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(71) Applicant: **JAPAN TOBACCO INC.**
Minato-ku
Tokyo 105-8422 (JP)

(72) Inventors:
- **FUJITA, Ryoji**
  Tokyo 130-8603 (JP)
- **NAKAAE, Hiroki**
  Tokyo 130-8603 (JP)

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

(54) FILTER EQUIPPED WITH CAPSULE HAVING LIQUID ENCAPSULATED THEREWITHIN AND SMOKING ARTICLE PROVIDED WITH SAME

(57) A filter of the invention includes: a capsule CA having a tubular shape and including a peripheral wall 10 constituting a peripheral surface of the tubular shape and a pair of end walls 11, 12 closing front and rear openings of the tubular shape, respectively, the capsule having a liquid encapsulated therein, at least the peripheral wall 10 being elastically deformable, and the peripheral wall being provided with at least one ring-shaped main thin-walled region 10a extending in a peripheral direction of the peripheral wall or with at least one straight main thin-walled region 10c extending in an axial direction perpendicular to the peripheral direction; and a generally cylindrical filter body having an accommodation space 204 in which the capsule CA is accommodated, wherein the capsule is disposed within the accommodation space such that the ring-shaped main thin-walled region 10a or the straight main thin-walled region 10c is directed parallel to a radial direction of the filter body.

FIG. 1A

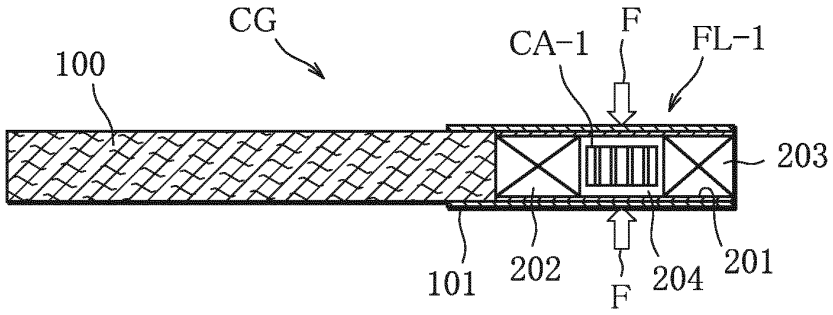

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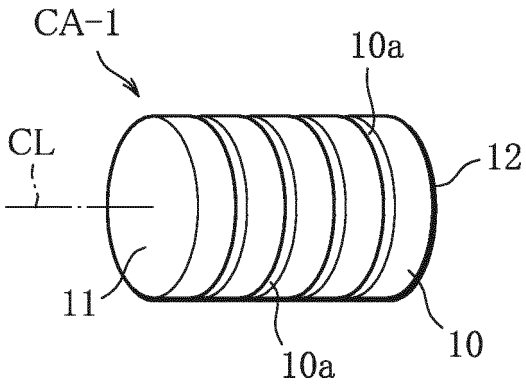
FIG. 1B



Description

Technical Field

[0001] The present invention relates to a filter that is equipped with a capsule having a liquid encapsulated therein and is suited for use with a smoking article such as a filter-tipped cigarette, and a smoking article provided with the filter.

Background Art

[0002] By allowing a liquid, such as water or an aqueous solution having a flavor-emitting additive dissolved in water, to permeate into the filter of a smoking article such as a filter-tipped cigarette when the smoking article is smoked, it is possible to improve the flavor characteristics of mainstream smoke or to add a flavor different from that of the mainstream smoke. In such cases, the liquid is previously encapsulated into a capsule to be incorporated into a filter body, and a user breaks the capsule before smoking the smoking article, to allow the liquid to gush out from the capsule and permeate into the filter. Specifically, the user applies force externally to the capsule by holding, between his/her fingers, the capsule from outside the filter, to break the capsule.

[0003] Capsules made of polysaccharide such as gelatin are, however, soluble in water and are not suited for encapsulating hydrophilic liquids, and the use of such water-soluble capsules is generally restricted to encapsulation of hydrophobic flavorings. On the other hand, capsules made of synthetic resin are insoluble in water, are suited for encapsulating hydrophilic liquids and have excellent shape stability. However, since capsules made of synthetic resin are hard, compared with water-soluble capsules, various means stated below have been contrived to facilitate breaking of the capsules.

[0004] In the case of a capsule having a cylindrical shape, for example, a plurality of long radial grooves are formed in one end wall of the capsule, and when the capsule is applied externally with a crushing force, the grooves split off and allow the liquid contained in the capsule to gush out (Patent Document 1).

[0005] Also, a capsule may be provided with a seal so that when the capsule is applied with external force, the seal may be broken to allow the liquid contained in the capsule to gush out (Patent Document 2).

[0006] Further, a capsule has been known which is obtained by fitting two capsule halves together via an annular seal, and when the capsule is squeezed, the seal is broken and allows the liquid contained in the capsule to gush out (Patent Document 3).

Prior Art Document

Patent Document

[0007]

Patent Document 1: Japanese Examined Patent Publication No. H06-2164
Patent Document 2: Japanese Patent No. 2515794
Patent Document 3: National Publication of International Patent Application No. 2008-528053

Summary of the Invention

Problems to be solved by the Invention

[0008] However, it is the case that a great force (external force) is still required to break a capsule made of synthetic resin, and it is not easy for a user to crush such a capsule by picking the capsule with his/her fingers. That is to say, the aforementioned conventional techniques facilitate breaking of the capsules to some extent, but a considerable force is still required to tear the grooves apart or to break the seals. Thus, there has been a demand for capsules that are easier to break.

[0009] An object of the present invention is to provide a filter equipped with a capsule improved in crushability (easy-to-break property), and a smoking article provided with the filter, such as a filter-tipped cigarette.

Means for Solving the Problems

[0010] The above object is achieved by a filter of the invention, which includes: a capsule having a tubular shape and including a peripheral wall constituting a peripheral surface of the tubular shape and a pair of end walls closing front and rear openings of the tubular shape, respectively, the capsule having a liquid encapsulated therein, at least the peripheral

wall being elastically deformable, and the peripheral wall being provided with at least one ring-shaped main thin-walled region extending in a peripheral direction of the peripheral wall or with at least one straight main thin-walled region extending in an axial direction perpendicular to the peripheral direction; and

a generally cylindrical filter body having an accommodation space in which the capsule is accommodated,

wherein the capsule is disposed within the accommodation space such that the ring-shaped main thin-walled region or the straight main thin-walled region is directed parallel to a radial direction of the filter body.

[0011] The capsule may be provided with the ring-shaped main thin-walled region plus a straight sub thin-walled region extending perpendicularly to the main thin-walled region, or with the straight main thin-walled region plus a ring-shaped sub thin-walled region extending perpendicularly to the main thin-walled region.

[0012] The ring-shaped main thin-walled region, the straight sub thin-walled region, the straight main thin-walled region and the ring-shaped sub thin-walled region may each be a continuous region or a non-continuous region including a discontinuity.

[0013] Also, the ring-shaped main thin-walled region, the straight sub thin-walled region, the straight main thin-walled region and the ring-shaped sub thin-walled region may each be a grooved region having a wall thickness smaller than that of the other region.

[0014] Preferably, a casing surrounding the filter body has water resistance.

[0015] Where the capsule is provided with the straight main thin-walled region, the casing surrounding the filter body is preferably made of a transparent sheet material so that the accommodation space can be viewed from outside.

[0016] Any of the aforementioned filters equipped with the capsule may be incorporated into smoking articles such as filter-tipped cigarettes.

Advantageous Effects of the Invention

[0017] With the filter equipped with the capsule according to the present invention, a user can break the capsule easily, so that the liquid released from the capsule can efficiently infiltrate into the filter or tobacco.

[0018] Thus, where the filter with the capsule is incorporated into a smoking article such as a filter-tipped cigarette, a user can enjoy improved taste by breaking the capsule with ease.

Brief Description of the Drawings

[0019]

FIG. 1A illustrates a filter equipped with a capsule according to a first embodiment of the present invention, wherein the filter is used with a cigarette as a smoking article.

FIG. 1B illustrates the capsule taken out of the filter shown in FIG. 1A.

FIG. 2 is a schematic illustration of the filter in FIG. 1A applied with external forces.

FIG. 3 illustrates an improvement example of the filter shown in FIG. 1A.

FIG. 4 illustrates an exemplary case where thin-walled regions of the filter shown in FIG. 1A have discontinuities.

FIG. 5A illustrates a filter equipped with a capsule according to a second embodiment of the present invention, wherein the filter is used with a cigarette as a smoking article.

FIG. 5B illustrates the capsule taken out of the filter shown in FIG. 5A.

FIG. 6 is a schematic illustration of the filter in FIG. 5A applied with external forces.

FIG. 7 illustrates an improvement example of the filter shown in FIG. 5A.

FIG. 8 illustrates evaluation results of actually produced filters shown in FIG. 5A.

FIG. 9 illustrates a modification of the filter shown in FIG. 5A.

Mode for Carrying out the Invention

[0020] Preferred embodiments of the present invention will be described below with reference to the drawings.

[0021] FIG. 1A illustrates a filter equipped with a capsule according to a first embodiment of the present invention, wherein the filter is used with a cigarette CG as a smoking article. FIG. 1B illustrates the capsule CA-1 taken out of the filter FL-1 of the cigarette CG.

[0022] The cigarette CG, which is a filter-tipped cigarette as shown in FIG. 1A, is constituted by a cigarette body 100 obtained by rolling shredded tobacco in thin paper into a rod shape, and the filter FL-1 disposed at one end of the cigarette body 100. The filter FL-1 has a filter body constituted by a flexible casing 201 and two rod-shaped filter elements 202 and 203 accommodated in the interior of the casing 201. The casing 201 is obtained, for example, by rolling a sheet material into a tubular shape and gluing overlapping edges of the rolled sheet material together. The cigarette body 100 and the filter LF-1 are connected together by tip paper 101 wound around both of the filter FL-1 and a part of the cigarette

body 100, to obtain a single filter-tipped cigarette CG.

[0023] A first filter section 202 serving as a first filter element and a second filter section 203 serving as a second filter element are disposed within the casing 201 and set apart from each other so as to be located at the opposite ends of the casing 201. The filter sections 202 and 203 may be made of the same filter material as that ordinarily used in filter-tipped cigarettes, namely, acetate fiber, and may further contain charcoal. Alternatively, paper filter may be used for that purpose. The filter sections 202 and 203 may be made of the same material or of different materials.

[0024] The first filter section 202 located at one end of the casing 201 adjoins the cigarette, and the second filter section 203 located at the other end of the casing 201 constitutes a mouth end. The first filter section 202 and the second filter section 203 are spaced from each other, as stated above, to define an accommodation space 204 therebetween. Thus, strictly speaking, the filter body is constituted by the first filter section 202, the second filter section 203, and the accommodation space 204 located between the first and second filter sections. The capsule CA-1 is disposed in the interior of the accommodation space 204.

[0025] Referring also to FIG. 1B which is an enlarged view of the capsule CA-1, the capsule CA-1 has a hollow, generally tubular (columnar) shape, and a liquid is encapsulated in the capsule CA-1.

[0026] More specifically, the capsule CA-1 has a side wall, or peripheral wall 10 forming the side surface, or peripheral surface, of the tubular shape and a pair of end walls 11 and 12 closing the opposite, front and rear openings of the tubular shape, respectively, and a liquid is contained in the capsule CA-1. The peripheral wall 10 is made of a synthetic material that is at least elastically deformable. The end walls 11 and 12 may be made of the same material as that of the peripheral wall 10, but the material to be used is not particularly limited insofar as it is able to securely close the openings of the tubular peripheral wall 10.

[0027] Synthetic materials preferred to constitute the peripheral wall 10 include plastic materials used for food packaging and may be selected from the group comprising polyethylene, polypropylene, polyvinyl chloride, polystyrene, polyethylene terephthalate, polyvinyl alcohol and polyamide, by way of example.

[0028] Although the end walls 11 and 12 may be made of the same material as the peripheral wall 10, a film material such as laminated film may be used to close the openings of the tubular peripheral wall 10 by heat sealing. In the case of using such a heat-sealing film, the film may be bonded to the opening edges of the peripheral wall 10 by a thermoplastic adhesive. As such adhesive, hot-melt adhesive containing, as its main agents, an adhesive polyolefin resin, a low-molecular-weight polyethylene and EVA (ethylene vinyl alcohol) may be used, for example.

[0029] The liquid to be encapsulated in the capsule CA-1 is not particularly limited and a suitable liquid capable of improving the taste and flavor of cigarettes may be selected. For example, any of water, hydrophilic flavorings and hydrophobic flavorings may be used. In the case of a hydrophobic flavoring, it may be used in the form of emulsion or be used in combination with a solvent such as propylene glycol or ethanol. More specifically, the liquid to be used may be a solution prepared by dissolving sugar, tobacco extract, fragrance and the like in water, or a water-based solution such as brandy, by way of example. The liquid may be mixed with a chemical solution for preventing deterioration, where necessary. Further, minute solids such as microcapsules (perfume capsules) having perfume encapsulated therein may be used as the liquid, and such perfume capsules may be suspended in water to be used as the liquid.

[0030] Preferably, a water-resistant sheet material is used for at least one of the casing 201 and the tip paper 101 so that the liquid may be prevented from leaking to the outside.

[0031] The filter FL-1 for use with the cigarette CG is equipped with the capsule CA-1 that breaks easily when applied with external force by a user (the force with which the filter is picked between the user's fingers).

[0032] As mentioned above, the filter FL-1 has a rod-like (generally cylindrical) shape corresponding to the shape of the cigarette body 100, and the capsule CA-1 is disposed within the accommodation space 204 between the filter sections 202 and 203. When the filter is picked between the user's fingers, it is acted upon by radial external forces, as indicated by arrows F in FIG. 1A. The peripheral wall 10 of the capsule CA-1 has an easy-to-break structure such that the capsule CA-1 easily breaks when applied with such external forces. Specifically, the peripheral wall 10 has a thin-walled region, as described below. The thin-walled region is a region of which the wall thickness is smaller than the other region so that the thin-walled region may be easier to break than the other region applied with stress. For example, the thin-walled region is a grooved region having a V-shaped groove.

[0033] In the capsule CA-1 exemplified in FIGS. 1A and 1B, the peripheral wall 10 has at least one ring-shaped main thin-walled region 10a (in FIGS. 1A and 1B, four thin-walled regions) extending in a peripheral direction, or circumferential direction, of the capsule CA-1 and having a linear shape. As shown in FIG. 1A, the tubular capsule CA-1 is disposed within the space 204 such that the axis of the capsule CA-1 lies along the axis of the filter.

[0034] Thus, the ring-shaped thin-walled regions 10a extend in such a direction that when the filter FL-1 is picked and applied with radial external forces F, the thin-walled regions 10a are parallel with the direction in which the external forces F are applied.

[0035] FIG. 2 is a schematic illustration of the capsule CA-1 applied with such external forces F.

[0036] The peripheral wall 10 of the capsule CA-1 has the main thin-walled region 10a (in the figure, four thin-walled regions) directed parallel to the direction of application of the external forces F. Since the main thin-walled regions 10a

are provided, the capsule CA-1 is deformed progressively as the external forces are applied, and when the stress acting in bent portions 13 where stress is concentrated due to the bending exceeds a certain value, the capsule CA-1 breaks as illustrated. The pressure in the capsule CA-1 rises with the application of the external forces F, and therefore, forces directed perpendicularly to the direction of application of the external forces F are generated in the capsule CA-1. Consequently, the main thin-walled regions 10a directed parallel to the direction of application of the external forces F are broken easily.

[0037] FIG. 3 illustrates an improvement example of the capsule, wherein the capsule is provided not only with the ring-shaped main thin-walled regions 10a but also with straight sub thin-walled regions 10b perpendicular to the main thin-walled regions 10a. The main thin-walled regions 10a are each in the form of a ring; on the other hand, the sub thin-walled regions 10b are each in the form of a straight line extending along the axis CL of the capsule perpendicularly to the peripheral direction in which the main thin-walled regions 10a extend. With the sub (auxiliary) thin-walled regions 10b formed in this manner, the capsule CA-1 can be broken more easily.

[0038] The main thin-walled regions 10a and the straight sub thin-walled regions 10b need not be continuous regions. That is, the thin-walled regions may be non-continuous regions having discontinuities in part thereof (where the wall thickness is not reduced). FIG. 4 illustrates an exemplary capsule of which the ring-shaped main thin-walled regions 10a have discontinuities 14.

[0039] The capsule illustrated in FIG. 3 may also be configured such that the main thin-walled regions 10a and the sub thin-walled regions 10b each have similar discontinuities. In this case, either the main thin-walled regions 10a or the sub thin-walled regions 10b or both of them may be provided with the discontinuities.

[0040] Further, the form of discontinuities is not particularly limited, and each thin-walled region may be in the form of a broken line having regularly spaced breaks or irregularly spaced breaks.

[0041] A filter FL-2 equipped with a capsule CA-2 according to a second embodiment, for use with the cigarette CG, will be described below with reference to the drawings. In the drawings and the following description, like reference signs refer to like elements, and description of the elements already explained above will be omitted. The following description is focused on the differences between the first and second embodiments.

[0042] FIG. 5A illustrates an exemplary case where the filter FL-2 equipped with the capsule according to the invention is used with a cigarette CG. FIG. 5B illustrates the capsule CA-2 taken out of the filter FL-2.

[0043] The exemplary capsule CA-2 illustrated in FIGS. 5A and 5B has at least one straight main thin-walled region 10c extending along the axis CL of the tubular peripheral wall 10 (in a direction perpendicular to the peripheral direction of the peripheral wall). As shown in FIG. 5A, the tubular capsule CA-2 is disposed within the space 204 such that the axis of the capsule CA-2 is directed perpendicularly to the axis of the filter.

[0044] Thus, the straight thin-walled regions 10c extend in such a direction that when the filter FL-2 is picked and applied with radial external forces F, the thin-walled regions 10c are parallel with the direction in which the external forces F are applied.

[0045] FIG. 6 is a schematic illustration of the capsule CA-2 applied with such external forces F.

[0046] As stated above, the peripheral wall 10 of the capsule CA-2 has the main thin-walled regions 10c that are directed parallel to the direction of application of the external forces F. Since the main thin-walled regions 10c are provided, the capsule CA-2 is deformed progressively as the external forces are applied, and when the stress acting in the most bent portions 13 where stress is concentrated due to the bending exceeds a certain value, the capsule CA-2 breaks at the bent portions 13, as illustrated. The pressure in the capsule CA-2 rises with the application of the external forces F, and therefore, forces directed perpendicularly to the direction of application of the external forces F are generated in the capsule CA-2. Consequently, the main thin-walled regions 10c parallel to the direction of application of the external forces F are broken easily.

[0047] In the case of this embodiment, it is preferable that the location of the capsule CA-2 in the accommodation space 204 be visually identifiable. For example, the casing 201 of the filter body surrounding the accommodation space 204 is made of a transparent sheet material so that the accommodation space 204 can be viewed from outside. Further, the tip paper 101 surrounding the filter body is similarly made of a transparent sheet material. This allows a user to squeeze the capsule CA-2 while confirming the location of the capsule CA-2.

[0048] Preferably, the surfaces of the capsule to be pushed are marked with letters, for example, "PUSH" as shown in FIG. 6, or if the surfaces to be pushed are too small to carry readable letters, other mark may be affixed to the push surfaces (e.g., the push surfaces may be colored in red or blue), so that a user can readily locate the capsule to be pushed.

[0049] FIG. 7 illustrates an improvement example of the capsule, wherein the capsule is provided not only with the straight main thin-walled regions 10c but also with ring-shaped sub thin-walled regions 10d perpendicular to the main thin-walled regions 10c. In this embodiment, the main thin-walled regions 10c extend straight along the axis CL of the capsule, and the sub thin-walled regions 10d are each in the form of a ring. With the sub (auxiliary) thin-walled regions 10d formed in this manner, the capsule CA-2 can be broken more easily.

[0050] Also in the second embodiment, the main thin-walled regions 10c and the ring-shaped sub thin-walled regions 10d need not be continuous regions. That is to say, the thin-walled regions may be non-continuous regions having

discontinuities in part thereof, as stated above.

(Production and Evaluation)

[0051] The aforementioned capsule CA-2 of the second embodiment was actually produced and evaluated, as described below.

[0052] The capsule CA-2 was produced using distilled water as the liquid to be encapsulated in the capsule, and breaking strength of the produced capsule CA-2 was measured. Specifically, using low-density polystyrene, which is a plastic material used for food packaging, the capsule CA-2 was formed by injection molding. Then, 90% (v/v) distilled water was poured into the space within the capsule CA-2, and the open end of the capsule CA-2 was completely heat sealed with a polyamide/low-density polyethylene laminated film (KIMURA-TEC, NY/LDPE, 60 μm), to obtain a capsule containing distilled water.

[0053] The breaking strength of the capsule was measured by a creep meter (RHEOMETER II, from YAMADEN CO., LTD.). FIG. 8 illustrates the manner of how the breaking strength was measured and the measurement results.

[0054] Using identical capsules CA-2 fabricated in the same manner, external force was applied to the capsules CA-2 in different directions. Test A shows the case where the external force was applied to the peripheral wall provided with the thin-walled regions 10c, and Test B shows the case where the external force was applied to the capsule in a direction parallel to the thin-walled regions 10c, as in the present invention.

[0055] In Test A, the breaking load required to break the capsule was 95.6 N, and in Test B, the breaking load required was 29.6 N, proving that a very small force is sufficient to break the capsule.

[0056] A preferred modification of the second embodiment will be described with reference to FIG. 9.

[0057] The capsule CA-2 exemplified in FIGS. 5A and 5B is columnar in shape and has thin-walled regions formed in the peripheral wall 10, and the capsule CA-2 is disposed within the filter such that the axis of the capsule CA-2 is directed perpendicularly to the axis of the filter.

[0058] The shape of the capsule CA-2 is, however, not limited to cylinder, and as shown in FIG. 9 by ways of example, the capsule CA-3 may be in the form of a prism (in the figure, quadrangular prism (rectangular parallelepiped)). Where the capsule has a prismatic shape, its posture inside the accommodation space 204 can be stabilized. In this case, the thin-walled regions 10c are formed in the four side walls constituting the peripheral wall of the capsule. The capsule CA-3 may be disposed within the accommodation space 204 such that the side walls of the capsule CA-3 are directed parallel with the axis of the filter, in which case the four side walls face frontward, rearward and to the right and left, respectively, with respect to the filter. Alternatively, the capsule CA-3 may be disposed within the accommodation space 204 such that one corner of the capsule CA-3 projects frontward, as shown in FIG. 9.

[0059] To stabilize the position of each capsule CA (CA-1, CA-2, CA-3) more reliably, fiber that is used to form the filter elements may be filled in the gap of the accommodation space 204, if necessary, to prevent positional shift of the capsule. Also, protrusions for positioning the capsule CA may be formed on the inner surface of the casing 201 so that the capsule CA may be pressed radially inward by the protrusions to be set in position. Where the capsule CA can be stably positioned in this manner, either one or both of the first and second filter sections may be omitted as the case may be. In this regard, in the foregoing embodiments explained above, the space defined between the first and second filter sections is used as the accommodation space of the filter body. This configuration is, however, just a preferred example and the accommodation space may be configured in a different way.

[0060] The manner of how a user (smoker) handles the filter-tipped cigarette CG to smoke the same will now be explained. The user holds the middle portion of the filter FL with his/her fingers and applies force externally to squeeze the filter FL, as indicated by the arrows F in FIG. 1A, with the result that the casing 201 of the filter FL and the capsule CA-1 disposed within the casing 201 are elastically deformed. Since the capsule CA-1 has an easy-to-break structure, it breaks easily and allows the liquid to flow out of the capsule CA-1 to be absorbed in the filter.

[0061] Subsequently, the user lights the filter-tipped cigarette CG to smoke the same. The liquid absorbed in the filter serves to reduce the water-soluble components contained in the smoke flow from the cigarette, and the flavoring added to the liquid improves the taste of the cigarette.

[0062] The present invention is not limited to the foregoing embodiments.

[0063] In the embodiments described above, the filter equipped with the capsule according to the present invention is applied to filter-tipped cigarette. However, the application of the present invention is not limited to filters attached to cigarettes. That is, the invention may be embodied as independent filter products.

Explanation of Reference Signs

[0064]

FL (FL-1, FL-2): Filter

CA (CA-1, CA-2, CA-3):	Capsule
CG:	Cigarette
10:	Peripheral wall
10a, 10b, 10c, 10d:	Thin-walled region
10a:	Ring-shaped main thin-walled region
10b:	Straight sub thin-walled region
10c:	Straight main thin-walled region
10d:	Ring-shaped sub thin-walled region
11:	Front wall
12:	Rear wall
100:	Cigarette body
101:	Tip paper
201:	Casing
202, 203, 204:	Filter body
202:	First filter section
203:	Second filter section
204:	Accommodation space

Claims

1. A filter comprising:

a capsule having a tubular shape and including a peripheral wall constituting a peripheral surface of the tubular shape and a pair of end walls closing front and rear openings of the tubular shape, respectively, the capsule having a liquid encapsulated therein, at least the peripheral wall being elastically deformable, and the peripheral wall being provided with at least one ring-shaped main thin-walled region extending in a peripheral direction of the peripheral wall or with at least one straight main thin-walled region extending in an axial direction perpendicular to the peripheral direction; and

a generally cylindrical filter body having an accommodation space in which the capsule is accommodated, wherein the capsule is disposed within the accommodation space such that the ring-shaped main thin-walled region or the straight main thin-walled region is directed parallel to a radial direction of the filter body.

2. The filter according to claim 1, wherein the capsule is provided with the ring-shaped main thin-walled region plus a straight sub thin-walled region extending perpendicularly to the main thin-walled region, or with the straight main thin-walled region plus a ring-shaped sub thin-walled region extending perpendicularly to the main thin-walled region.

3. The filter according to claim 1 or 2, wherein the ring-shaped main thin-walled region, the straight sub thin-walled region, the straight main thin-walled region and the ring-shaped sub thin-walled region are each a continuous region or a non-continuous region including a discontinuity.

4. The filter according to any one of claims 1 to 3, wherein the ring-shaped main thin-walled region, the straight sub thin-walled region, the straight main thin-walled region and the ring-shaped sub thin-walled region are each a grooved region having a wall thickness smaller than that of the other region.

5. The filter according to any one of claims 1 to 4, wherein a casing surrounding the filter body has water resistance.

6. The filter according to any one of claims 1 to 5, wherein the capsule is provided with the straight main thin-walled region, and a casing surrounding the filter body is made of a transparent sheet material so that the accommodation space can be viewed from outside.

7. A smoking article including the filter equipped with the capsule according to any one of claims 1 to 6.

FIG. 1A

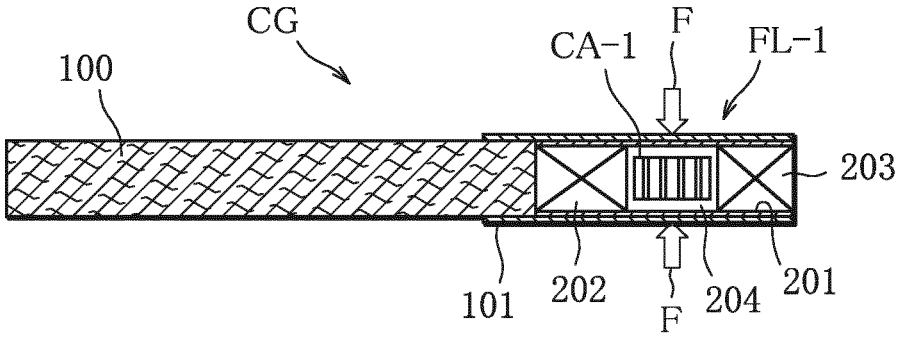


FIG. 1B

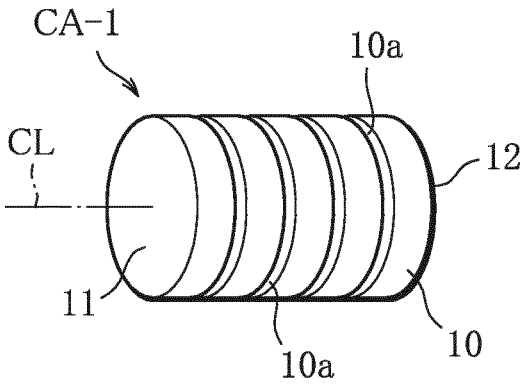


FIG. 2

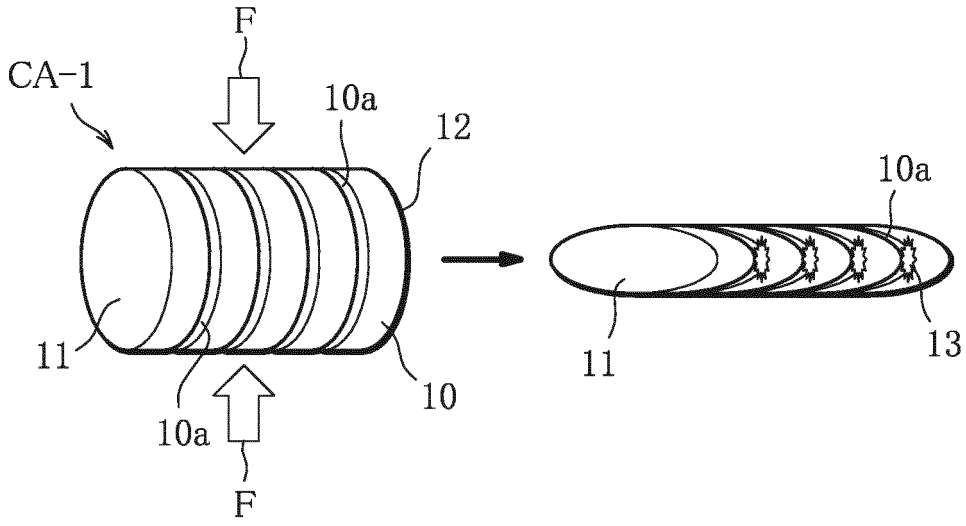


FIG. 3

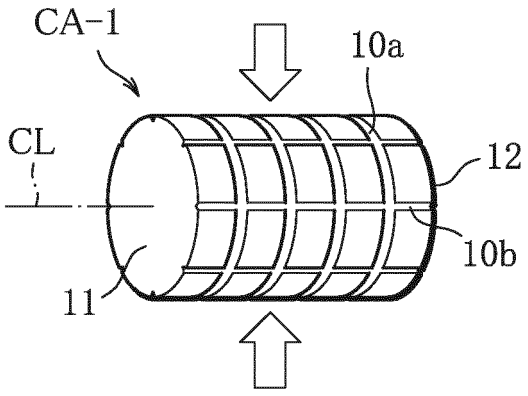


FIG. 4

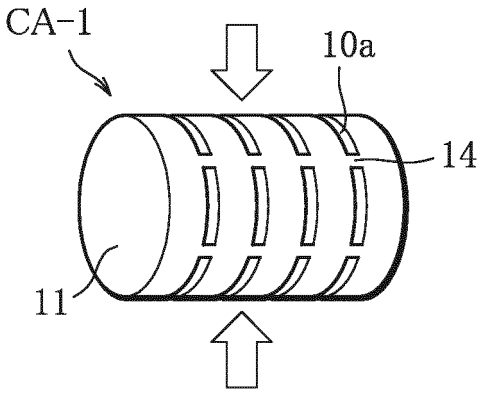


FIG. 5A

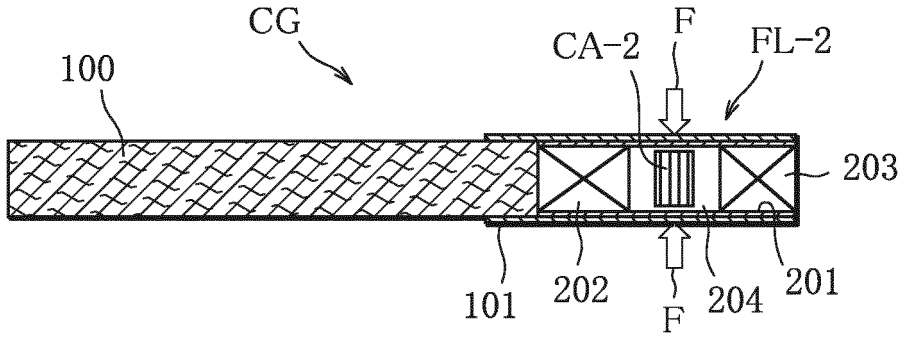


FIG. 5B

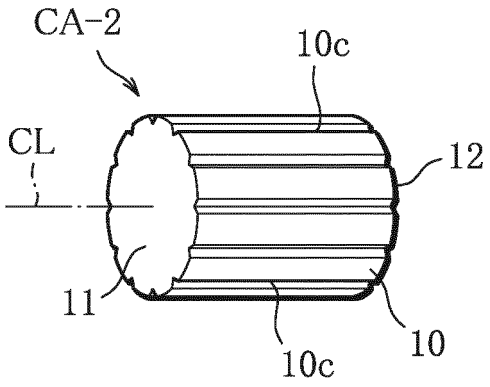


FIG. 6

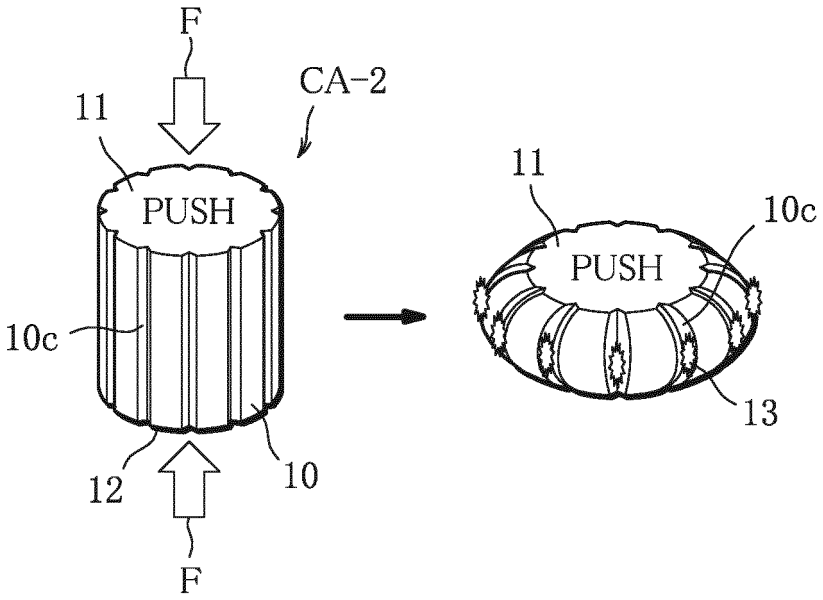


FIG. 7

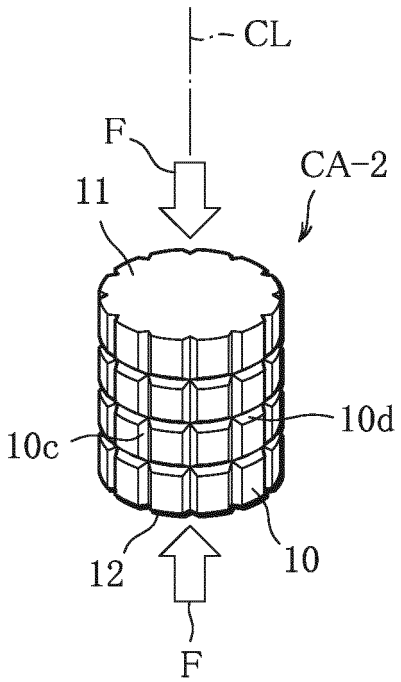


FIG. 8

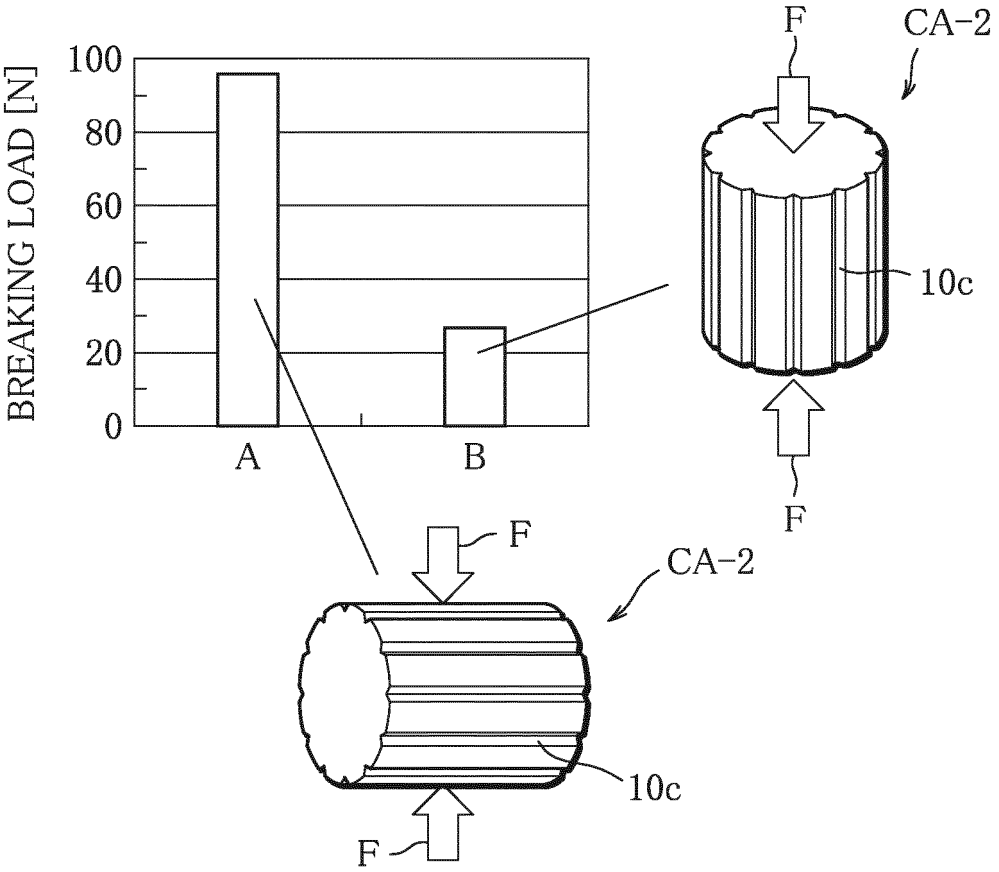
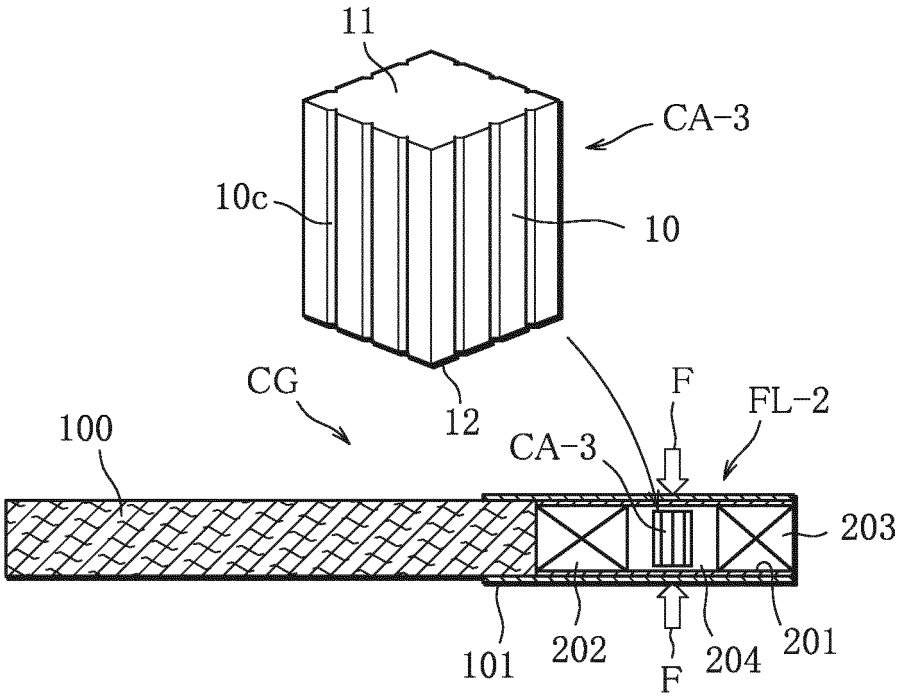


FIG. 9



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2014/057346

A. CLASSIFICATION OF SUBJECT MATTER
A24D3/02(2006.01)i, *A24F13/06*(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)
A24D3/02, A24F13/06

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 1996-2014
Kokai Jitsuyo Shinan Koho 1971-2014 Toroku Jitsuyo Shinan Koho 1994-2014

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	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 74308/1987(Laid-open No. 186191/1988) (Shiro TSUCHIZAKI), 29 November 1988 (29.11.1988), fig. 1 (Family: none)	1-7
A	WO 2013/021863 A1 (Japan Tobacco Inc.), 14 February 2013 (14.02.2013), fig. 1A, 1B & TW 201318571 A	1-7

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

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Date of the actual completion of the international search	Date of mailing of the international search report
09 April, 2014 (09.04.14)	22 April, 2014 (22.04.14)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2014/057346

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 63-276474 A (Japan Tobacco Inc.), 14 November 1988 (14.11.1988), fig. 1, 13, 14 (Family: none)	1-7
A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 93900/1983(Laid-open No. 1296/1985) (Setsuo ARAI), 08 January 1985 (08.01.1985), fig. 1 (Family: none)	1-7
A	JP 2000-14377 A (Yoji HARADA), 18 January 2000 (18.01.2000), fig. 2 (Family: none)	1-7
A	JP 2008-183240 A (Olympus Medical Systems Corp.), 14 August 2008 (14.08.2008), fig. 9 & US 2009/0287121 A1 & EP 2111788 A1 & WO 2008/093578 A1 & CN 101594821 A	1-7

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP H062164 B **[0007]**
- JP 2515794 B **[0007]**
- JP 2008528053 A **[0007]**