~~Thus, it is an objecte~~Embodiments of the invention ~~to~~ provide a treatment device for a smoking article, which allows a better distribution of the treatment fluid throughout the smoking article, while at the same time being compact and safe to operate.

According to the first aspect of the present invention, there is provided a handheld treatment device for a smoking article, comprising: a smoking article receiving portion shaped and configured to receive at least a portion of a smoking article; and a needle storage portion with a needle holder and a needle connected to the needle holder; wherein the needle is movable between an extended position in which the needle extends at least partially into the smoking article receiving portion and a retracted position in which the needle is fully retracted into the needle storage portion with respect to the extended position, to protect an operator from the needle, wherein the treatment device is configured to inject a treatment substance through the needle into a smoking article while the needle is moved with respect to the smoking article.

According to a second aspect, there is provided a cartridge for the above treatment device, wherein the cartridge comprises a treatment substance for a smoking article, wherein the cartridge comprises a plunger receiving means which is adapted to receive a plunger to force the treatment substance out of the cartridge, and wherein the cartridge has at least one side wall which is adapted to be perforated by a second end of the needle, such that the second end of the needle may protrude into the inside of the cartridge, wherein the treatment substance is stored.

According to an embodiment of the invention there is provided a handheld treatment device in which the needle is movable between an extended position in which the needle extends at least partially into the smoking article receiving portion and a retracted position in which the needle is fully retracted into the needle storage portion with respect to the extended position, to protect an operator from the needle. In particular, in the retracted position, the needle storage portion encloses the needle, such that the operator is prevented from touching the needle. Preferably, an enclosure may be provided around the needle, wherein the enclosure extends along the longitudinal length of the needle in its retracted position. The enclosure may be comprised of one or several walls, which may be curved or flat, and which extend substantially around the full circumference of the needle. Thus, by means of moving the needle the distance in between the extended position and the retracted position, the injection can be carried out along a portion of the smoking article without modifying the position of the smoking article.

A needle according to an embodiment of the present invention can be any dispensing element, which is adapted to extend into the smoking article storage portion to provide a

treatment substance to a smoking article. In particular, the needle has at least one inner channel to provide the treatment substance to the smoking article. The needle may be tapered along at least a part of its longitudinal extension or may have a constant cross section. The needle may have a circular, cylindrical, rectangular, polygonal or any other cross section. The shape of the cross section may vary along the longitudinal extension of the needle. The needle may be substantially flat. The needle may be formed from any material, preferably metal or polymer material. In particular, a needle with a single opening at the tip can be provided, which nevertheless allows distribution of the treatment fluid along at least a portion of the length of the smoking article. Alternatively, it is also possible to provide a needle with a plurality of openings along its length (for example two, or more than two openings), such that with a shorter movement length a continuous distribution of a treatment substance can be obtained. The needle may be movable together with a needle holder or relative to a needle holder, as further discussed below.

The fact that the needle is retractable also has the benefit that the needle does not project at all from the needle storage portion when the needle is in the retracted position. In some embodiments the smoking article may protrude from the smoking article receiving portion into the needle storage portion, such that the needle is already slightly inserted in the smoking article, when the needle is still in the retracted position. In this way, the size of the smoking article receiving portion can be minimized, while still protecting the operator from the needle.

at higher concentration levels. These flavourants, which can be referred to as the low potency flavourants, are typically used at levels that result in orders of magnitude higher amounts of flavourant released into the smoke. Suitable low potency flavourants include, but are not limited to, natural or synthetic menthol, peppermint, spearmint, coffee, tea, spices (such as cinnamon, clove and ginger), cocoa, vanilla, fruit flavours, chocolate, eucalyptus, geranium, eugenol and linalool. Preferably, the flavourant includes an essential oil, or a mixture of one or more essential oils. An "essential oil" is a volatile oil having the characteristic odour and flavour of the plant from which it is obtained. Suitable essential oils for inclusion in the flavour granules as per embodiments of the present invention include, but are not limited to, peppermint oil and spearmint oil.

In the alternative, or in addition to flavouring substances, the treatment substance may comprise one or more other functional substances. These functional substances may be used to hinder the formation of, or capture certain smoke constituents. Thus, the treatment substance can also provide the benefit of reducing or removing smoke constituents.

The treatment substance may be a liquid, a solid, a gas, or any combination of these states.

Preferably, the treatment device is configured to inject the treatment substance when the needle is moved from the extended position to the retracted position. Thus, the treatment substance is injected while the needle is retracted from the smoking article. In this way, the needle may interfere less with the injected treatment substance. Furthermore, the injection process is finished when the needle is in the retracted position, such that the operator can immediately remove the smoking article from the treatment device.

In a preferred embodiment, the needle and the needle holder are attached to a sliding means, which is slidable in between the extended position and the retracted position in the needle storage portion. The sliding movement may be a linear movement, which allows the insertion of the needle to be minimally invasive to the smoking article and the smoking material of the smoking article. In particular, the needle has a longitudinal axis that is aligned with the sliding direction of the sliding means.

Preferably, the smoking article receiving portion is adapted to hold the smoking article such that a longitudinal axis of the smoking article is substantially aligned with the sliding direction of the sliding means or substantially parallel to the sliding direction of the sliding means. This allows the needle to be moved along the smoking article to distribute the treatment substance along all or portion of the smoking article. In particular, the sliding direction, the needle and the smoking article receiving portion (and therefore the smoking article) may all be aligned or parallel.

the needle storage portion and smoking article receiving portion, respectively. Alternatively, the needle storage portion and the smoking article receiving portion are attached to one another with a hinge and the two portions may be rotatable with respect to one another between a storage configuration and a treatment configuration.

Furthermore, an interlock may be provided when the smoking article receiving portion is in the storage position, such that the sliding means is locked in a retracted position. Further, an interlock can be provided to lock the sliding means in the retracted position when the smoking article receiving portion is open.

Also, it is possible to provide an interlock to prevent opening of the smoking article receiving portion when the sliding means is in the extended position. An interlock may further be provided to prevent movement of the sliding means when the needle storage portion is open.

In one embodiment, the smoking article receiving portion is configured to receive a rod-shaped smoking article with a greater longitudinal length than width, and the needle is adapted to be inserted centrally along the longitudinal length of the smoking article. Rod-shaped smoking articles include smoking articles such as cigarettes and cigars.

~~The object~~An embodiment of the invention ~~is also attained by~~comprises a cartridge for a treatment device as specified above, wherein the cartridge comprises a treatment substance for a smoking article. According to an embodiment of the invention, the cartridge comprises a plunger receiving means which is configured to receive a plunger to force the treatment substance out of the cartridge. Further, the cartridge has a side wall which is adapted to be perforated by a second end of the needle, such that the second end of the needle may protrude into the inside of the cartridge, wherein the treatment substance is stored. In particular, the cartridge is a disposable item of low cost, which can be used together with a reusable treatment device, such that a variety of treatment operations can be conducted, while it is only necessary to replace the cartridges. The plunger receiving means is configured to receive a plunger, wherein the plunger is inserted into the plunger receiving means by the movement of the needle holder, such that the treatment substance is forced out of the cartridge.

In particular, the cartridge comprises a sealed opening or a penetrable surface on one end thereof, in which a docking part connected to the needle holder can be inserted, such that the treatment substance of the cartridge can be forced into the needle. The docking part may be a rear end of the needle which protrudes from the needle holder. The side walls of the cartridge preferably have a higher stability, such that they can bear the pressure while the plunger is operated. The sealed opening or penetrable surface and the plunger receiving means are preferably provided at opposite sides of the cartridge.

Preferably, the cartridge has a cylindrical form. However, in other embodiments the cartridge may have a rectangular or other cross-sectional shape.

The cartridge does not need to comprise a plunger of its own, as the plunger can be provided in the needle storage portion of the previously described treatment device.

In one embodiment however, the cartridge comprises a plunger in the plunger receiving means, which protrudes from the cartridge and is adapted to be inserted into the cartridge to force the treatment substance out of the cartridge. Such a plunger may be maintained outside the plunger receiving means prior to use or it may extend partially into the plunger receiving means. In use, the plunger is then inserted into, or further inserted into, the plunger receiving means to force the treatment substance from the cartridge.

Furthermore, an embodiment of the invention also relates to a method for treating a smoking article, in particular with a handheld treatment device as specified above, which comprises arranging a smoking article in a smoking article receiving portion of a treatment device, and moving the needle of a needle storage portion of the treatment device from an extended position, in which the needle extends at least partially into the smoking article receiving portion, to a retracted position, in which the needle is retracted into the needle storage portion.

The method may further comprise the step of moving the needle from the retracted position into the extended position while a smoking article is arranged in the smoking article receiving portion such that the needle is inserted into the smoking article. A cartridge, which contains the treatment substance, may be placed in the needle storage portion, and the treatment substance is forced out of the cartridge and through the needle into the smoking article during the movement of the needle from the extended position to the retracted position.

~~The~~Embodiments of the invention also relate~~s~~ to any combination of any of the previously described treatment devices and cartridges.

The invention will be further described by means of example only with reference to the figures, wherein:

Figure 1 shows a sectional view of a first embodiment of the treatment device and the cartridge, wherein the needle storage portion of the treatment device is in a storage position.

Figure 2 shows a sectional view of the treatment device according to the first embodiment, wherein a smoking article is provided in the smoking article receiving portion and the needle storage portion is provided in an operating position.

Figure 3 shows a sectional view of the first embodiment of the treatment device before the injection process, wherein the cartridge is inserted in the needle storage portion.

Claims:

1. A handheld treatment device for a smoking article, comprising:
a smoking article receiving portion shaped and configured to receive at least a portion of a smoking article; and
a needle storage portion with a needle holder and a needle connected to the needle holder;
wherein the needle is movable between an extended position in which the needle extends at least partially into the smoking article receiving portion and a retracted position in which the needle is fully retracted into the needle storage portion with respect to the extended position, to protect an operator from the needle~~.~~,
wherein the treatment device is

~~2. The treatment device according to claim 1,~~ configured to inject a treatment substance through the needle into a smoking article while the needle is moved with respect to the smoking article.

2~~3~~. The treatment device according to claim 1 ~~or 2~~, wherein the treatment device is configured to inject the treatment substance when the needle is moved from the extended position to the retracted position.

3~~4~~. The treatment device according to claim 2~~3~~, wherein the needle holder is attached to a sliding means, which is slideable between the extended position and the retracted position.

4~~5~~. The treatment device according to claim 3~~4~~, wherein the smoking article receiving portion is adapted to hold the smoking article in an orientation substantially parallel to the sliding direction of the sliding means.

5~~6~~. The treatment device according to any one of claims 3~~4~~ to 4~~5~~, wherein the sliding means comprises a cartridge seat for holding a cartridge comprising a treatment substance.

6~~7~~. The treatment device according to claim 5~~6~~, wherein a first end of the needle is adapted to be inserted into the smoking article and a second end of the needle extends into the cartridge seat.

7~~8~~. The treatment device according to any one of the previous claims, wherein the needle storage portion comprises a lid that can be moved between an open configuration and a closed configuration, the open configuration facilitating the insertion and removal of the cartridge into and from the needle storage portion.

89. The treatment device according to any one of the previous claims, wherein the smoking article receiving portion comprises a receiving space for the smoking article with an abutment wall arranged at the opposite side with respect to the needle storage portion, wherein the abutment wall is configured to hold the smoking article during insertion of the needle.

910. The treatment device according to any one of claims 34 to 89, wherein the needle storage portion comprises a stationary plunger, which extends in the sliding direction of the sliding means and is configured to be inserted into a cartridge by means of the sliding motion of the sliding means.

1011. The treatment device according to any one of the previous claims, wherein the needle storage portion and the smoking article receiving portion are movable with respect to one another between an operating configuration and a storage configuration in which at least one dimension of the treatment device is smaller than in the operating configuration.

1112. The treatment device according to claim 1011, wherein the needle storage portion and the smoking article receiving portion are slidable with respect to one another between the operating configuration and the storage configuration.

1213. The treatment device according to any one of the previous claims, wherein the smoking article receiving portion is configured to receive a rod-shaped smoking article with a higher longitudinal length than width, and the needle is adapted to be inserted centrally along the longitudinal length of the smoking article.

1314. A cartridge for a treatment device according to any one of the previous claims 1 to 13, wherein the cartridge comprises a treatment substance for a smoking article, wherein the cartridge comprises a plunger receiving means which is adapted to receive a plunger to force the treatment substance out of the cartridge, and wherein the cartridge has at least one side wall which is adapted to be perforated by a second end of the needle, such that the second end of the needle may protrude into the inside of the cartridge, wherein the treatment substance is stored.

1415. The cartridge according to claim 1314, further comprising a plunger in the plunger receiving means, which extends a first distance into the cartridge and is adapted to extend a second distance into the cartridge to force the treatment substance out of the cartridge.