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(54) Title: SMOKING ARTICLE

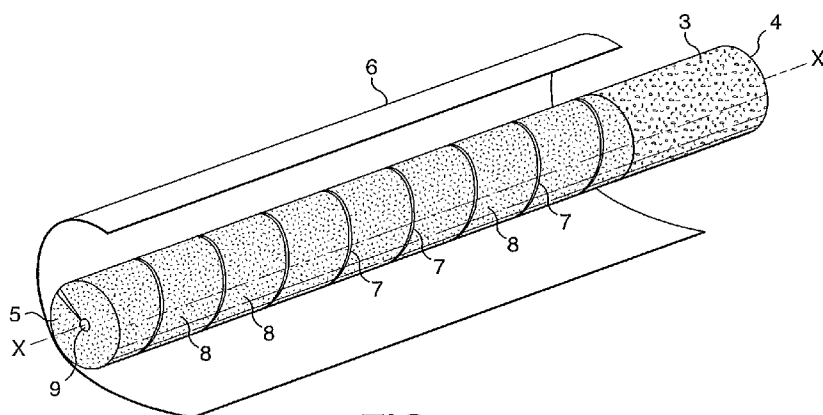


FIG. 2

(57) Abstract: A smoking article in the form of a cigarette has a tobacco rod 2 which includes a baffle insert 7 which may be configured in a spiral pattern to deflect smoke passing along the rod towards the mouth end 4. A matrix of intertwined baffle threads 7 may alternatively be used.

Smoking Article

Field

This invention relates to a smoking article, particularly but not exclusively to a
5 cigarette.

Background

It has been proposed in WO/2008/068458 to include a helical, spiral core in a
cigarette filter in order to improve its filtering characteristics.
10

Summary

Embodiments of a smoking article described herein comprise a rod of combustible
material and a baffle insert within the combustible material to deflect smoke
passing along the rod towards one end thereof.
15

The rod may contain a combustible material of a first material composition and
the baffle insert may be made of material having a second, different material
composition from the first material.

20 The second material composition may be combustible. In one example, the first
material composition comprises tobacco strands or tobacco dust, and the second
material composition may comprise cut rag tobacco.

A shaft of a third material composition such as carbon, which may include a
25 flavourant or other additive, may extend axially along the rod. The shaft can be
made of reconstituted tobacco and may include a catalyst or at least one
adsorbent to interact with the smoke passing along the rod.

The baffle insert may include baffle surface region disposed at an angle to the
30 longitudinal axis of the rod to deflect smoke during its passage along the rod away
from the longitudinal direction of the rod. In this way, the unburnt tobacco
produces a filtering effect on the smoke as it passes through the rod by extending
the flow path for smoke through the rod.

35 The baffle insert may comprise a helical member extending along the rod with a
baffle surface region of spirals around the longitudinal axis of the rod.

Alternatively, the baffle insert may include a matrix of intertwined strips of the second material.

- 5 The smoking article may be manufactured by a method comprising forming a rod of combustible material containing baffle insert to deflect smoke passing along the rod towards an end thereof.

10 The baffle insert may be formed by an extrusion process, which may for example utilise a rotary extrusion head that may include a nozzle configured so that on rotation, the baffle insert is formed as a helical spiral. Alternatively, the extrusion head may include a plurality of nozzles configured so that the baffle insert is formed on rotation as intertwined, extruded threads of material.

- 15 Spaces in the baffle insert may be filled with tobacco-containing combustible material by applying a differential pressure in order to cause the material to fill the spaces.

20 After filling, a wrapper may be provided around the baffle and combustible material. A filter may then be added to the rod in order to form the finished smoking article.

Brief description of the drawings

25 In order that the invention may be more fully understood an embodiment thereof will now be described by way of an illustrative example with reference to the accompanying drawings in which:

Figure 1 is a schematic perspective view of smoking article that comprises a cigarette,

Figure 2 is a partially exploded view of the cigarette shown in Figure 1,

30 Figure 3 is a partially broken away view of the cigarette shown in Figure 2,

Figure 4 illustrates the process steps for manufacturing the cigarette,

Figure 5 is a schematic partial section of an extrusion apparatus for forming a baffle insert for use in the cigarette,

Figure 6 is an end view of a rotary extrusion nozzle in the apparatus of Figure 5,

Figure 7 is a schematic illustration of apparatus for filling the baffle insert with tobacco,

Figure 8 is a sectional view of the apparatus illustrated in Figure 7,

Figure 9 illustrates an alternative form of nozzle head for producing a baffle insert
5 that comprises a matrix of baffle threads,

Figure 10 illustrates a modification of the apparatus shown in Figure 5 in which the nozzle head shown in Figure 9 is fitted, and

Figure 11 is a schematic illustration of another apparatus for filling the baffle insert with tobacco.

10 Detailed description

Referring to Figures 1-3, a smoking article in the form of a cigarette 1 comprises a tobacco rod 2 to which a filter 3 is attached at one end. The filter 3 may be a cellulose filter as well known *per se* in the art and may be attached to the rod using tipping paper
15 (not shown). The smoking article has a cylindrical outer surface and an axis of symmetry X-X', a proximal end 4 and a distal end 5 which in use is ignited to form smoke which passes through the tobacco rod 2 and the filter 3 when the user draws on the proximal end 4. As illustrated in Figure 2, the tobacco rod 2 is wrapped by a wrapper 6 which may comprise a sheet of paper. The rod 2 includes a baffle insert 7
20 which in this example is configured as a helical spiral about the axis X-X'. The helical space between the baffle insert 7 and the outer wrapper 6 are filled with tobacco 8.

Thus, when the cigarette is lit at the distal end 5, the tobacco forms a burning coal and smoke is drawn through the rod 2 into the filter 3 when the user draws on the proximal
25 end 4. The baffle insert 7 provides a generally helical baffle surface region disposed at an angle to the longitudinal axis of the rod 2 so as to deflect smoke during its passage along the rod away from the longitudinal direction of the rod. Thus, smoke travelling from the coal formed at the distal end 5 of the rod 2 travels in a helical path to the filter 3 when the user draws on the proximal end 4. This helical path is accordingly longer
30 than a typical flow path for smoke in a conventional cigarette in which the smoke would take a shorter route along the linear axis X - X'.

The helical arrangement also creates a spiral burn pattern for the tobacco 8, which may lengthen the time taken for the tobacco to burn down towards the proximal end of the cigarette.

5 Also, an axially aligned shaft 9 may be included, which may comprise a carbon core that smoulders at a lower burn rate than the tobacco 8. The helical baffle insert 7 may be made of combustible material, for example reconstituted paper with a slower burn rate than the tobacco 8, so that the tobacco rod 2 may burn
10 down in such a way that all of the constituent parts of the rod burn at substantially the same rate in the axial direction X-X'. Alternatively, the tobacco 8 may burn at a faster rate than the baffle insert 7 and core 9 such that the interior structure of the rod 2 is exposed so as to display the spiral baffle insert 7 during smoking the device, so as to provide a distinctive visual effect.

15 In a modification to the above described arrangement, the carbon core 9 may be impregnated with an additive such as flavourant in order to flavour the smoke passing along the rod 2 to the filter 3.

In a further modification, the baffle insert may have different, non-helical shape.
20 For example, the baffle insert may comprise an intertwined matrix of threads made of a different material composition to the tobacco 8 so as to provide baffle surface regions disposed at an angle to the longitudinal axis of the rod, thereby deflecting smoke during its passage along the rod away from the longitudinal direction of the rod. In this way, the tobacco material 7 acts as a filter for the
25 smoke passing to the filter 3.

Manufacture of the cigarette will now be described in more detail. Referring to Figure 4, which illustrates an overview of the manufacturing process, the baffle insert 7 is formed in an initial step S1. In this example, the insert is formed by an
30 extrusion process.

In step S2, the baffle insert is filled with tobacco 8 and the wrapper 6 is applied in step S3. The resulting tobacco rod may be manufactured on a continuous basis and cut into lengths in step S4. The filter may be added at step S5. As well known in
35 the art, this may involve providing a length of filter suitable for two cigarettes,

attaching tobacco rods as cut in step S4 to opposite ends of the filter rod and then cutting the filter rod in the middle in order to provide two cigarettes back-to-back.

The extrusion process of step S1 will now be described in more detail with
5 reference to Figures 5 and 6. In this example, the baffle insert is made from cut rag tobacco (CRT) which is well known in the art. The CRT is mixed with water to form a pliable mass 11 with a dough-like consistency, and placed in a hopper 10. A screw 12 located at the bottom of the hopper 10 is driven by a motor 13 to drive the CRT 11 along an outlet tube 14 towards a rotary extrusion head 15. As illustrated
10 also in Figure 6, the extrusion head 15 comprises a rotary nozzle gear 16 driven by motor 17 through a drive gear train 18 illustrated schematically. The nozzle gear 16 is interchangeably mounted between idler gears 19, 20 and the drive gear 18. Nozzle gear 16 includes a nozzle 21 that includes an axial opening 22 and a radial slit 23.

15 As illustrated in Figure 5, a carbon containing thread or cord in a roll 24 extends through an axial opening in the drive screw 12, along the outlet tube 14 through the axial nozzle opening 22 of nozzle gear 16. The thread could be formed of reconstituted tobacco.

20 In use, the CRT dough 11 is extruded through the radial nozzle slit 21, which is rotated by motor 17 to form the helical baffle insert 7 as illustrated in Figure 5. The thread from roll 24 feeds along the outlet tube 14 same rate as CRT dough 11, so as to form the central shaft 9 in the centre of the baffle insert 7 formed by the
25 extrusion from nozzle 15. The thread from roll 24 may be drawn by the surface tension of the surrounding dough 11 in tube 14 or may be driven by a motor (not shown).

A heater 25 may be provided to heat the extruded baffle insert 7 in order to make
30 it more rigid. The heater may be an electrical radiant heater but air plasma heating could be used. Also a chemical hardening process can be included to form the baffle insert 7. Alternatively or in addition, steam may be applied in order to form the baffle insert 7. It will be understood that the baffle insert 7 is produced on continuous basis. The dough 11 may move along the outlet tube 14 at a rate of the
35 order of 14m/s although any suitable rate may be chosen by controlling the speed of the motor 13 and the gear ratio of the drive train 18. The pitch of the helical

baffle insert 7 may be controlled by controlling the relative speeds of the motors 13, 18.

The baffle insert 7 and central core 9 arrangement produced by the process of
5 Figure 5 is then filled with tobacco (step S2) using apparatus for example as
illustrated in Figures 7 and 8. Tobacco 8 is fed from a hopper (not shown) along a
chute 26 on to a perforated, endless belt 27 and moves in the direction of arrow Y.
The belt 27 is driven by a motor, (not shown). The spiral baffle insert 7 and
associated carbon core 9 pass on a continuous basis over the belt 27 and the
10 tobacco 8 lying upon it. The belt 27 tobacco 8 and baffle insert 7 pass under
longitudinally extending cowl 28 which has an upper part 29 that is semi circular
in cross section, under which is arranged a semi-cylindrical, perforated plate 30.
The upper part 29 of the cowl 28 that is coupled to a vacuum pump (not shown)
through a conduit 31, so as to establish negative pressure in the upper part of the
15 cowl, thereby establishing a pressure differential across the cross sectional
diameter of the baffle insert 7. In this way, tobacco 8 on the belt 27 is drawn by the
pressure differential into the semi-cylindrical plate 30 so that the tobacco 8 is
drawn into the helical space between successive turns of the baffle insert 7. In this
way, the insert 7 becomes filled with tobacco 8. Any suitable form of tobacco may
20 be used, for example tobacco shreds or dust.

The resulting arrangement is then fed to a wrapping station 32 in order to apply
the wrapper 6 (step S3). The paper wrapper 6 is fed from a reel (not shown) in a
continuous strip and a tongue (not shown) is used to wrap the strip around the
25 combination of the baffle insert 7, tobacco 8 and core 9 leaving the cowl 28 shown
in Figure 7. The wrapper 6 may be wrapped around the rod by means of the tongue
and glued as well known *per se* in the art.

The resulting tobacco rod 2 may then be cut into lengths at a cutting station not
30 shown, for example as described in similar manner as for conventional tobacco
rods. The rods may then be fitted to opposite ends of lengths of filter rod using
tipping paper and each filter rod then cut in half to form two cigarettes back to
back, as well known in the art.

35 A modification of the process will now be described in reference to Figures 9 and
10. In this example, the nozzle gear 16 shown in Figure 6 replaced by nozzle gear

33 which contains a plurality of nozzles 34. In this example, four nozzles 34 are utilised, spaced symmetrically around the axis of rotation of the nozzle gear 33 but will be understood that different nozzle patterns using different numbers of nozzles may be alternatively used.

5

As shown in Figure 10, operation of the rotary nozzle 16 with the nozzle gear 33 produces an intertwined matrix of baffle surfaces 7' which may be used instead of the helical spiral 7 shown in Figure 5 to form the baffle insert for the cigarette. The intertwined threads 7' can be used in the apparatus shown in Figures 7 and 8 to
10 produce the tobacco rod.

Many other modifications and variations will be evident to those skilled in the art. For example, the baffled insert could be made of reconstituted paper which may be extruded in a similar manner to that described in Figure 5. Alternatively, the baffle
15 insert could be formed by a moulding or machining process. The baffle insert could be made of non-combustible material so as to be fully exposed when the tobacco 8 has been combusted.

Also, different nozzle shapes for the nozzle gear will be evident to skilled in the
20 art. For example, instead of the single radial blade 21 shown in Figure 6, multiple blades may be used to produce a more complex helical baffle insert with multiple, spiralled baffle surface regions wound concurrently, for example a cruciform arrangement of nozzle blades.

25 Another apparatus for forming a tobacco rod containing the baffle insert is shown in Figure 11, which can be retrofitted to a commercially available tobacco rod making machine such as manufactured by Hauni Maschinenbau AG or GD. In such machines, cut tobacco or the like 8 is drawn by a suction pump arrangement 33 from a supply surface 34 onto the underside of an endless,
30 porous belt 35 that extends around driven pulleys 36, 37 and delivered from the belt in the direction of arrow A to a wrapping station 32 where the tobacco 8 is wrapped in wrapper 6 as previously described and well known in the art to form the tobacco rod. The arrangement is contained within a housing 38 so that the pump 33 draws air through conduit 31, which draws air in the direction of
35 arrows B through the porous belt 35, entraining the cut tobacco 8 on surface 34 in the air flow such that it moves upwardly in the direction of arrows C and

accumulates on the underside of the belt 35 to form the tobacco rod delivered to the wrapping station 32.

In accordance with the invention, a baffle insert forming device for example as
5 described with reference to Figure 5 or 10, is retrofitted to the rod making
machine in the location shown by reference 39, so as to supply the baffle insert 7
and/or rod 9 in through opening 40 in housing 38 in the direction of arrow D to
the underside of the belt 35. Thus, as the tobacco 8 builds up on the underside of
the belt 35, it fills the interstitial spaces in the insert 7, so that the wrapping
10 station 32 forms a continuous tobacco rod containing the baffle insert.

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 smoking articles
15 and methods of making 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
20 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
25 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 smoking article comprising a rod of combustible material and a baffle insert within the combustible material to deflect smoke passing along the rod
5 towards an end thereof.
2. A smoking article according to claim 1 wherein the rod contains a first combustible material composition and the baffle insert is made of a second material having a different material composition from the first material.
3. A smoking article according to claim 2 wherein the second material is
10 combustible.
4. A smoking article according to claim 2 or 3 wherein the first material composition comprises tobacco.
5. A smoking article according to claim 4 wherein the first material composition comprises tobacco dust.
- 15 6. A smoking article according to any one of claims 2 to 5 wherein the second material composition comprises reconstituted paper.
7. A smoking article according to any one of claims 2 to 5 wherein the second material composition comprises cut rag tobacco.
8. A smoking article according to any one of claims 2 to 5 including a shaft of a
20 third material composition extending axially along the rod.
9. A smoking article according to claim 8 wherein the shaft comprises a carbon core.
10. A smoking article according to claim 8 wherein shaft is made of reconstituted tobacco.
- 25 11. A smoking article according to claim 8 or 9 wherein the shaft includes a catalyst or at least one adsorbent to interact with the smoke passing along the rod.
12. A smoking article according to any preceding claim wherein the baffle insert includes a baffle surface region disposed an angle to the longitudinal axis of the

rod to deflect smoke during its passage along the rod away from the longitudinal direction of the rod.

13. A smoking article according to claim 12 wherein the baffle insert includes a helical member extending along the rod with a baffle surface region that spirals
5 around the longitudinal axis of the rod.

14. A smoking article according to any one of claims 2 to 12 wherein the baffle includes a matrix of intertwined strips of the second material.

15. A smoking article according to any preceding claim wherein the rod has a distal end combustible to form the smoke and a proximal end to which the smoke
10 is to travel.

16. A smoking article according to claim 15 including a filter on the tobacco rod at the distal end.

17. A method of manufacturing a smoking article comprising forming a rod of combustible material containing a baffle insert to deflect smoke passing along the
15 rod towards an end thereof.

18. A method according to claim 17 including forming the baffle insert by an extrusion process.

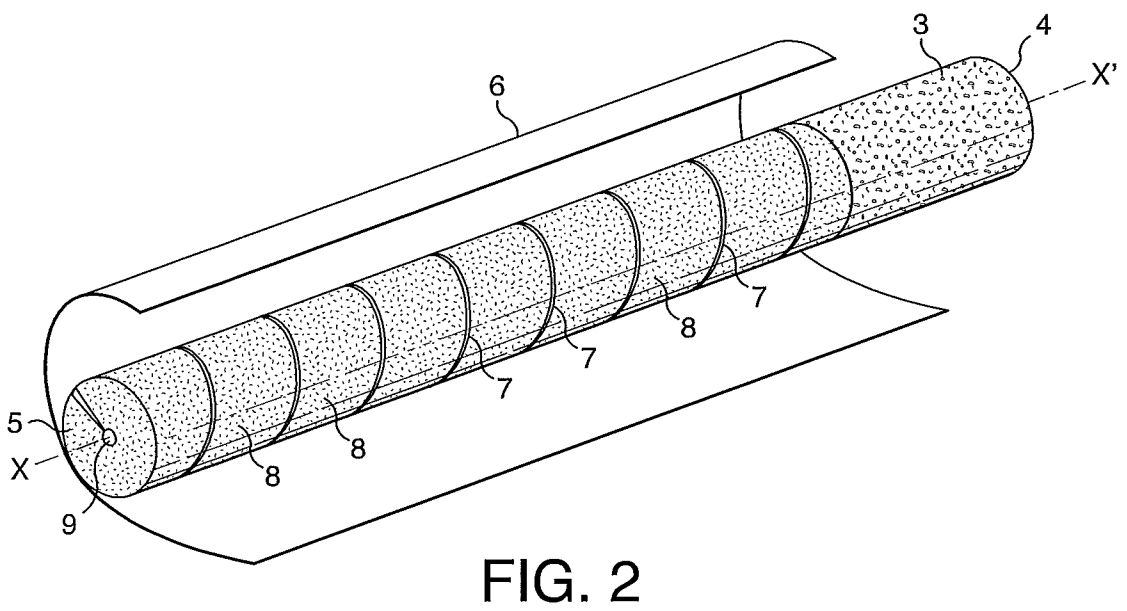
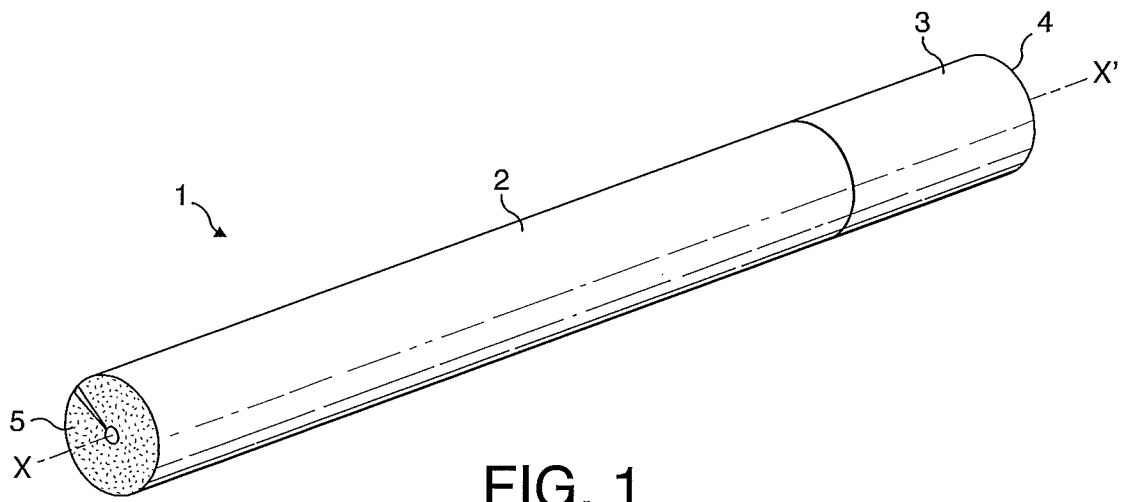
19. A method according to claim 18 including extruding material for the baffle insert through a rotary extrusion head.

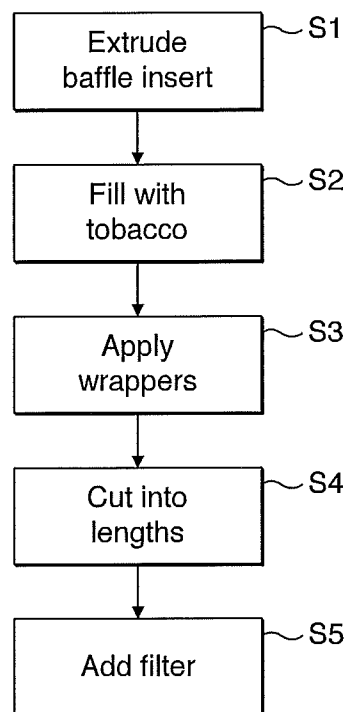
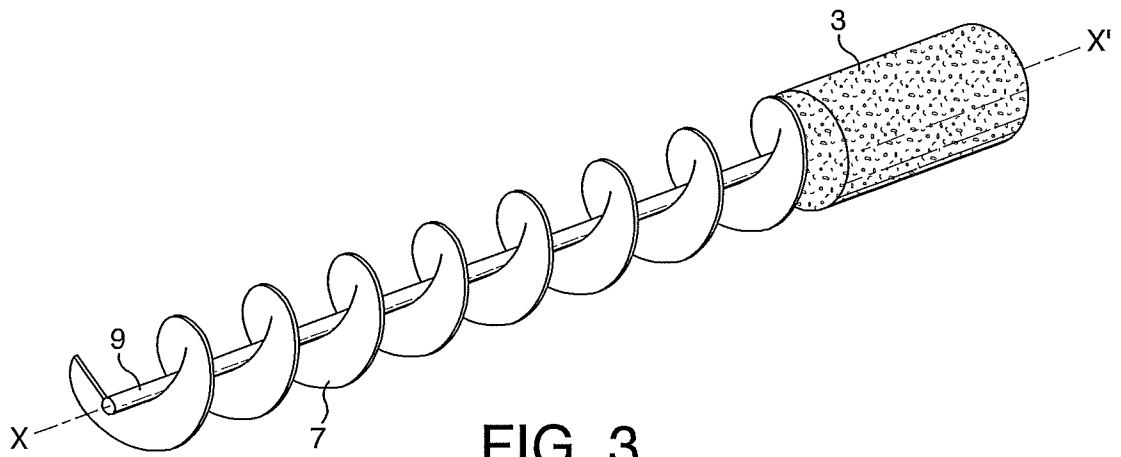
20. A method according to claim 19 wherein the rotary extrusion head has a plurality of nozzles configured so that the baffle insert is formed by rotation of the head, as intertwined, extruded threads of material.

21. A method according to any one of claims 17 to 20 including filling spaces in the baffle with a tobacco containing material by applying a differential pressure to
25 cause the material to fill the spaces.

22. A method according to any one of claims 17 to 21 including providing a wrapper around the baffle and the combustible material.

23. A method according to claim 22 including attaching a filter to the rod.





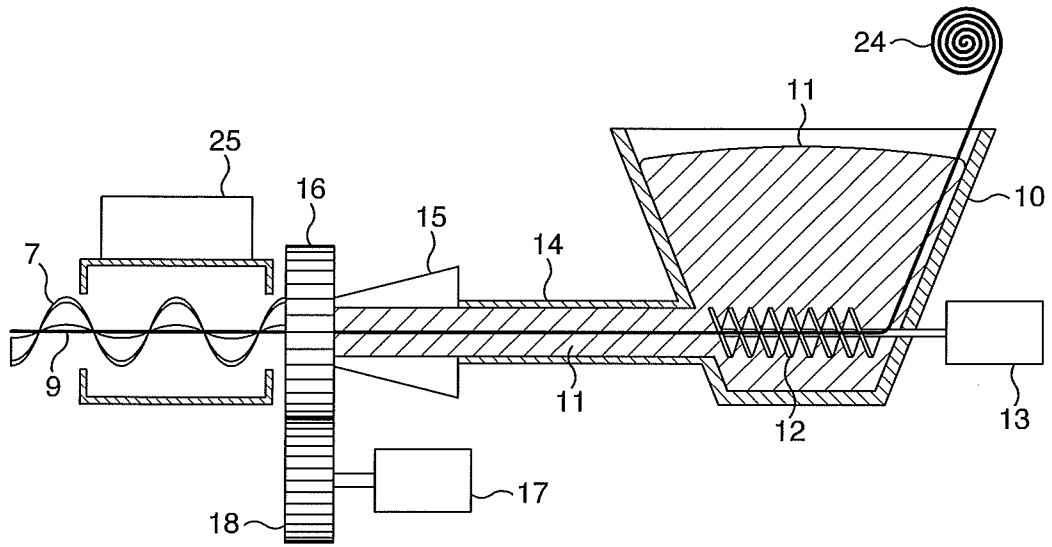


FIG. 5

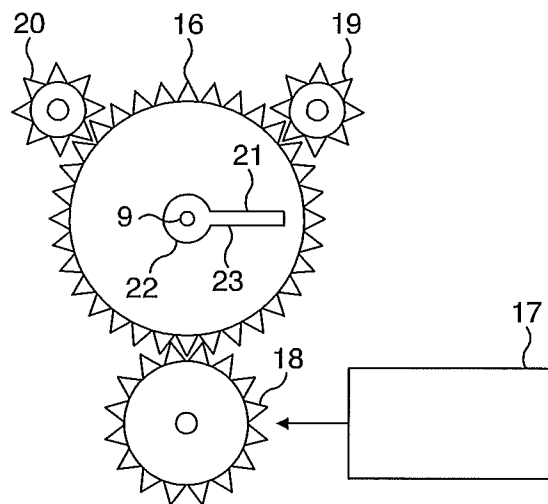
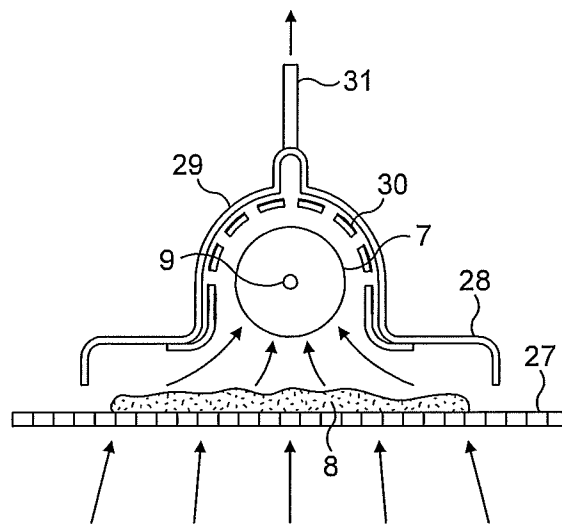
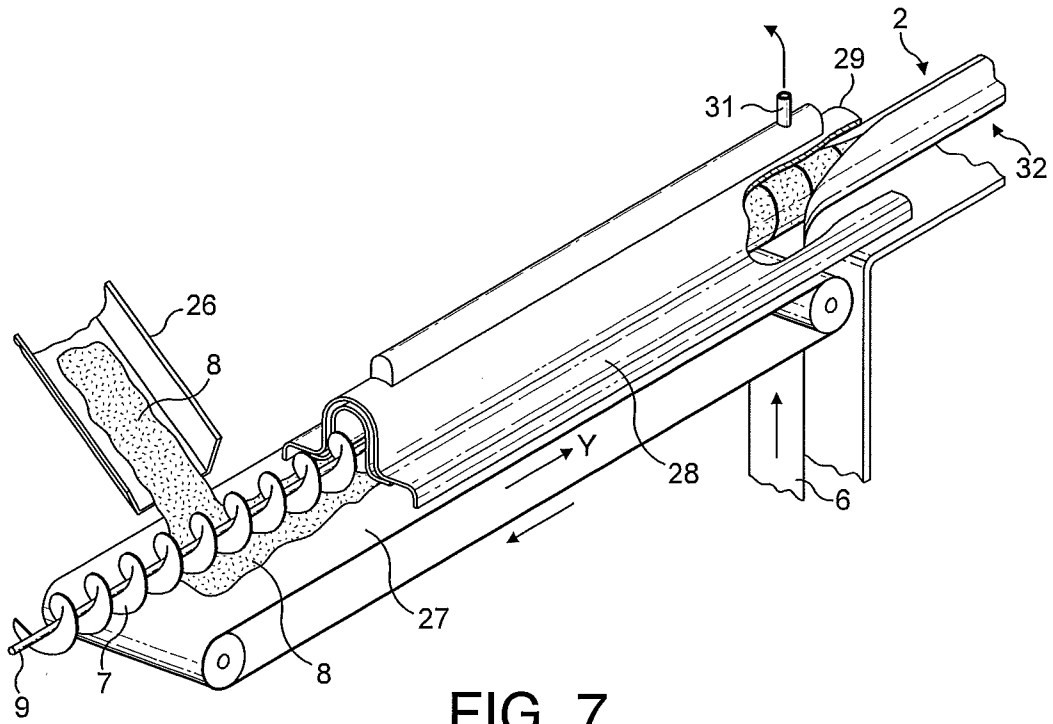


FIG. 6



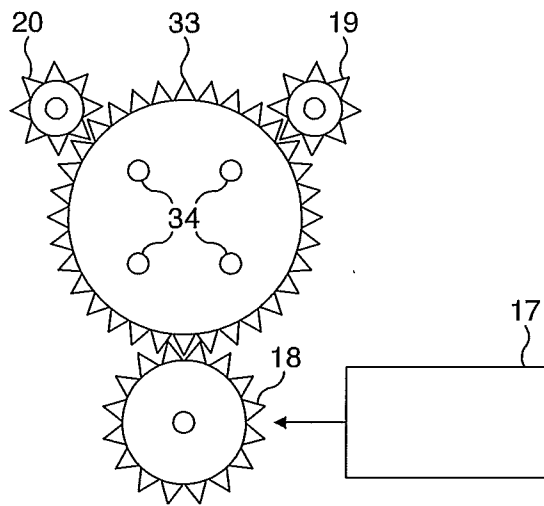


FIG. 9

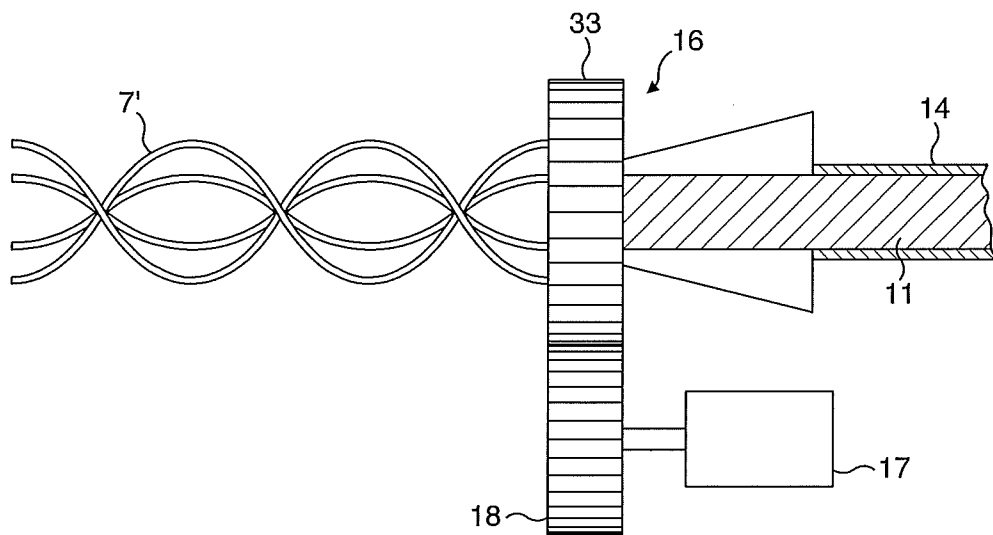


FIG. 10

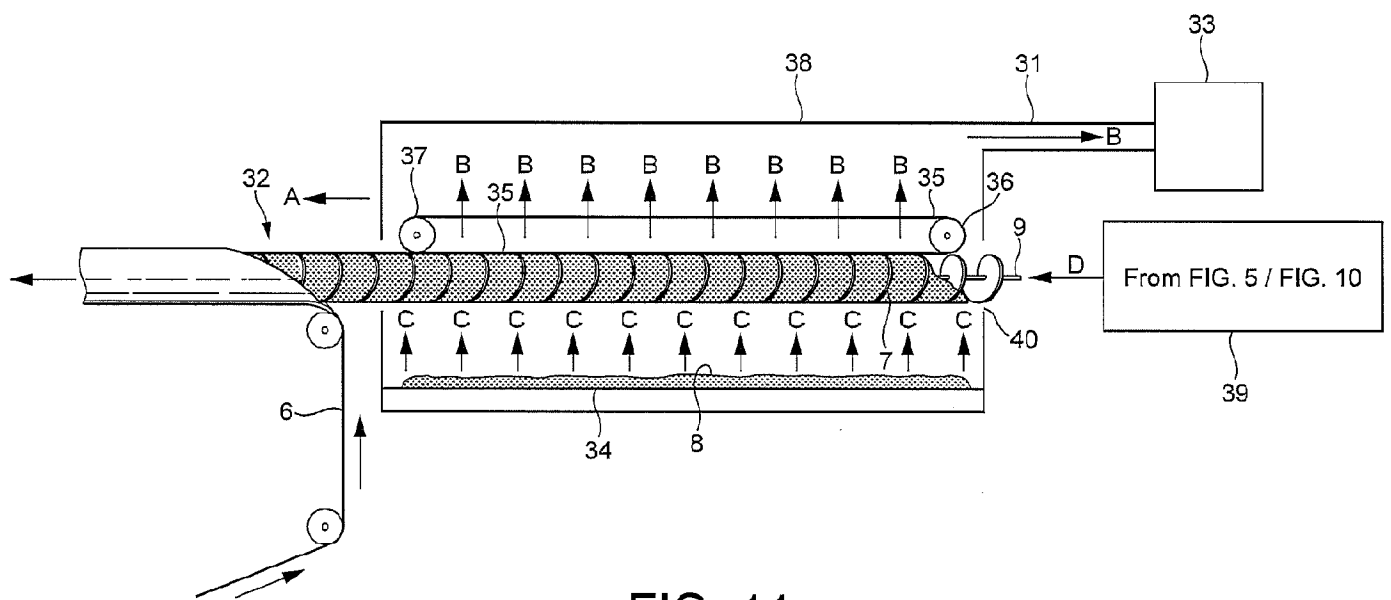


FIG. 11

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/061612

A. CLASSIFICATION OF SUBJECT MATTER
INV. A24D1/00
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 B29C

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

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A		8-11,14, 21
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X	----- US 3 494 366 A (STARBUCK HERMAN S ET AL) 10 February 1970 (1970-02-10) abstract; figure 3 ----- -/-	1,17



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"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

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Date of the actual completion of the international search

20 September 2012

Date of mailing of the international search report

28/09/2012

Name and mailing address of the ISA/

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Kock, Søren

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2012/061612

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

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