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(71) Applicant *(for all designated States except US)*: **BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED** [GB/GB]; Globe House, 1 Water Street, London WC2R 3LA (GB).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **NICHOLLS, Jane** [GB/GB]; c/o British American Tobacco (Investments) Limited, Globe House, 1 Water Street, London WC2R 3LA (GB). **AWTY, Edward** [GB/GB]; c/o British American Tobacco (Investments) Limited, Globe House, 1 Water Street, London WC2R 3LA (GB). **NANDRA, Charanjit** [GB/GB]; c/o British American Tobacco (Investments) Limited, Globe House, 1 Water Street, London WC2R 3LA (GB). **HOOPER, Nicole** [GB/GB]; c/o British American Tobacco (Investments) Limited, Globe House, 1 Water Street, London WC2R 3LA (GB). **KALJURA, Karl** [GB/GB]; c/o British American Tobacco (Investments) Limited, Globe House, 1 Water Street, London WC2R 3LA (GB). **SPENCER, Alfred Vincent** [GB/GB]; c/o British American Tobacco (Investments) Limited, Globe House, 1 Water Street, London WC2R 3LA (GB). **FROBISHER, Paul** [GB/GB]; c/o Systematic Innovation Ltd, 5a Yeo-Bank Business Park, Kenn Road, Clevendon BS21 6UW (GB). **NEWNHAM, Michael** [GB/GB]; c/o Systematic Innovation Ltd, 5a Yeo-Bank Business Park, Kenn Road, Clevedon BS21 6UW (GB).

(74) Agents: **GILL, Siân** et al.; 200 Aldersgate, London EC1A 4HD (GB).

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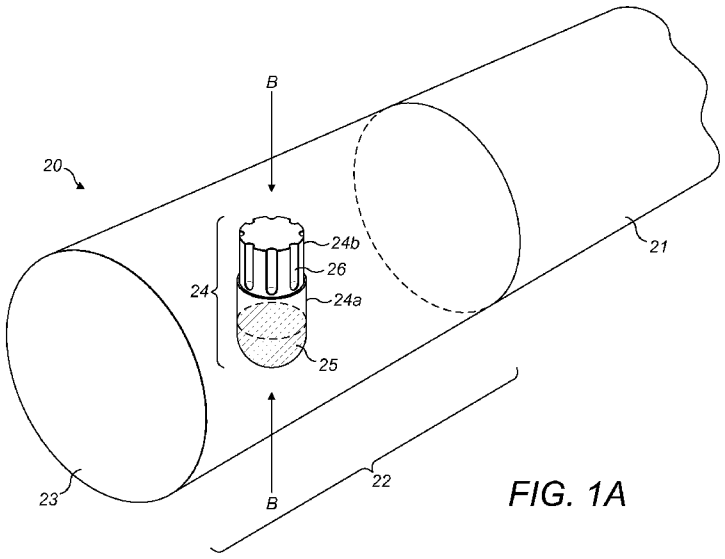

FIG. 1A

(57) Abstract: A multi-part container (24) for use in a smoking article filter (22) is disclosed, the container containing an additive (25), wherein two or more parts (24a, 24b) of the container are arranged to define the volume of a chamber in which an additive is stored and wherein at least one of said parts is arranged to move relative to the other part or parts upon application of an external force applied to the container so that the volume of the chamber is reduced and the additive is released from the container. Filters and smoking articles containing the multi-part container are also provided.

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Container

Field of the Invention

The present invention relates to a container suitable for use in a smoking article filter.

Background

As used herein, the term "smoking article" includes smokeable products such as cigarettes, cigars and cigarillos whether based on tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco or tobacco substitutes and also heat-not-burn products (i.e. products in which flavour is generated from a smoking material by the application of heat without causing combustion of the material). Typically, smoking articles are provided with filters for removing constituents from the smoke.

It is known to provide containers containing additives such as flavourants inside smoking articles. By applying force to the outside of the smoking article, the smoker may break the container and release the flavourant. Thus, a smoker wishing to add flavour to the smoke may do so by simply squeezing the smoking article.

However, as the containers are located within the smoking article, it may be difficult for the user to release the additive. To overcome this problem, containers may be used from which additive is more easily released; however such containers may have an increased likelihood of accidental additive release. Furthermore, since containers are located within smoking articles, it may be difficult for the user to detect or determine whether or not the additive has been released from the container.

Summary

According to a first aspect, there is provided a multi-part container for use in a smoking article, wherein two or more parts of the container are arranged to define the volume of a chamber in which an additive is stored and wherein at least one of said parts is arranged to move relative to the other part or parts upon application of an external force applied to the container so that the volume of the chamber is reduced and the additive is released from the container.

In some embodiments, an external force induces one part of the container to be moved in a direction inwardly of another part.

In some embodiments, the additive is released only in one or more predetermined directions.

In some embodiments, the additive is forcefully ejected or driven from the container.

In some embodiments, the additive is released through a gap between the parts defining the volume of the chamber. The gap between the parts may be formed or opened following the movement of at least one part relative to the other part or parts.

In some embodiments, the container comprises a non-frangible material. The material may be non-frangible due to being robust and resistant to fracture under the normal forces that are exerted on smoking article filters. Alternatively or in addition, the material may be non-frangible due to being flexible.

In some embodiments, the additive is a deodoriser, a diluent, an adsorbent, water, or a flavourant.

In some embodiments, the container comprises two or more chambers in which an additive may be stored or is stored.

In some embodiments, the container comprises two different additives.

In some embodiments, the additive is held inside a capsule within the container.

According to a second aspect, there is provided a filter for a smoking article, comprising a multi-part container in accordance with the first aspect.

According to a third aspect, there is provided a smoking article comprising a multi-part container in accordance with the first aspect, or a filter in accordance with the second aspect.

Brief Description of the Drawings

Embodiments will be described, by way of example only, with reference to the accompanying drawings (not to scale), in which:

Figure 1A shows a filter comprising a container according to a first embodiment;

Figures 1B and 1C illustrate the construction and use of containers according to the first embodiment;

Figure 2A shows a filter comprising a container according to a second embodiment;

Figure 2B illustrates the use of a container according to the second embodiment; and

Figures 2C, 2D, and 2E show alternative containers according to the second embodiment.

Detailed Description

The invention relates to containers for retaining an additive and releasing the additive upon actuation of the container. In some embodiments, multiple deliveries of additive may be provided upon multiple actuations of the container.

In some embodiments, the container is made of at least two parts which define a chamber. Upon compression, one part moves relative to another part, causing the additive to be released. In some embodiments, one part moves (further) inside another, for example, one part slides inside another.

In some embodiments, the additive is released through a gap between the parts defining the volume of the chamber. This gap between the parts may, for example, be formed following the movement of at least one part relative to the other part or parts. In some embodiments, the gap may be formed by different alignment of the parts after movement, for example where the movement moves the parts from a position where they fitted together so that no gap is present, to a position where a gap is present, for example, formed by a notch or channel in the surface of one part which is now positioned where the parts are adjacent to one another. Alternatively or in addition, the parts are arranged so that there is a gap between them, but this gap is closed or sealed by a sealing structure which is ruptured or removed when the parts move relative to one another.

The container may include multiple chambers holding the same or different additives. The additive may be released from the multiple chambers at the same time or one chamber may be emptied per actuation.

The multi-part container comprises two or more separate sections. The sections may be joined together to form an enclosed (encapsulated), or substantially enclosed region, in which the additive may be held. The parts of the multi-part container are arranged to

move relative to one another and in this way, the additive may be released. The relative movement of the parts of the container is induced by external force applied to the container. Relative movement of the parts induces the additive to be released from the container.

In some embodiments, the parts of the container may comprise a non-frangible material.

In some embodiments of the invention, the multi-part containers allow additive to be released upon the application of a lower degree of force than is generally required to release additive from frangible capsules. However, the containers are not as susceptible to releasing additive prematurely, such as during the manufacture of the filter.

The additive may be held directly within the container, for example when the container comprises an enclosed region. Alternatively, the additive may be present within a conventional capsule, which is held within the container, and which is ruptured by means of the relative movement of the parts of the multi-part container.

The parts of the multi-part container may comprise a non-frangible material. In other words, the parts of the multi-part container may not rupture under the normal forces that are exerted on smoking article filters in general use. This may be, for example, because the material is robust and resistant to fracture, or because it is flexible. A consequence of this is that the additive may be released from the container only by means of the parts of the multi-part container moving relative to one another, and not by means of the container rupturing.

In response to external pressure, the parts of the container move relative to one another. In other words, at least a section of one or more of the parts of the multi-part container is altered in alignment or conformation with respect to the remaining part or parts of the container. For example, in some embodiments, the parts of the container may remain bound together and/or arranged within one another, to some extent throughout all modes of operation of the container. This adjustment of the position of the parts with respect to each other may include any kind of sliding or twisting, and may optionally also include alteration in shape of one or more of the parts, for example, bending, buckling, or stretching. According to some embodiments, the movement to release the additive does not involve crushing, rupturing or splitting of the container.

When conventional containers provided in smoking articles rupture, the fracture pattern of the container is random, and thus the contents are released into the smoking article in an unpredictable manner. What is more, the additive may be passively released from conventional containers, for example, seeping out of the container and into the surrounding filter material.

In contrast, in some embodiments, the parts of the multi-part container of the present invention comprise a non-frangible material, thus release of the smoke modifying material does not occur due to random rupture of the container, but occurs as a result of the parts of the multi-part container moving relative to one another. The manner in which the parts may move relative to one another, and thus the manner in which additive may be released, is predetermined by the design and structure of the container. Thus, the container is arranged to release the additive only in a predetermined direction or directions. What is more, the additive will, in some embodiments, be forcefully ejected from the container as a result of the pressure generated in the container by the relative movement of the parts which causes a reduction in the volume of the chamber holding the additive.

The parts of the multi-part container are induced to move relative to one another by the application of external force applied to the container. The force may be a compressive force. In use, force may be exerted by the user squeezing the smoking article filter, and thus imparting external force on the container, prior to, or during, smoking of the smoking article. Force exerted on the filter may be transmitted to a central container due to compression of the surrounding filter material. Alternatively, a portion of the container may protrude from, or be at or near the surface of the smoking article, and thus force may be exerted substantially directly on the container.

The additive may be held within the container inside a capsule. The additive may be held directly within the container, for example when the container comprises an enclosed region. Alternatively, the additive may be present within a conventional capsule, which is held within the container, and which is ruptured by means of the relative movement of the parts of the multi-part container.

The container may comprise a material that is non-frangible due to being robust and resistant to fracture under the normal forces that are exerted on smoking article filters.

For example, the container may comprise a material that is non-frangible due to being flexible.

A container may be anything having an internal chamber in which one or more, such as 2, 3, 4, or 5 additives can be held and subsequently released when required. The additive may be held directly within the container, or may be held within the container within a capsule, such as a frangible capsule. The containers of the invention may be arranged to release the additive into the smoking article in a controlled manner in a predetermined direction. The container may comprise an entirely enclosed, sealed, region in which the additive may be held, or the additive may be held in a region of the container that is substantially, but not entirely, enclosed.

Containers for use in the invention may comprise an outer wall which is generally thin in relation to the dimensions of the carrier as a whole. The outer wall may surround and encapsulate, or substantially encapsulate an interior chamber in which the additive may be held.

The present container is a multi-part container and comprises two or more separate parts. The parts may be joined together to form an enclosed chamber, in which the additive may be held. Alternatively, the parts may not be attached together as such, but may be arranged together in physical contact, with or without actually being physically attached, for example, one part may be arranged to fit inside another part.

The sections of the multi-part container are capable of moving relative to one another, and in this way, the additive may be released from the container. The relative movement of the parts of the container may take any form, for example, the movement may be a hinging, sliding, twisting, folding, etc. movement. Furthermore, one or more of the parts may undergo a change in shape, such as a bending, buckling, or stretching. The movement of the parts may or may not encompass the parts of the container separating entirely from one another. Even if the parts are not physically attached together, they may remain arranged together throughout all modes of operation of the container, but may be adjusted in relative configuration. The movement of the parts results in a reduction in the volume of the chamber in which additive is stored, causing ejection of the additive from the container.

The manner in which the parts may move relative to one another, and thus the manner in which additive may be released, is predetermined by the material, design, and structure of the container arrangement. Since the movement of the parts relative to one another results in release of the additive, then the manner and direction of release of the additive is predetermined by the arrangement of the container.

The parts of the multi-part container are induced to move relative to one another by the application of external force on the container. In use, force is exerted, for example, by the user squeezing the smoking article filter prior to, or during, smoking of the smoking article or upon disposal of the smoking article. Such squeezing of the filter may impart compressive force on the container. Compressive force is generally exerted on the container in a longitudinal direction, however, in some embodiments, the compressive force may be exerted in a lateral direction on the container.

The parts of the container may be arranged so that upon external force, additive is ejected, squirted or driven from the container, and is thus deposited further from the container than is generally possible with known containers, such as when frangible capsules are ruptured. Since the direction of release is predetermined, the additive may be ejected, squirted or forcefully driven from the container in a particular direction.

Since the direction of release is predetermined, the additive may be released into the smoking article in any specific direction, or in multiple specific directions, and may be directed towards a particular region or regions of the smoking article, such as the filter. The region may be, for example, a cavity, a particular region of filter material, or a peripheral region of the smoking article filter. The region into which the additive is released may comprise an active component, such as a second additive, which may or may not be held by a container.

Within the centre of the container may be a hollow cavity, or may be a sponge-like porous material. The sponge-like material may carry the additive distributed within the sponge-like material, and optionally, absorbed by the sponge-like material. The sponge may be compressible and may release the additive when compressed, for example by a compression force induced by the relative movement of the parts of the multi-part container.

In some embodiments, the container may be further encapsulated in a second container, or a sheath, or the like. This may allow greater control over the directional release of the contents of the container. It may also provide greater protection from accidental or premature breakage, or incidental leakage. In this way, for example, single wall or multi-wall containers may be used to tailor container stability, strength, rupture resistance, processing ease in filter manufacture, etc.

Figure 1A shows a smoking article 20 comprising a cylindrical rod of smokeable material, in this case tobacco 21, and a filter 22. The filter 22 comprises a substantially cylindrical plug of filter material 23, which is wrapped in a plugwrap (not shown).

The rod of smokeable material 21 is aligned with the filter 22 such that the end of the tobacco rod 21 abuts the end of the filter 22. The rod is wrapped in a paper wrapper (not shown), and is joined to the filter 22 by tipping paper (not shown) in a conventional manner.

The filter 22 comprises a container 24. The container 24 contains an additive 25, which in this embodiment is a flavourant (such as menthol).

The container 24 is a two part container, having a first part 24a, and a second part 24b. The two parts are composed of a robust, non-frangible material, in this case a polymeric material, such as polylactic acid. The material is such that it will not break under the normal forces that are exerted on smoking article filters.

The container 24 is positioned within the filter 22 in an orientation that is substantially perpendicular to the longitudinal axis of the filter 22. In other embodiments the container may be situated within the filter in other orientations.

As shown in Figure 1B, the first part 24a of the container has the form of a hollow cylinder having a sealed end, which is domed, or hemispherical, and an open end. Additive 25 is contained within the first part of the container.

The second part 24b, is also in the form of a cylinder, however, both ends are sealed. In the embodiment shown, one end of the second part has a flat surface, while the other end, which is to be inserted into the first part, is domed, or hemispherical. On the outer circumferential surface of the second part are a series of longitudinal grooves or

channels 26. The channels extend from the flat surface along a significant proportion of the length of the second part, towards, but not up to, the domed end of the second part.

Prior to use of the container, as illustrated in the central image of Figure 1B, the chamber holding the additive is sealed as the surfaces of the two parts form a tight, friction fit seal. There is no gap between the inner surface of part 24b and the inner surface of part 24a where the parts overlap.

The container is held within the filter due to being encompassed by the tipping paper. In some embodiments, the sealed end of the container may be internal to the filter, or flush with the surface of the filter, and may or may not be encapsulated by the plugwrap and/or tipping papers. In other embodiments, the sealed end of the second part 24b of the container 24 is external to the filter 22, and is not encapsulated by the plugwrap or tipping papers.

In use, lateral force is exerted on the filter 22 in the region of the container 24, as indicated by the arrows B in the accompanying Figures 1A and 1B. The user may apply force to the container, for example by squeezing the filter between the fingers and thus providing a compressive force to a longitudinal axis of the container. Preferably, the filter comprises an indication of the location at which compressive force should be applied.

As shown in Figure 1A, by squeezing the filter in this way, the second part 24b of the container 24 is pushed into the first part 24a. Due to the grooves 26 on the outer surface of the second part 24b of the container 24, as the second part 24b is pushed into the first part 24a, the two parts no longer form a tight seal. Instead, a gap is formed by the relative positions of the parts because the overlap between the parts includes at least part of the grooves 26 which create a gap through which the additive may exit the chamber and be released. Furthermore, as the second part is pushed into the first part, the force within the container 24 is increased. Due to this increase in force, and the loss of the seal, additive 25 is forced out of the container 24.

Substantially all of the additive that is forced out of the container enters the filter material at or near the position of the grooves of the second part 24a of the container 24.

Thus, due to the two part arrangement of the container, the additive is directionally released into the smoking article filter in a controlled manner in a predetermined direction. Furthermore, the degree of additive 25 that is released is proportional to the force exerted on the container and the degree of depression of the second part 24b into the first part 24a of the container.

The arrangement of the container also means that the user is able to release additive as and when required, and can release further additive into the filter material throughout the duration of the smoking article, by simply applying further force to the ends of the container. The arrangement also allows the additive to be released by forceful ejection, as opposed to the additive passively seeping out of the container. In some embodiments, the pressure under which the additive leaves the container drives it away from the direct vicinity of the container.

In an alternative embodiment the second part 24b may be inserted into the first part in the opposite orientation.

In an alternative embodiment shown in Figure 1C, the second part of the container 24b comprises along outer circumferential surface a series of notches 27. The first part 24a comprises along its rim a widened section which acts as a stop 28.

As compressive force is applied to the container the second part 24b is pushed into the first part 24a as described above. However, the degree of insertion of the second part is limited by the stop 28 gripping the notch 27. Thus, a controlled and accurate dose of released. Further compressive force pushes the second part of the container further within the first release in a further dose of additive.

Figure 2A shows a smoking article 30 comprising a cylindrical rod of smokeable material, in this case tobacco 31, and a filter 32. The filter 32 comprises a composite filter, which in this case is a triple filter comprising two substantially cylindrical plugs of filter material 33, which are wrapped in a plugwrap (not shown). The two plugs of filter material 33 are separated by a container 34.

In other embodiments, the container is not held between two plugs of filter material, but is positioned within a single plug of filter material. For example, the filter may be incorporated into the tow feed during manufacture of the filter plug.

The rod of smokeable material 31 is aligned with the filter 32 such that the end of the tobacco rod 31 abuts the end of the filter 32. The rod is wrapped in a paper wrapper (not shown), and is joined to the filter 32 by tipping paper (not shown) in a conventional manner.

The filter 32 comprises a container 34, which is a four-part container, having a first part 34a, a second part 34b, a third part 34c, and a fourth part 34d. The arrangement of the parts of the container is shown diagrammatically in Figure 2B. The four parts are composed of a robust, non-frangible material, in this case a polymeric material, such as polylactic acid. The material is such that it will not break or deform under the normal forces that are exerted on smoking article filters.

In other embodiments, the container may comprise different numbers of parts, such as 2, 3, 5, or 6 parts.

The second, third, and fourth parts 34b, 34c, and 34d, of the container 34 are substantially the same shape and size. They have the form of a frustum of a cone, or flat topped cone. In each case, the smaller end of the frustum, which forms the base, has a flat surface, whilst the larger end of the frustum, at the top, is open.

The inside surface of the base of each of the second, third, and fourth parts 34b, 34c, and 34d, of the container 34 contain an additive 35a, 35b, and 35c. The additive is sealed within the part of the container by means of a sealing layer, which in this embodiment is a gelatin sealing layer, 36a, 36b, 36c. In other embodiments, the sealing layer may comprise any suitable frangible material, such as a wax.

The parts are held together to form a single container unit by means of a plurality of small, weak, strips or arms 37 connecting the side of one part to the rim of the subsequent part. In other embodiments, other means of holding the parts together may be used, such as hinges or flanges, or the parts may be sealed, for example, using a wax or other sealant. Forming a seal like this may be an alternative to the inclusion of the sealing layers 36a,36b,36c shown, as it can prevent the additive leaving the container before actuation.

In the embodiment shown, the additive is a flavourant. Each part 34b, 34c, and 34d contains a different flavourant, being a first flavourant 35a, a second flavourant 35b, and a third flavourant 35c, respectively. In other embodiments, two or more of the parts may comprise the same flavourant.

The sealing layers 36a, 36b, and 36c comprise different degrees of frangibility. In the embodiment shown in Figures 2A and 2B, the sealing layer 36a of the first additive 35a is more frangible than the second sealing layer 36b, and the third sealing layer 36c is the least frangible. In other embodiments, the sealing layers may have substantially equal frangibilities.

The first part 34a of the container 34 also comprises a frustum of a cone, or flat topped cone, and has the same size and dimensions as the second, third, and fourth parts 34b, 34c, and 34d, of the container. The first part differs from the other three parts, however, in that both ends of the first part comprise a flat end surface.

The four parts of the container are assembled in a stacked configuration, wherein the first part 34a is fitted within the second part 34b, the second part is fitted within the third part 34c, and the third part is fitted within the fourth part 34d.

The container 34 is positioned approximately within the centre of the filter 32 in an orientation that is substantially perpendicular to the longitudinal axis of the filter 32. The container is held within the filter due to being braced by the adjacent sections of filter material 33, and by being encompassed by the tipping paper. In other embodiments, the end of the first part 34a of the container 34 is external to the filter 32, and is not encapsulated by the plugwrap or tipping papers, such that the first part 34a of the container 34 protrudes from the smoking article filter 32.

In use, a compressive force is exerted on the filter 32 in the region of the container 34, for example by the user squeezing the filter between the fingers, as indicated by the arrow C in the accompanying Figure 2A.

The action of compressive force on the container is indicated diagrammatically in Figure 2B. As a first compressive force C1 is applied to the container, the first sealing layer 36a, being more frangible than the other two sealing layers 36b and 36c, is caused to rupture. As the first sealing layer 36a is ruptured, the first flavourant 35a is released

through the gap between the parts 34a,34b. The first compressive force C1 on the container 34 squeezes the flavourant 35a from the ruptured first sealing layer 36a and into the filter material 33. This rupture of the first sealing layer and release of flavourant may be detected by the user as a sudden release of pressure as the first part of the container 34a suddenly moves into the second part 35b and the first flavourant 35a is forced from the first part of the container. Rupture of the first sealing layer 36a, and the relative movement of the first and second parts, may be accompanied by an audible noise, such as a pop or a click, for example as the struts 37 are broken. The aroma of flavourant may also be detected.

If compressive force continues to be applied to the container, shown in Figure 2B as forces C2 and C3, the second sealing layer 36b, being more frangible than the third sealing layer 36c, will be ruptured, and the second flavourant 35b will be released, in a process equivalent to that described above in respect of the release of the first flavourant 35a from the first part of the container.

Finally, under application of force C3, the third sealing layer 36c will be ruptured, and the third flavourant 35c will be released.

Due to this four-part arrangement of the container 34, three separate additives may be directionally released into the smoking article filter in a controlled manner in a predetermined direction. Furthermore, the user is able to separately release each additive as and when required.

A further advantage of this arrangement is that the user may be able to feel and/or hear the movement of the individual parts of the container, and will thus be able to determine when each additive has been released from the container.

In an alternative embodiment shown in Figure 2C, the container does not retain the additive by means of sealing layers. Instead, each of the second, third, and fourth parts 34b, 34c, and 34d, of the container 34 comprise an additive held within a frangible dome 38 or other frangible capsule. In the embodiment shown in Figure 2C, the domes contain an additive, which in this embodiment is a flavourant. Each dome comprises a different flavourant, being a first flavourant, a second flavourant, and a third flavourant respectively. The surfaces of the domes comprise a frangible material such as gelatin. The domes in each of the first, second, and third parts of the container have different

degrees of frangibility and therefore rupture sequentially in response to different applications of compressive force.

Figure 2D shows an alternative embodiment in which the additive is retained within each part by means of a sealing layer 36d, 36e, 36f which also serves to hold the parts together. The sealing layers have different degrees of frangibility and therefore rupture sequentially in response to different applications of compressive force.

In the alternative embodiment shown in Figure 2E, the container does not comprise sealing layers, but instead the parts of the container comprise longitudinal ridges 39a, 39b, and 39c on an upper part of their outer surface. The parts do not comprise ridges at their lower end and initially form a tight seal to one another at this point. As the parts are compressed the seal is broken due to the ridges entering the neighbouring part, and thus flavourant is released. Sequential release of each flavourant from this telescopic container arrangement may be achieved by means of each part having ridges raised to a different extent. Thus, different compressive forces are required to compress each part into its neighbour.

The size of the container may be dependent on the volume of additive required, which in turn may be dependent on a number of factors, including the potency of the additive and the degree of smoke modification desired.

Generally, it is preferable for the volume of the container to be as large as possible, so that as much additive as possible may be provided, to modify the smoke as significantly as possible. The container should not be so large however, that it has an adverse effect on the filtration or draw characteristics of the filter. Furthermore, as the size of the container is increased, the risk of accidental release of additive from the container may also be increased.

Since the rupture of conventional containers occurs randomly, the contents of the container may be released generally into the surrounding filter material. Consequently, the containers themselves must also be larger. However, in accordance with the present invention, the additive is directionally released from the container in a controlled and predictable direction. As a result, the distribution of additive is more efficient, and smaller containers may be used than was previously possible. Alternatively, containers having similar sizes to those used previously may be used in accordance with the

present invention to deliver a significantly greater amount of additive to a desired location within the filter.

Generally, the length of the container is within the range 1mm to 30mm, and more preferably between 5mm and 20mm. The diameter of the container is preferably within the range 0.1mm to 6mm, and more preferably between 1mm and 5mm.

If a large amount of additive is required, multiple containers may be used. The containers may all be multi-part containers in accordance with the invention, or may be a combination of conventional and multi-part containers. The containers may have the same or different shapes, and may be of the same or of different sizes. When multiple containers are used, they may contain similar or a combination of different additives.

The multiple containers may be engineered to release additive substantially simultaneously in response to a single application of force on the filter. Alternatively, when multiple containers are present, the filter may require a number of sequential applications of force for release of the contents from all of the containers. The containers may be arranged to directionally release the additives into substantially the same area of filter material, or each container may have a different target area of directional release.

The container may be arranged to release the entire contents of additive in response to a single application of force on the filter. Alternatively, the container may be arranged to release a number of discrete deliveries of additive in response to sequential applications of force.

In some embodiments, the container may comprise two separate chambers. The separate chamber may be different chambers, or be formed from a single chamber that is divided into two separate chambers, for example by means of a septum or other internal barrier. In this case, the two chambers of the container may comprise the same additive, or a combination different additives. The chambers may also comprise two reagents, one or both of which may not function as an additive, but which reagents react or mix together to form an additive. The two more additives may chemically react, for example, to produce an exothermic or endothermic reaction. The additives could be an organic acid and an alcohol which react to form an ester.

The additive or other reagents within each chamber may be released substantially simultaneously in response to a single application of force such as compressive force. Alternatively, the different chambers may release the additive in response to a number of sequential applications of force on the filter.

A single smoking article or smoking article filter may comprise two, three, four or more multi-part containers in accordance with the invention. Multiple containers may be positioned, for example, at regularly spaced intervals along the length of the smoking article and/or filter. Alternatively, multiple containers may be situated as a cluster within the smoking article and/or filter, for example within a cavity formed between two sections of filter material.

Due to the use of multi-part containers in which the parts are induced to move relative to one another, additive is released from the disclosed containers in a highly controlled and predictable manner.

The containers of the invention may have essentially any shape. The container may, for example, be hemispherical, conical, trapezoidal, pyramidal, oblate, ellipsoidal, cubic, or any other suitable shape. The shape of the container may only be restricted by the desired manner of release of the additive. For example, the shapes of the different parts of the multi-part container may be configured to release additive in a particular direction, in a particular amount, with a particular velocity, in response to a particular application of force, etc.

Directional release of additive from the container may be enhanced by the use of a wicking element, such as an absorbent material, within the smoking article filter, and in particular, the use of absorbent material that is more absorbent than general filter material such as cellulose acetate. For example, absorbent material may be positioned adjacent to the container within the filter in the area in which directional release of additive from the container is desired. In this way, the absorbent material may draw the additive in the desired direction. Any suitable absorbent material may be used, for example, uncrimped cellulose acetate thread, other cellulosic materials such as hydroxymethyl cellulose, starch, or foamed polyvinyl alcohol may be used.

In further embodiments, the container may be sized, shaped, or positioned so that at least a portion of the container is within the smoking article, and a portion is external to

the smoking article. For example, the container may be situated substantially within the smoking article filter, having an external portion which protrudes out of the filter and is accessible to the user. The external portion may merely comprise a single surface. For example, the container may be shaped to fit within a cavity in a smoking article filter, one surface of the container being shaped so that when the container is combined with the filter, the external surface of the container is flush with the outer surface of the filter.

The container is a multi-part container and comprises two or more separate parts. The parts of the multi-part container may comprise a non-frangible material.

Known containers, such as frangible capsules, generally release their contents into the smoking article in an unpredictable amount and direction, for example, because the capsule ruptures in a random manner. However, the parts of the present multi-part container comprise a non-frangible material, and release of the additive is due to movement of these parts relative to one another, and is not due to rupture or other random breakage of one or more parts of the container. Thus, the release of the additive does not occur randomly, but occurs with a predetermined and predictable direction, quantity and velocity.

The container may comprise any non-frangible material. Materials used in conventional frangible containers may be used in the invention provided that that they are toughened to provide resistance to rupture. For example, materials used to provide containers typically utilized in the pharmaceutical industry may be used, and may be strengthened by having a much greater thickness than would usually be the case. The parts of the container may comprise a moulded plastic structure.

Alternatively, the container may be resistant to rupture as a result of the different parts being flexible or having a degree of elasticity.

Suitable container material may be gelatin based, for example, or may be formed from a polymeric material, such as modified cellulose. One type of modified cellulose which may be used is hydroxypropylmethyl cellulose. Many materials are known which may be suitable for use in the production of containers and these include high molecular weight polyethylene glycols, polylactic acid, polyvinyl alcohol, plastarch material, polycaprolactone, polyglycolide, a polyhydroxyalkanoate such as poly-3-

hydroxybutyrate, and zein-derived bioplastics. However, the container could in principle be produced using any robust material, such as a mouldable synthetic polymer or plastic material, ceramic, starch, paper, metal, glass, or other suitable material known to the skilled person.

The container may alternatively be comprised of a wax, resin, natural or synthetic gum, latex or plastic material which retains its shape and strength at room temperature and at smoking temperature. Examples of suitable waxes include beeswax, candelilla, carnauba, shellac wax, caranday, sugarcane wax, myrtle wax and petroleum wax.

Suitable resins from which containers may be composed include epoxy resins, terpene resins, petroleum resins, ester gum, phenolic resins and rosin based resins. Preferred gums include gum arabic, locust bean, guar, alginates, carrageenan and pectin.

One or more of the parts of the container may advantageously be coated with a varnish or waterproof material, such as silicone, to strengthen the container material and/or prevent absorption of, or degradation by, the contents over a prolonged period.

Preferably the substances comprising the parts of the container have no effect on the taste or properties of the mainstream smoke.

The core of the container may comprise a cavity in which additive is held, or the container may comprise a sponge-like porous material, which may be compressible, or a gel or a similar material. The additive may be distributed within the sponge-like material, and optionally, absorbed by the sponge-like material, which may release the additive by diffusion, or when compressed. A sponge-like material may be a body of absorbent material impregnated with the additive, which is progressively compressible and configured to release at least a part of the additive contents when partly compressed.

The sponge-like material may comprise a matrix with a closed cell structure, in particular, a closed cell foam structure. The closed cell foam defines a matrix having a plurality of small cavities which may contain additive. The cavities are closed by the foam material, retaining the additive until selective release. On application of a compressive force, the closed cell foam may be configured to release additive.

The closed cell foam substrate does not require an outer shell to retain the additive, and so may form a part of the container without an outer shell.

Alternatively, the sponge-like material may be coated in a second material, which may form part of the container. This outer material may function to retain the smoke modifying material within the sponge-like material until release of the contents is desired, at which time, external force exerted by the user may rupture the outer shell and squeeze the additive from the sponge-like material.

The additive may be a deodoriser, a diluent, an adsorbent, water, or a flavourant. The container may comprise two or more different additives.

The additive held within the container may be anything which may be added to smoke and which may modify the composition of smoke. The additive may be a deodoriser, a diluent, an adsorbent, or any other substance that is capable of modifying the smoke. The additive may be water. Where local regulations permit, the additive may be a flavourant, such as menthol.

As used herein, the terms "flavour" and "flavourant" refer to materials which, where local regulations permit, may be used to create a desired taste or aroma in a product for adult consumers. They may include extracts (e.g., licorice, hydrangea, Japanese white bark magnolia leaf, chamomile, fenugreek, clove, menthol, Japanese mint, aniseed, cinnamon, herb, wintergreen, cherry, berry, peach, apple, Drambuie, bourbon, scotch, whiskey, spearmint, peppermint, lavender, cardamon, celery, cascarilla, nutmeg, sandalwood, bergamot, geranium, honey essence, rose oil, vanilla, lemon oil, orange oil, cassia, caraway, cognac, jasmine, ylang-ylang, sage, fennel, piment, ginger, anise, coriander, coffee, or a mint oil from any species of the genus Mentha), flavour enhancers, bitterness receptor site blockers, sensorial receptor site activators or stimulators, sugars and/or sugar substitutes (e.g., sucralose, acesulfame potassium, aspartame, saccharine, cyclamates, lactose, sucrose, glucose, fructose, sorbitol, or mannitol), and other additives such as charcoal, chlorophyll, minerals, botanicals, or breath freshening agents. They may be imitation, synthetic or natural ingredients or blends thereof. They may be in any suitable form, for example, oil, liquid, or powder.

The flavour may be a tobacco flavour. Where the flavour is delivered in liquid form the tobacco flavour could be derived from tobacco extract. Where the flavour is derived

from a solid product, the product could be tobacco leaf in shredded, particulate or granular form, or in the form of reconstituted tobacco sheet material.

The additive may be a solid, such as a powder, a liquid, such as a liquid flavourant, deodoriser, water, etc, or a gas, such as an aromatic composition.

The container may be coloured. For example, the container may comprise a colouring agent. The colouring agent may be used to render more easily the location of the container within the filter during the manufacturing process. Alternatively or additionally, the colouring agent may provide an interesting appearance to the smoking article, particularly if the container is intended to be only partially enclosed within the filter material, or if the tipping paper (and plugwrap if applicable) is intended to have a transparent window portion.

Alternatively or in addition, the additive held in the container may be coloured. This would give the user an additional, visual indication that the additive has been successfully released, as the additive may be seen to be released from the container. This may be particularly useful if the container comprises a combination of additives, wherein one of the additives is coloured, and thereby serves to indicate release of the other, colourless, additive(s).

When the additive is coloured, it may be desirable for the container to directionally release additive into a region of the smoking article or smoking article filter in which the colour will be observed. For example, the additive may be directionally released into a peripheral region of the smoking article, such as a circumferential region or towards the mouth end. The coloured additive may be directionally released into a section of the smoking article that is visible via a transparent window portion.

In some embodiments, smoking article filters comprising the containers of the invention may comprise a transparent window which may allow visualisation of the container within the filter. In this way, the user is able to visualise the container within the filter, and may be able to visually determine whether the additive has been released.

To produce the effect of a transparent window, the tipping paper (and plugwrap if applicable) may comprise a single piece of transparent material, which can be, but is not limited to, one of polypropylene, polyvinyl chloride (PVC), cellulose acetate film,

polyethylene terephthalate (PET), polyethylene oxide (PEOX), polyethylene, cellophane, Natureflex™, polylactic acid, plastarch material, polycaprolactone, polyglycolide, a polyhydroxyalkanoate such as poly-3-hydroxybutyrate, and zein-derived bioplastics. The tipping paper may have an opaque coating on certain portions to leave a transparent uncoated section which defines the window.

The container may be located in any position within the filter. For example, the container may be located in the centre of the filter.

The filter material in which the container is held may comprise any suitable filter material, such as cellulose acetate, polypropylene, paper or any other suitable material.

In some embodiments at least a portion of the container may be at or near the surface of the smoking article. For example, when the smoking article is a cigarette, at least a portion of the container may not be encompassed by the filter material, but may be incorporated within the smoking article only by means of the plugwrap or tipping paper.

The container may be an external container. In other words, at least a portion of the external container is not encompassed by the smoking article. For example, when the smoking article is a cigarette, at least a portion of the external container is not encompassed by the plugwrap, cigarette paper, tipping paper, or any other paper or covering of the cigarette. In other words, at least a portion of the container is outside of all of the other components of the smoking article both prior to use, and during use. In particular, in accordance with the invention, the user is able to see, touch, and feel at least a portion of the container directly. In some embodiments, the container may protrude from the smoking article filter.

The portion of the container that is at or near the surface of the smoking article, or is external to the smoking article may be a section of the container structure on which force such as compressive force should preferably be exerted in order to release the additive. For example, in containers in which the additive is released due to one part of the container being pushed into another part of the container, the part of the container that is pushed may be at or near the surface, or may protrude from the surface, of the smoking article. The smoking article may include some indication that force should be exerted in this region in order to release the additive. For example, the container may

comprise a surface having pimples or ridges, or other features, that may be detectable through any filter material or wrapping layers of the smoking article, alternatively, or in addition, the smoking article filter may comprise a graphic or other printed indication on the outer surface.

The container may have merely a single surface that is at or near the surface of the smoking article, or is external to the smoking article. For example, the container may be shaped to fit within a cavity in the smoking article filter, one surface of the container being flush with the outer surface of the filter. In this case, the container may be external to the tipping, plugwrap, or other surface layer of the smoking article, or may be encapsulated by such a wrapping. In other embodiments, the container may protrude out of the filter, and in this case, the container may be arranged so that when force is applied to the protruding section, this section becomes flush or internal to the surface of the smoking article. Such an effect may serve to indicate that the additive has been released from the container.

Where at least a portion of the container is external to the smoking article, at least this portion of the container will be directly accessible to the user. Therefore, the user will be able to readily detect the release of the additive from the container, for example, by simply feeling the movement of the multi-part container, by observing the release of the additive, or by detecting an aroma. Furthermore, in some embodiments, release of the additive from the container may be accompanied by an audible noise, or a detectable change in the feel of the container as the parts of the container move relative to one another.

The method of manufacture of the container may be dependent on the precise composition and make-up required. Any suitable method of manufacture may be used.

Parts of the multi-part container may be produced by any suitable technique. For example, techniques including blow moulding, injection moulding, 3D printing and the use of Rotary Dies may be used. A combination of techniques may be used.

The container may be incorporated at any location within a smoking article, for example, the container may be located within the filter of a smoking article.

The smoking article may comprise one or more containers that are arranged to directionally release additive towards a particular region of the smoking article or smoking article filter, which may be any region of the smoking article or smoking article filter.

This region may comprise a material which is activated by the additive released from the additive release component. For example this material may comprise a solid that is active when in solution, and is thus activated by the action of additive in the form of water or a specific solvent.

The target region of directional additive release may be a cavity within the centre of the filter, which may or may not comprise other active materials. For example, the cavity may comprise crystalline flavourant, which may be activated when additive in the form of a solvent is directionally released into the cavity to contact the crystals. Alternatively, the cavity may comprise a material which is sensitive to additive in the form of water, for example, a material which in contact with water changes colour, dissolves, makes a sound, emits a flavour or an odour, etc.

The particular region to which additive is directed may be a region of filter material comprising a solid material in the form of small granules evenly distributed within the material. Such an arrangement may be useful, for example, when a granular crystalline flavourant is to be used in combination with a container comprising a solvent additive. In this case, a plurality of containers may be used, from which additive may be sequentially released to provide flavourant over the duration of use of the smoking article. In this arrangement, additive may be directed into the same or different regions of the granule-containing filter material.

The region to which additive is directed may be a peripheral region of the smoking article or smoking article filter, such as a region at or near the circumferential surface of the smoking article, or at the mouth end of the filter. Such an arrangement may be suitable, for example, when the additive is coloured, to provide an interesting appearance to the smoking article, and/or to provide a visual indication that the additive has been released, for example, where the container comprises a combination of coloured and colourless additives. This arrangement may also be suitable when the additive is an odorant, to facilitate diffusion of the odour out of the smoking article.

A smoking article or smoking article filter may comprise two or more additives, each carried within a separate container. This arrangement may be suitable, for example, when the two or more additives chemically react, or where the additives are subject to oxidation, diffusion, or other means of loss of intensity over time.

The two or more containers may be arranged to directionally release additive towards each other. Such an arrangement may be useful, for example, where the additives chemically react, such as to produce an exothermic or endothermic reaction, or a reaction in which an odour or a gas is evolved, or a colour or other visual effect is produced.

The two or more containers may be arranged to directionally release additive towards a common region of the filter. This may be suitable where a significant quantity of additive is required to be supplied to a particular region of the filter, for example, where the additive is water, and the target region of the filter comprises a water sensitive material, such as a water swellable, water soluble, or water degradable material.

Since the containers of the invention are designed to directionally release additive, then the orientation in which the container is inserted into the filter should be controlled.

The container may be inserted into the filter using any suitable method.

In embodiments in which the container is intended to be positioned in the centre of the filter material, suitable apparatus may, for example, include a means for supplying a continuous stream of filter material from a source of such material (a bale, bobbin, or the like). The apparatus may further include a container insertion unit for inserting or depositing the individual containers at predetermined intervals within the filter material. The filter material having containers deposited therein may then be received into a rod-making means for providing a continuous rod which may subsequently be subdivided into the desired length at predetermined intervals to form individual filters.

Any suitable alternative technique may also be used if applicable. For example, the containers may be inserted into a cavity within the filter, or known dual or triple filter combining techniques may be used. The containers may be incorporated into the filter using a vertical feed method.

Embodiments of the invention are configured to comply with applicable laws and/or regulations, such as, by way of non-limiting example, regulations relating to flavours, additives, emissions, constituents, and/or the like. For example, a smoking article implementing the invention may be configured to be compliant with applicable regulations before and after a user releases an additive. Such implementations may be configured to be compliant with applicable regulations before, during and after user interaction.

In order to address various issues and advance the art, the entirety of this disclosure shows by way of illustration various embodiments in which the claimed invention(s) may be practiced and provide for superior additive release components and products including the same. The advantages and features of the disclosure are of a representative sample of embodiments only, and are not exhaustive and/or exclusive. They are presented only to assist in understanding and teach the claimed features. It is to be understood that advantages, embodiments, examples, functions, features, structures, and/or other aspects of the disclosure are not to be considered limitations on the disclosure as defined by the claims or limitations on equivalents to the claims, and that other embodiments may be utilised and modifications may be made without departing from the scope and/or spirit of the disclosure. Various embodiments may suitably comprise, consist of, or consist essentially of, various combinations of the disclosed elements, components, features, parts, steps, means, etc. In addition, the disclosure includes other inventions not presently claimed, but which may be claimed in future.

Claims

1. A multi-part container for use in a smoking article, wherein two or more parts of the container are arranged to define the volume of a chamber in which an additive is stored and wherein at least one of said parts is arranged to move relative to the other part or parts upon application of an external force applied to the container so that the volume of the chamber is reduced and the additive is released from the container.

2. A container according to claim 1, wherein external force induces one part of the container to be moved in a direction inwardly of another part.

3. A container according to either of the preceding claims, wherein the additive is released only in one or more predetermined directions.

4. A container according to any one of the preceding claims, wherein the additive is forcefully ejected or driven from the container.

5. A container according to any one of the preceding claims, wherein the additive is released through a gap between the parts defining the volume of the chamber.

6. A container according to claim 5, wherein the gap between the parts is formed or opened following the movement of at least one part relative to the other part or parts.

7. A container according to any one of the preceding claims, wherein the container comprises a non-frangible material.

8. A container according to any one of the preceding claims, wherein the container comprises a material that is non-frangible due to being robust and resistant to fracture under the normal forces that are exerted on smoking article filters.

9. A container according to any one of the preceding claims, wherein the container comprises a material that is non-frangible due to being flexible.

10. A container according to any one of the preceding claims, wherein the additive is a deodoriser, a diluent, an adsorbent, water, or a flavourant.

11. A container according to any one of the preceding claims, comprising two or more chambers in which an additive may be stored or is stored.

12. A container according to any one of the preceding claims, wherein the container comprises two different additives.

13. A container according to any one of the preceding claims, wherein the additive is held inside a capsule within the container.

14. A filter for a smoking article comprising a container as claimed in any of the preceding claims.

15. A smoking article comprising a filter as claimed in claim 14, or a container as claimed in any of the claims 1 to 13.

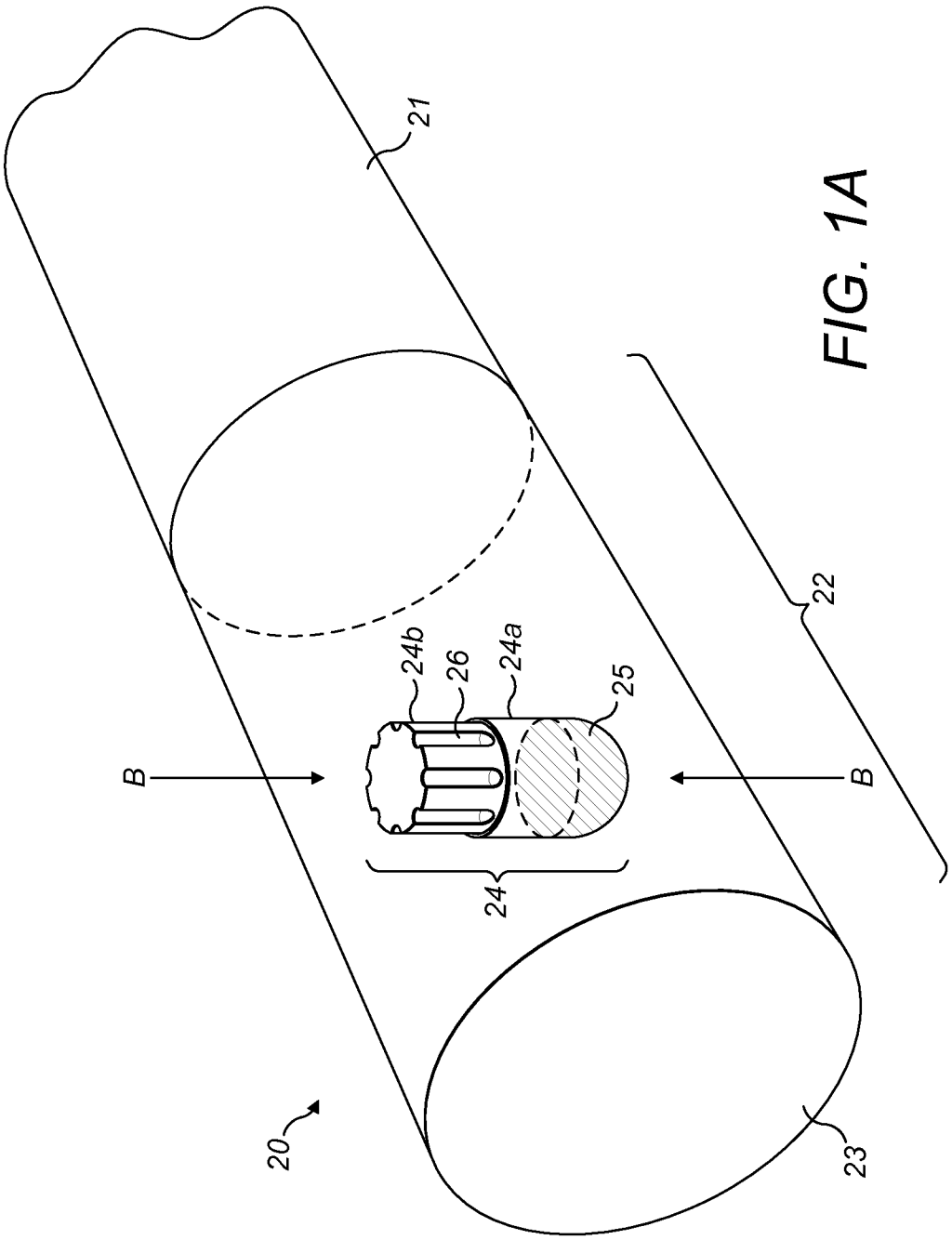

FIG. 1A

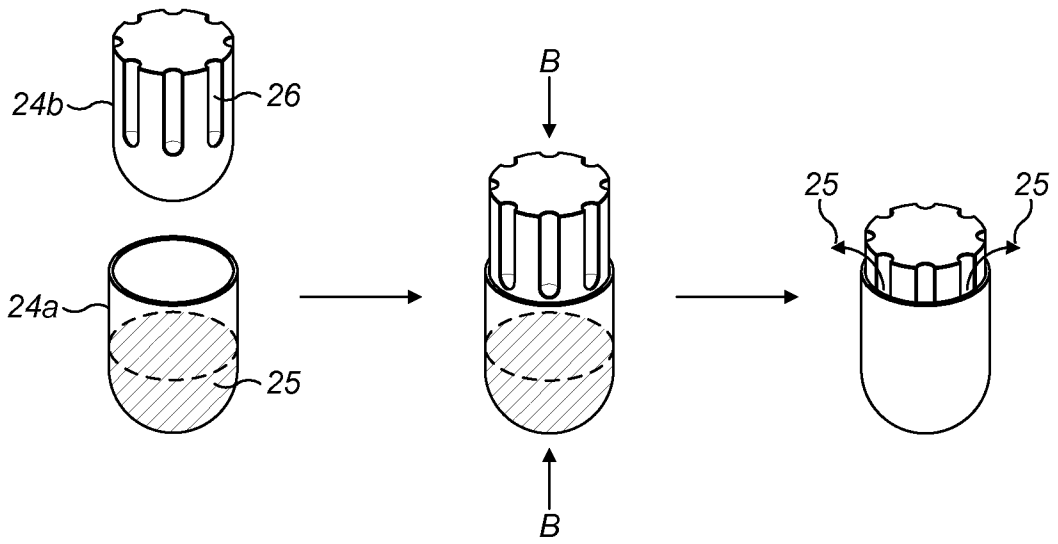

FIG. 1B

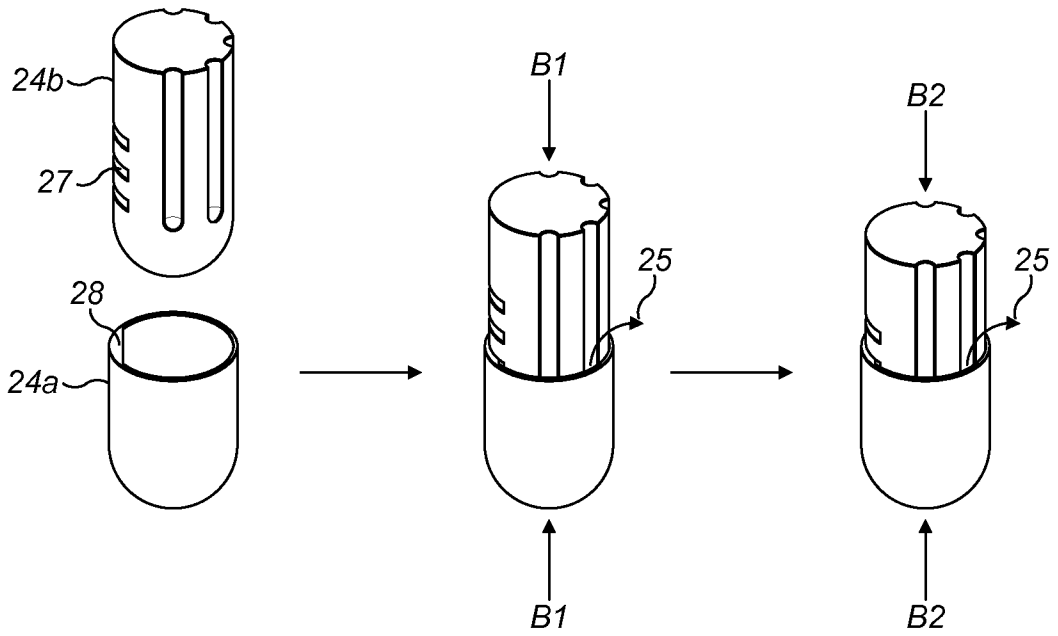

FIG. 1C

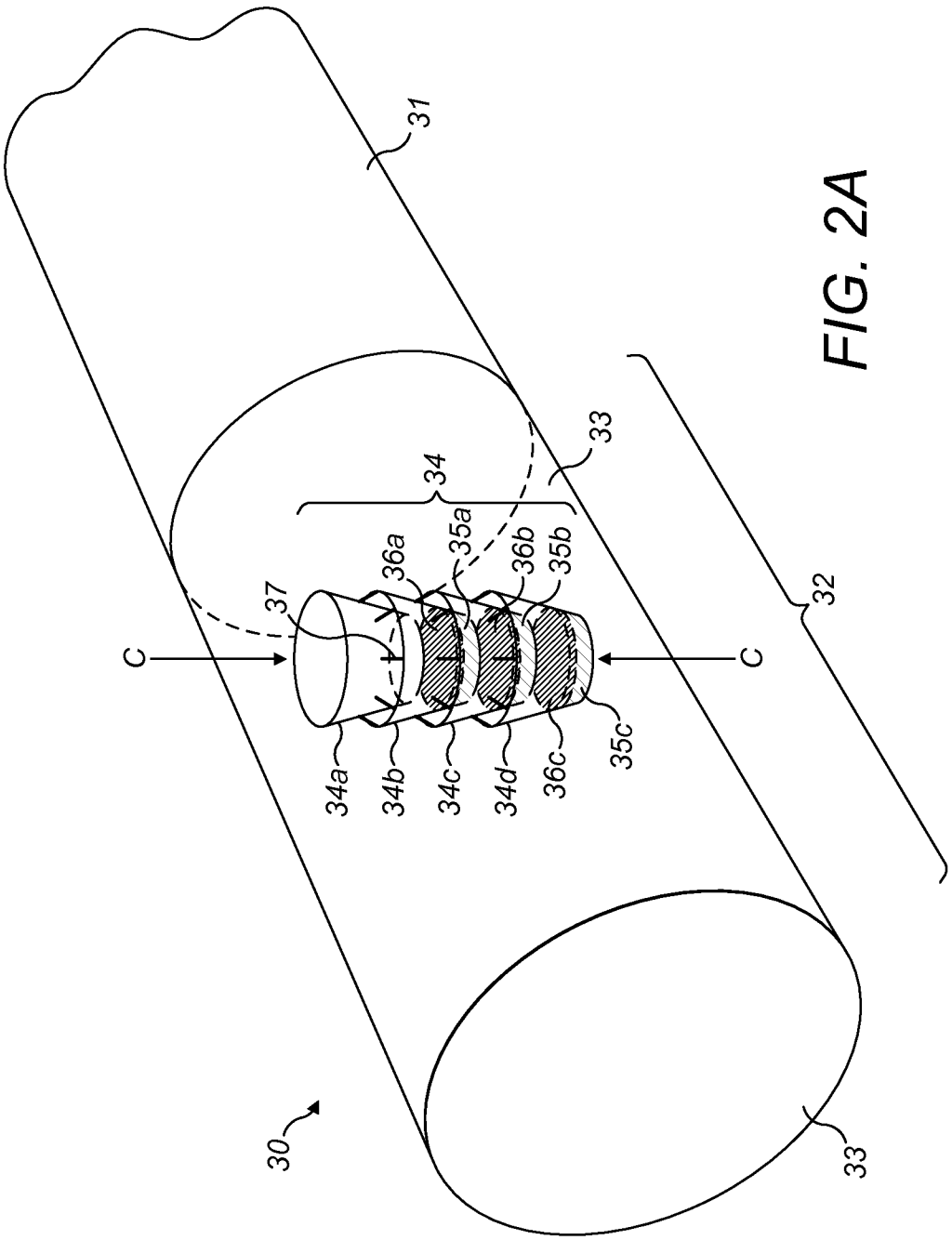

FIG. 2A

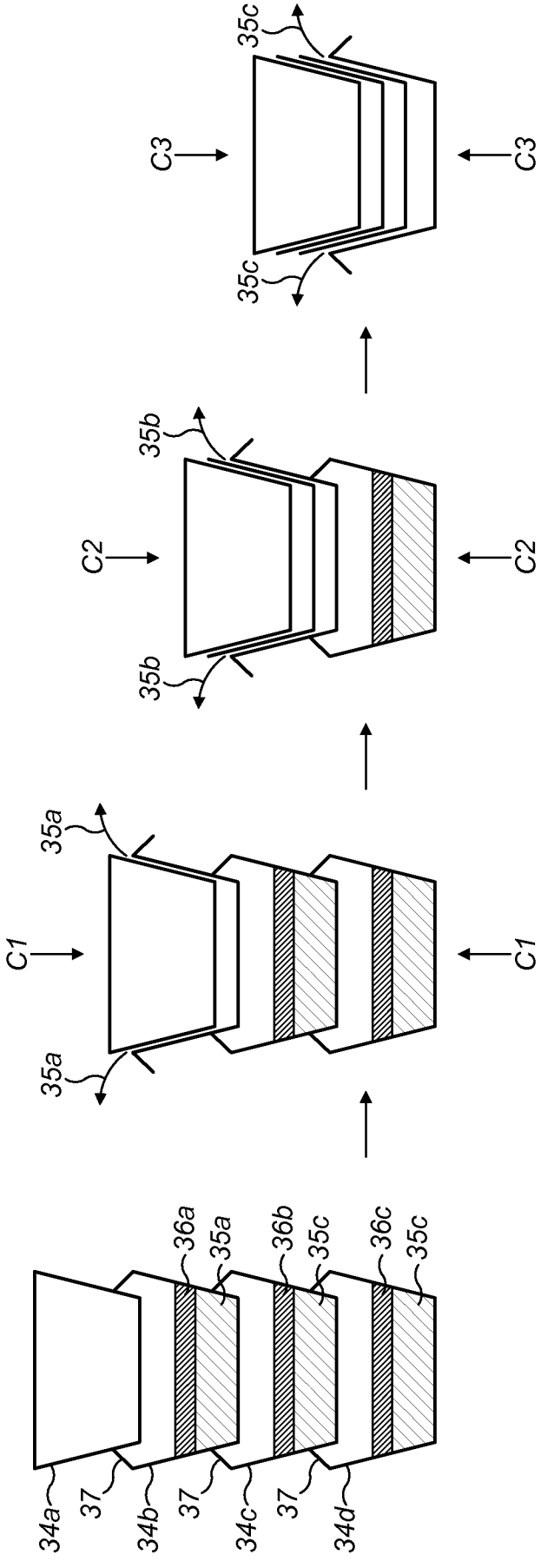
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FIG. 2B

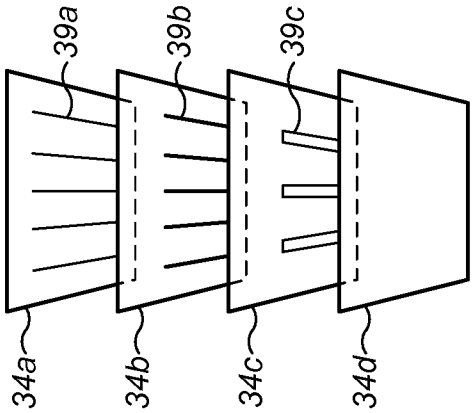

FIG. 2E

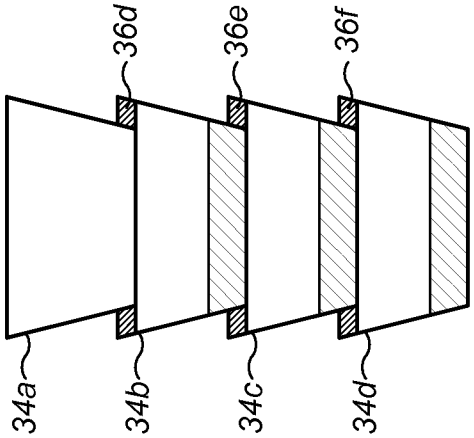

FIG. 2D

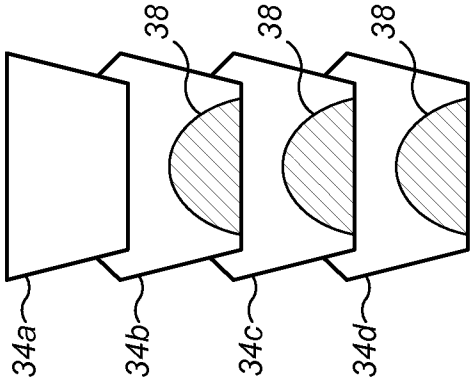

FIG. 2C

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2012/051040

A. CLASSIFICATION OF SUBJECT MATTER
INV. A24D3/04
ADD.

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)
A24D A24F

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

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 395 291 A2 (PHILIP MORRIS [US]) 31 October 1990 (1990-10-31) column 4, line 9 - column 10, line 27	1-4,7,8, 10-15
X	EP 0 171 601 A1 (GENE ESPARZA NATIVIDAD) 19 February 1986 (1986-02-19) page 7, line 1 - page 9, line 8	1-4, 7-13,15
X	WO 03/105614 A1 (HAYES GERARD [IE]; HAYMES ALAN [GB]) 24 December 2003 (2003-12-24) page 11, line 3 - page 16, line 3	1-4,7,8, 10,14,15

☐ 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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 August 2012	04/09/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Koob, Michael

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/GB2012/051040

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