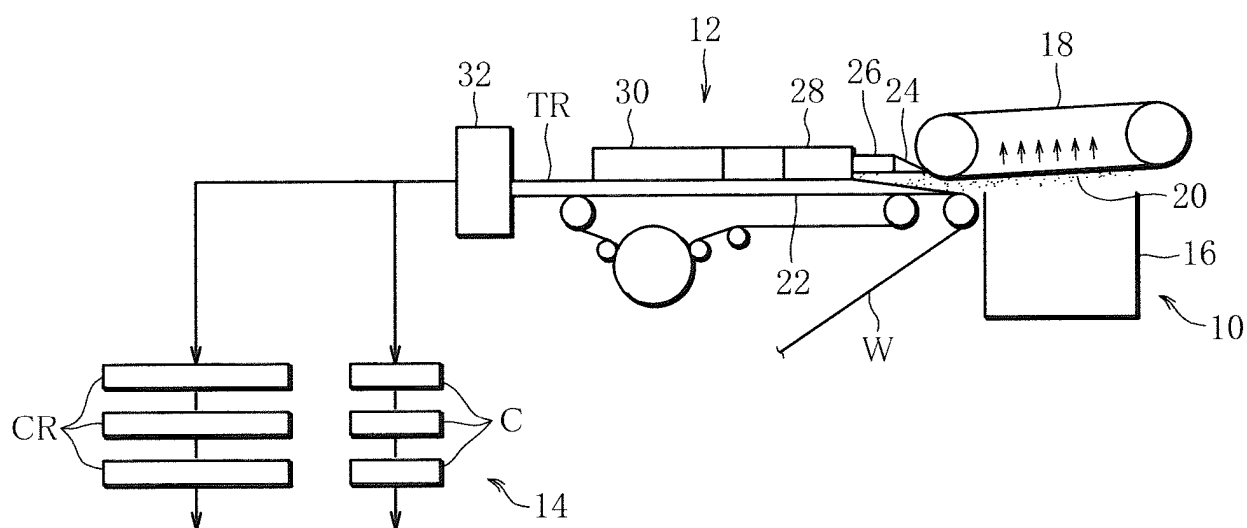


FIG. 3

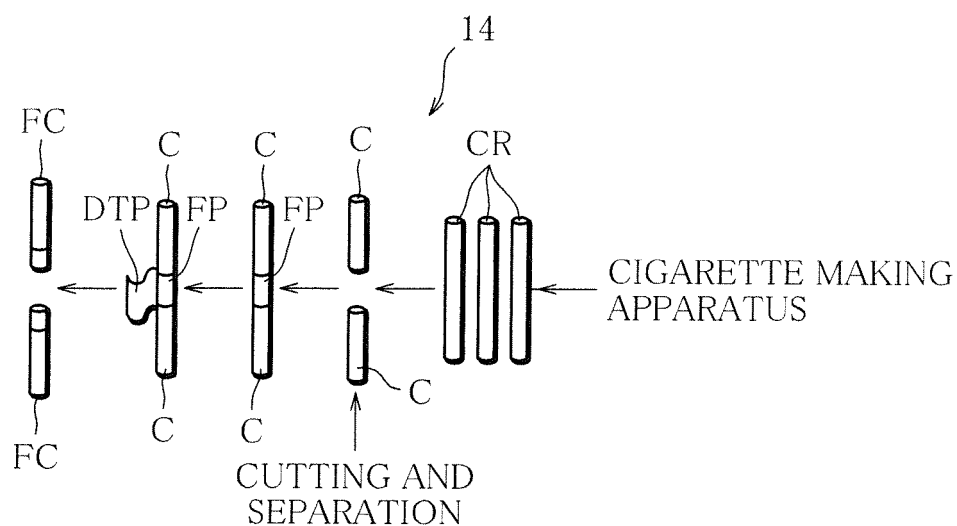


FIG. 4

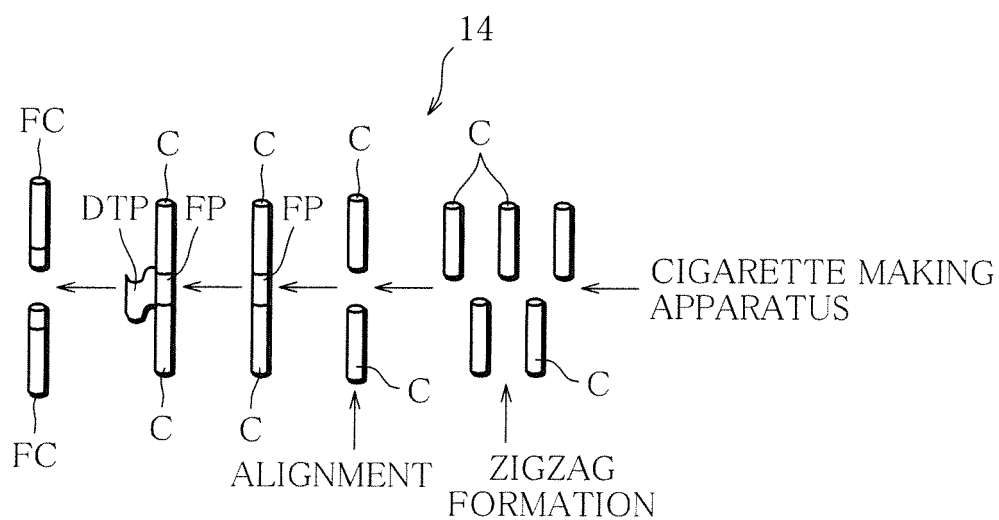


FIG. 5

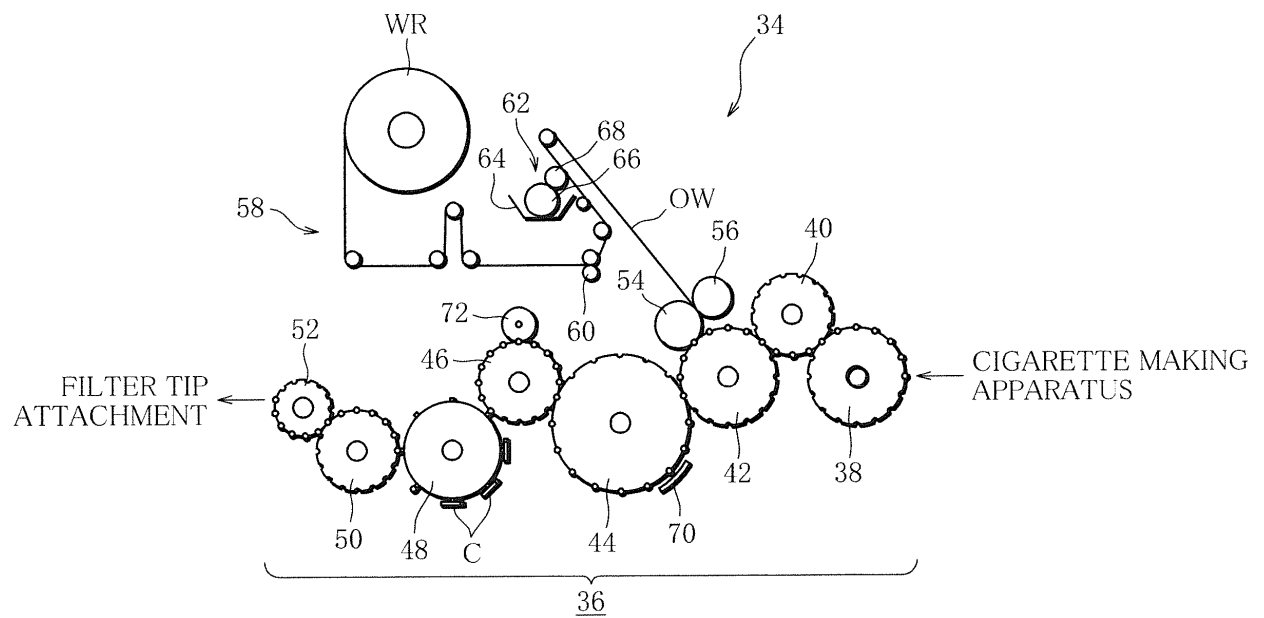


FIG. 6

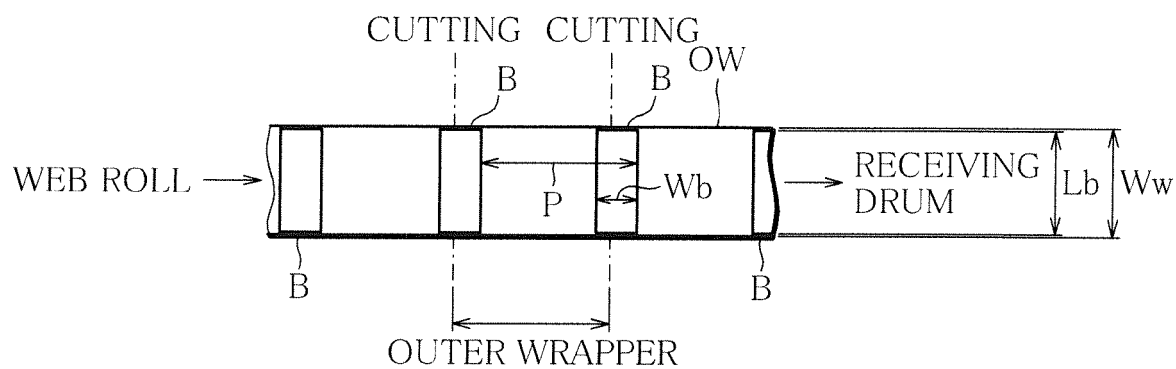


FIG. 7

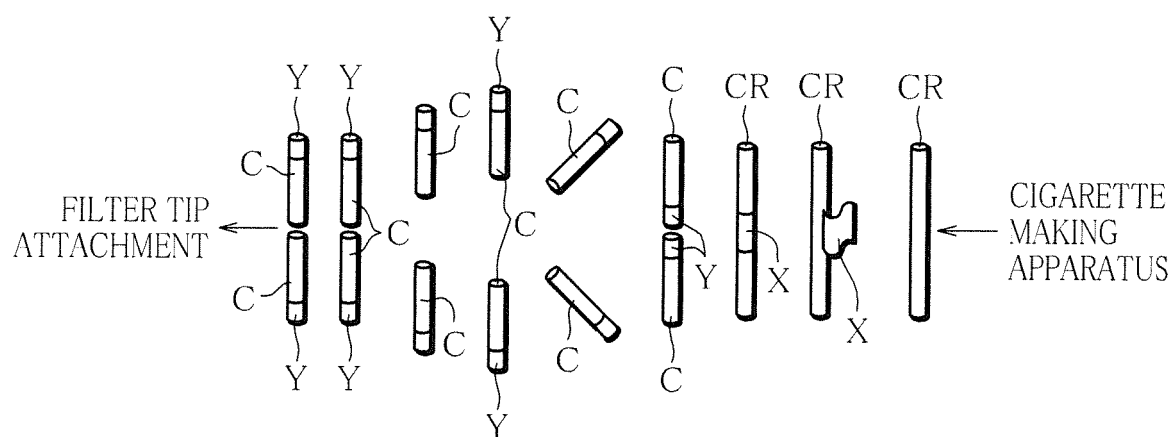


FIG. 8

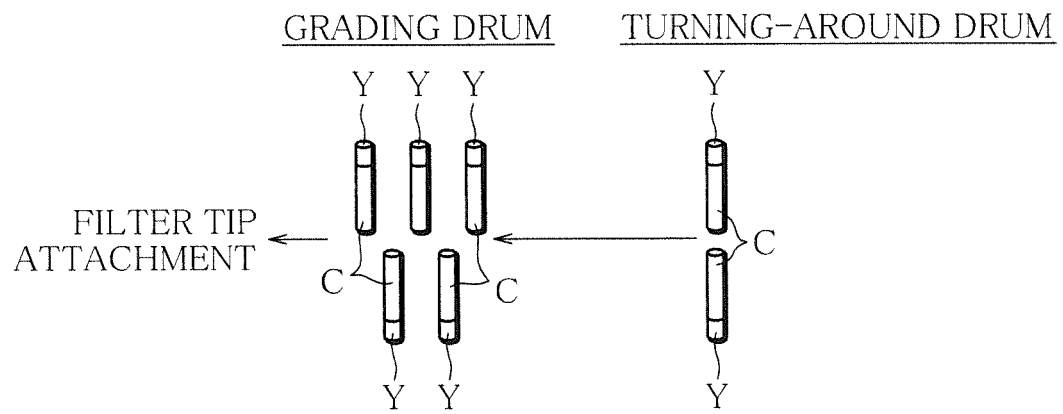


FIG. 9

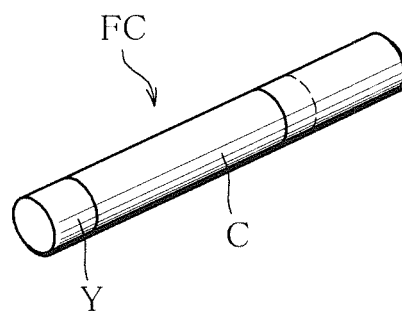


FIG. 10

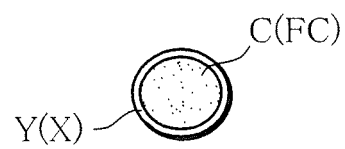


FIG. 11

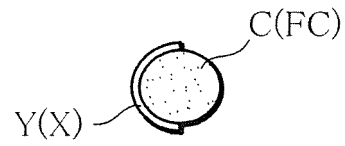


FIG. 12

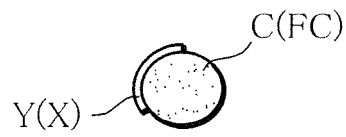


FIG. 13

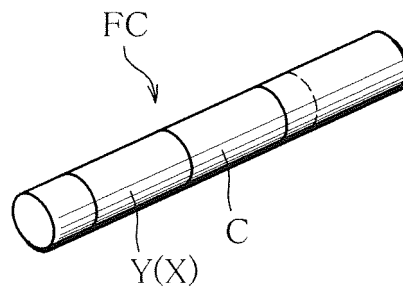
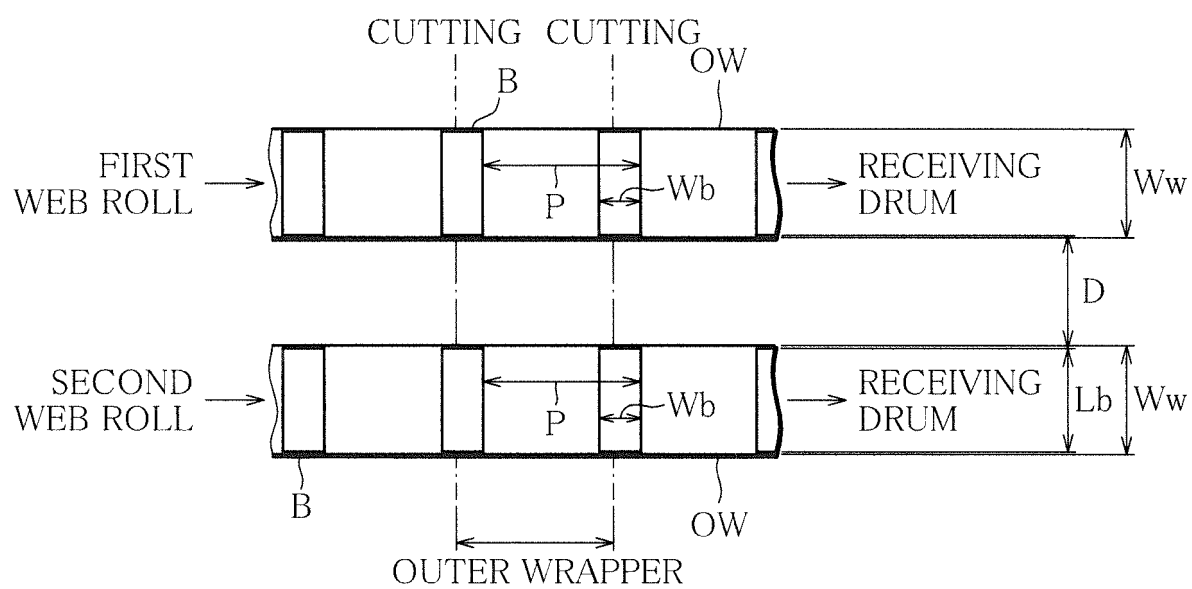


FIG. 14



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/057342

## A. CLASSIFICATION OF SUBJECT MATTER

A24D1/02(2006.01) i, A24C5/47(2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24D1/02, A24C5/47

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2015

Kokai Jitsuyo Shinan Koho 1971-2015 Toroku Jitsuyo Shinan Koho 1994-2015

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                                                                                                                                                   | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | JP 2013-524793 A (British American Tobacco (Investments) Ltd.),<br>20 June 2013 (20.06.2013),<br>entire text; all drawings<br>& US 2013/0118510 A1 & WO 2011/131465 A1<br>& CA 2796913 A & CN 102939020 A                                            | 1-5                   |
| A         | JP 2012-504972 A (British American Tobacco (Investments) Ltd.),<br>01 March 2012 (01.03.2012),<br>entire text; all drawings<br>& US 2011/0259352 A1 & WO 2010/043475 A1<br>& EP 2540173 A1 & CA 2740202 A<br>& KR 10-2011-0063585 A & CN 102186366 A | 1-5                   |

☒ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search  
25 May 2015 (25.05.15)Date of mailing of the international search report  
02 June 2015 (02.06.15)Name and mailing address of the ISA/  
Japan Patent Office  
3-4-3, Kasumigaseki, Chiyoda-ku,  
Tokyo 100-8915, Japan

Authorized officer

Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2015/057342

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                           | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| A         | GB 2259847 A (MOLINS PLC),<br>31 March 1993 (31.03.1993),<br>entire text; all drawings<br>(Family: none)                     | 1-5                   |
| A         | DE 1127778 B1 (HAUNI-WERKE KOERBER & CO. KG.),<br>12 April 1962 (12.04.1962),<br>entire text; all drawings<br>(Family: none) | 1-5                   |

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- JP 2007524418 A [0003]