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Appiah

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(54) **SHAVING APPARATUS**

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Related U.S. Application Data

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(51) **Int. Cl.**
B26B 21/22 (2006.01)

(52) **U.S. Cl.**
CPC ***B26B 21/227*** (2013.01); *B26B 21/225* (2013.01)

(58) **Field of Classification Search**
CPC B26B 21/227; B26B 21/222; B26B 21/225
USPC 30/50
See application file for complete search history.

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Primary Examiner — Hwei-Siu C Payer
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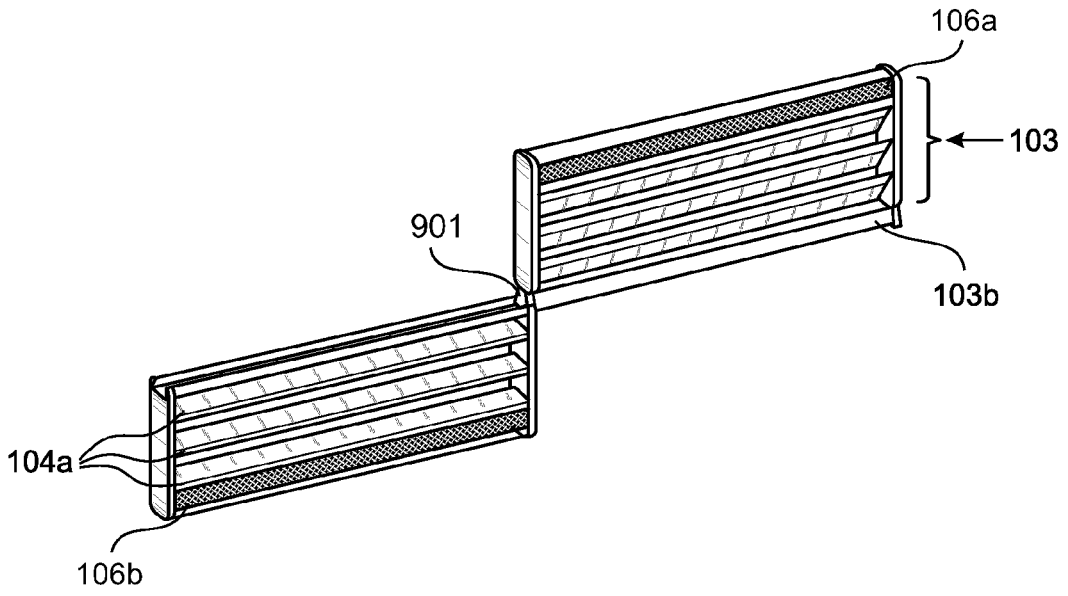
(57) **ABSTRACT**

A shaving apparatus including a handle and a cartridge connected to an upper end of the handle is provided. The cartridge includes at least two sub-cartridges connected to each other in a rigid connection or a detachable connection. Each of the sub-cartridges includes one or more blades extending outwardly at an acute angle relative to a face of the sub-cartridge and projecting generally away from a central longitudinal axis of the cartridge. The blades of a first of the two sub-cartridges are parallel to the blades of a second of the two sub-cartridges and positioned in a direction that opposes a direction of the blades of the second of the two sub-cartridges.

9 Claims, 18 Drawing Sheets



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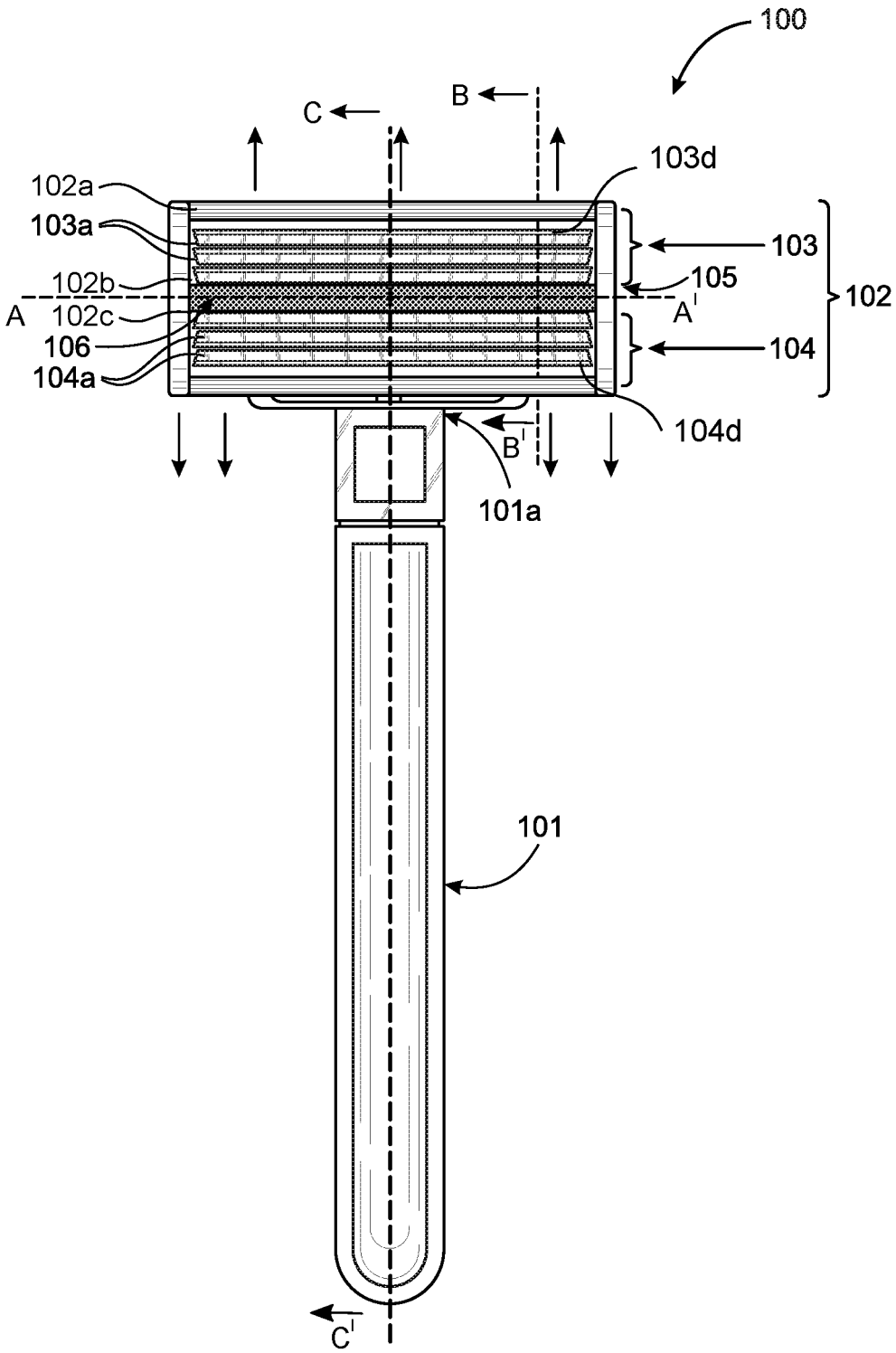
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FIG. 1A

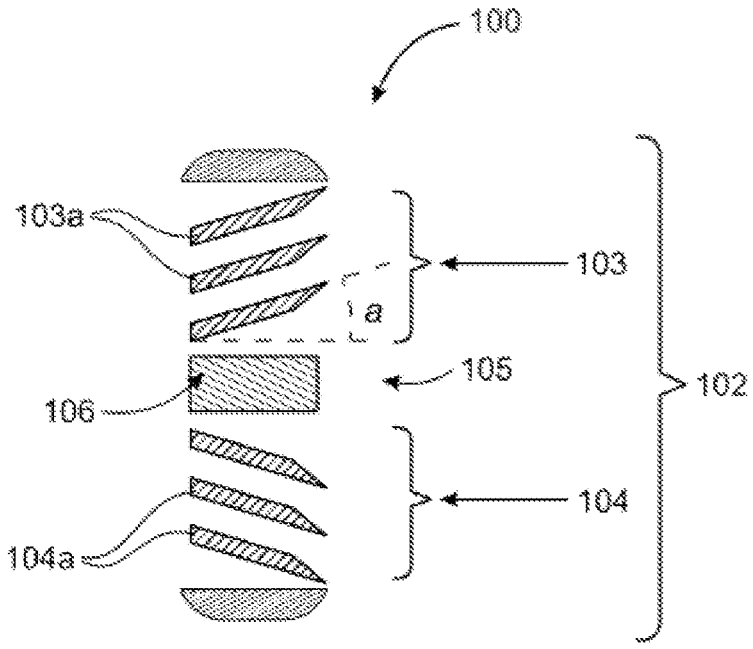

FIG. 1B

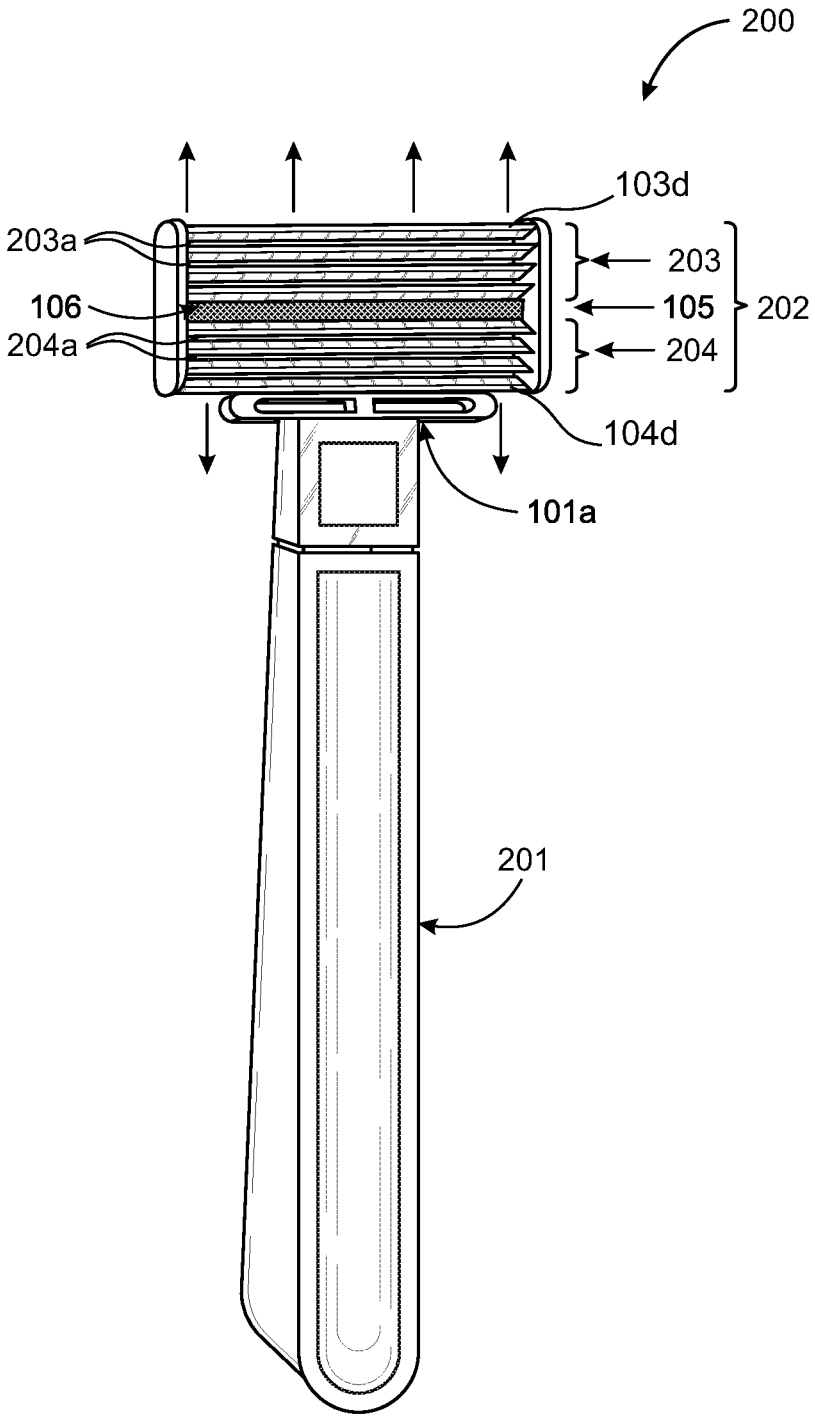

FIG. 2

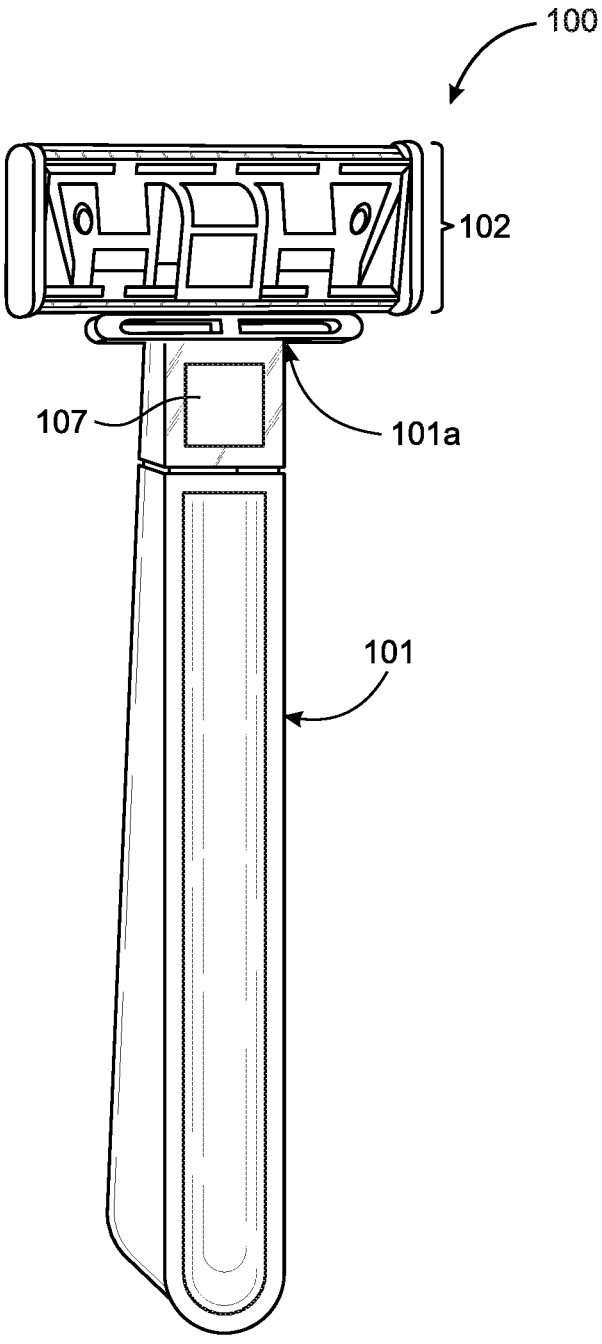

FIG. 3

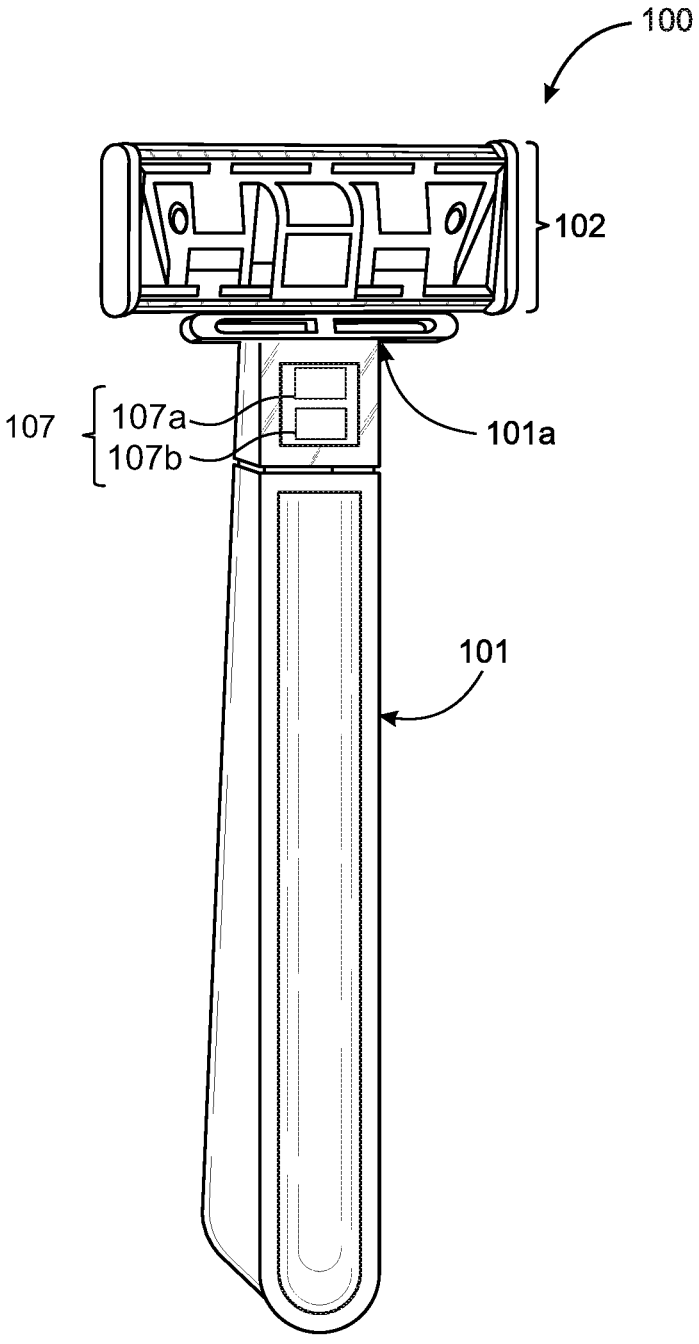

FIG. 4

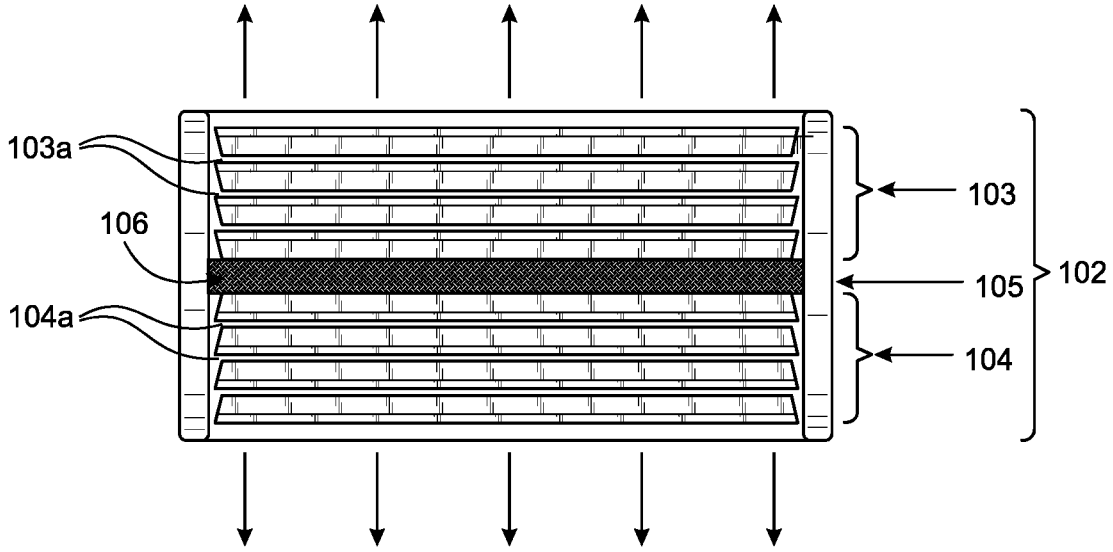

FIG. 5A

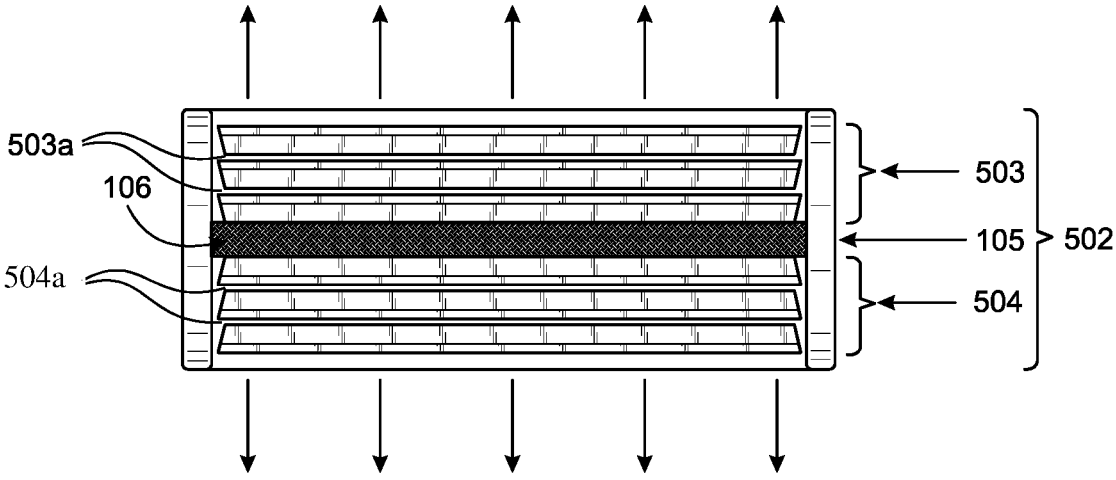

FIG. 5B

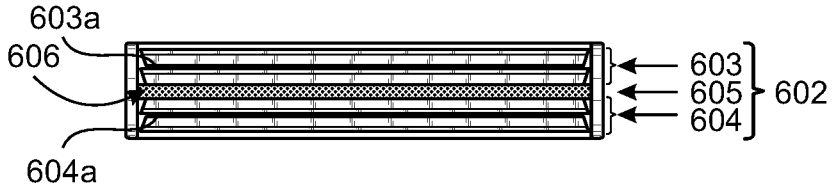

FIG. 6A

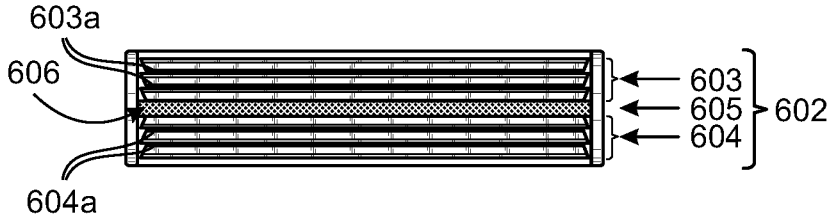

FIG. 6B

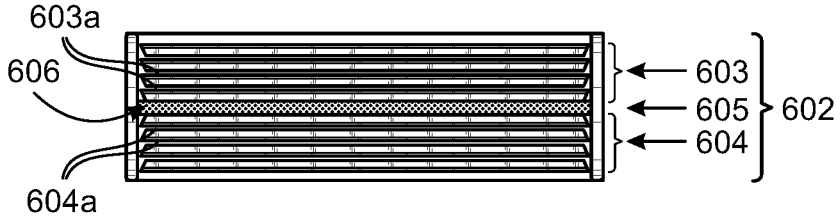

FIG. 6C

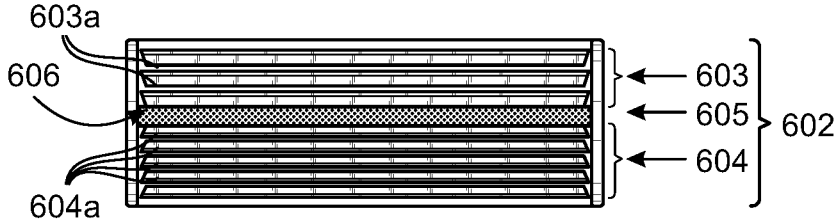

FIG. 6D

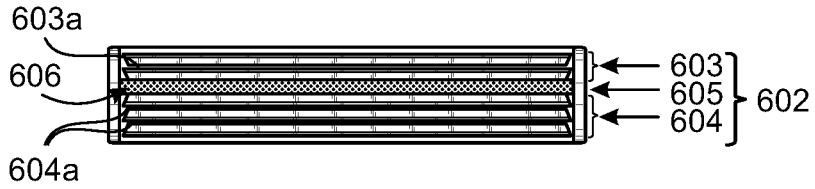

FIG. 6E

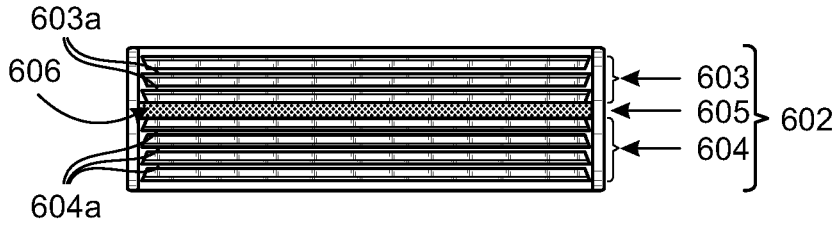

FIG. 6F

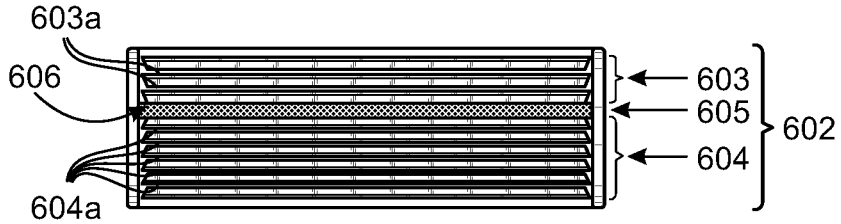

FIG. 6G

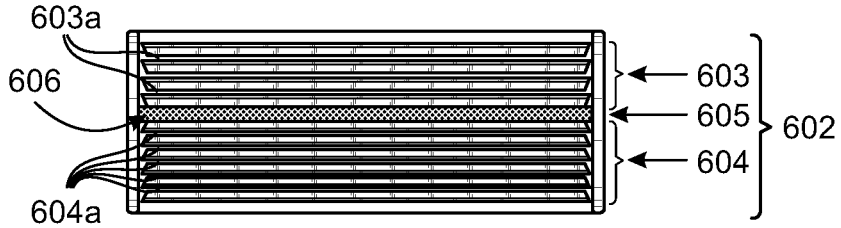

FIG. 6H

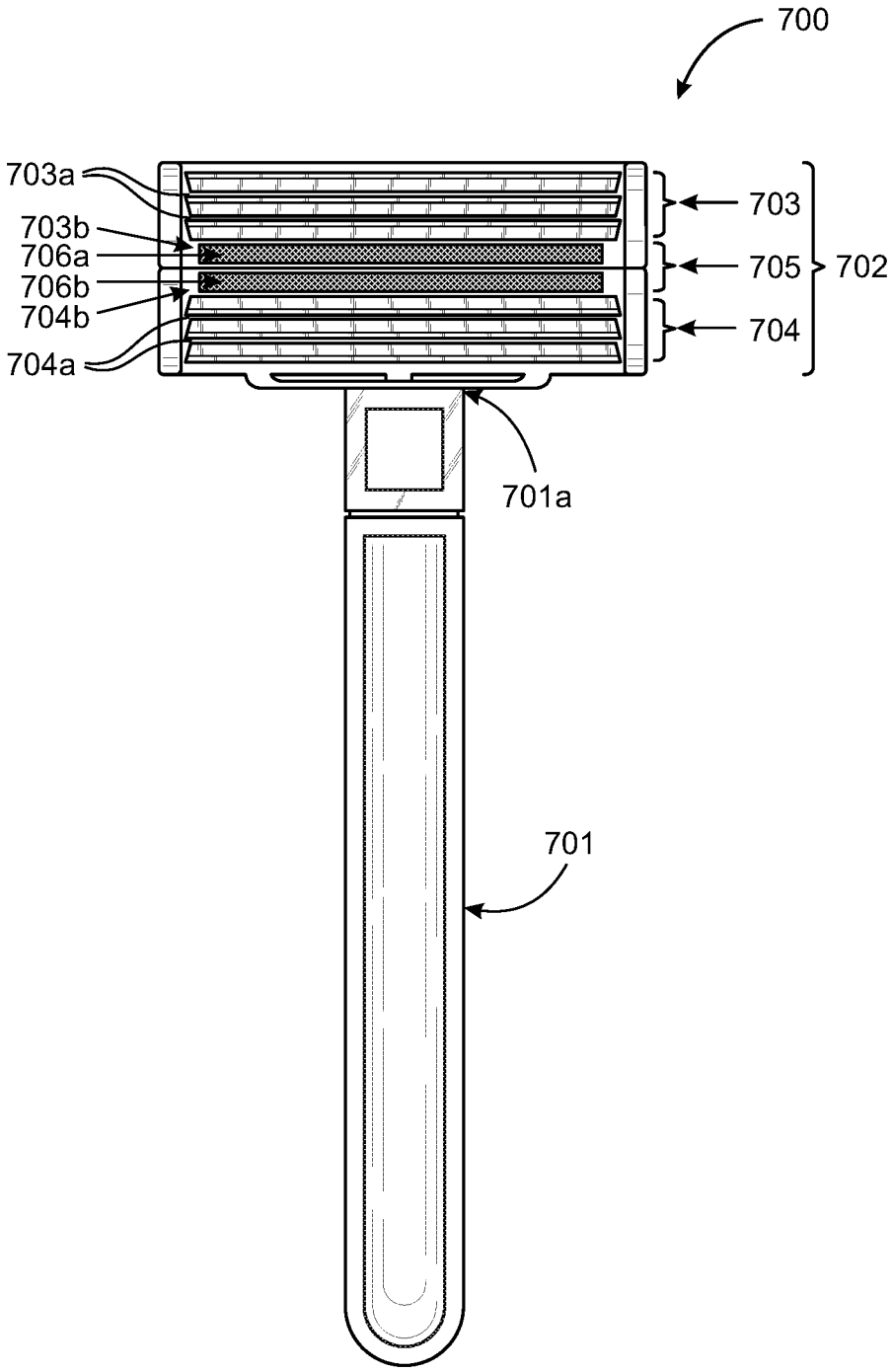

FIG. 7

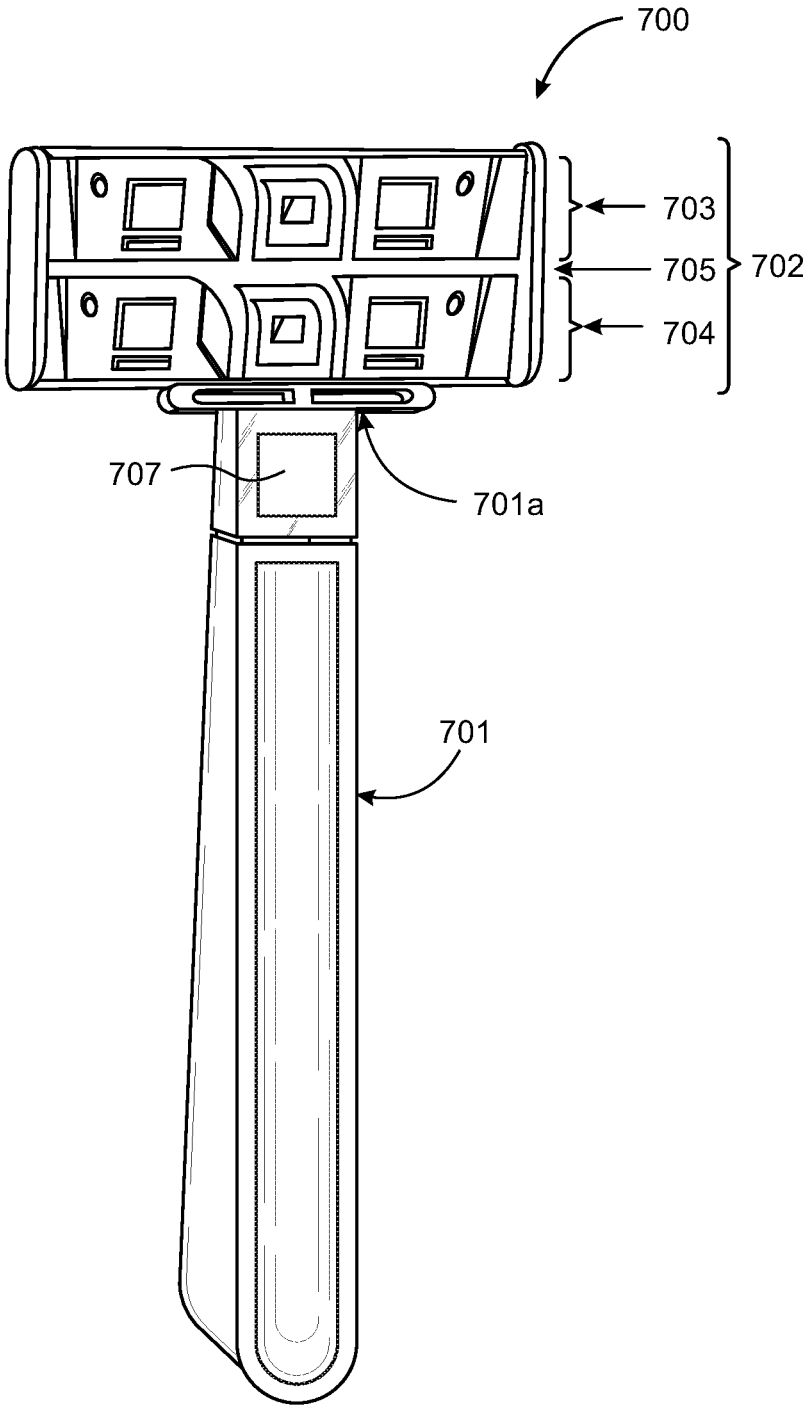

FIG. 8

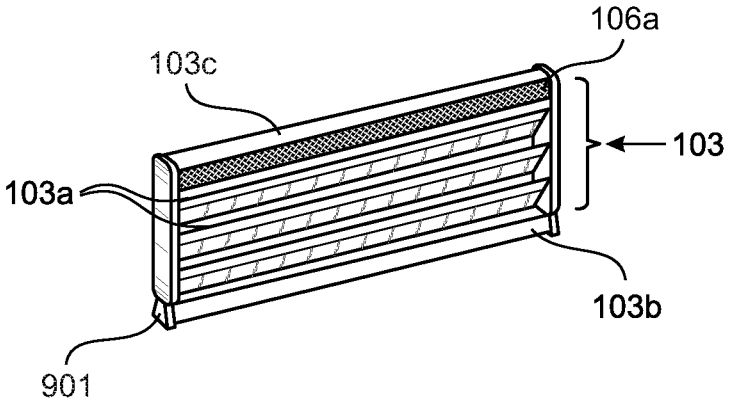

FIG. 9A

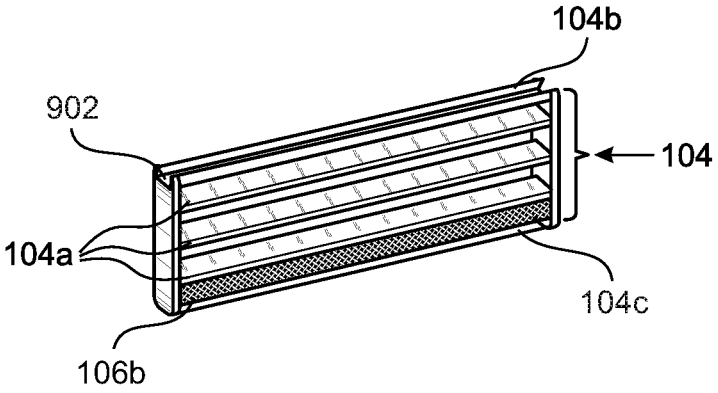

FIG. 9B

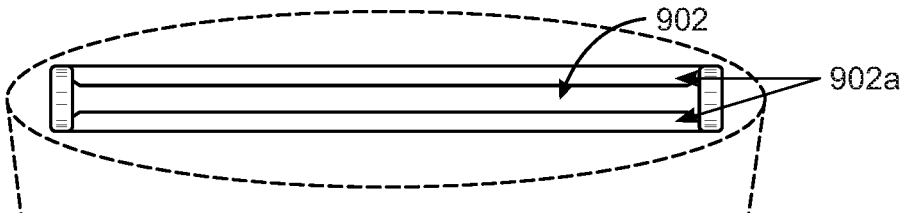

FIG. 10A

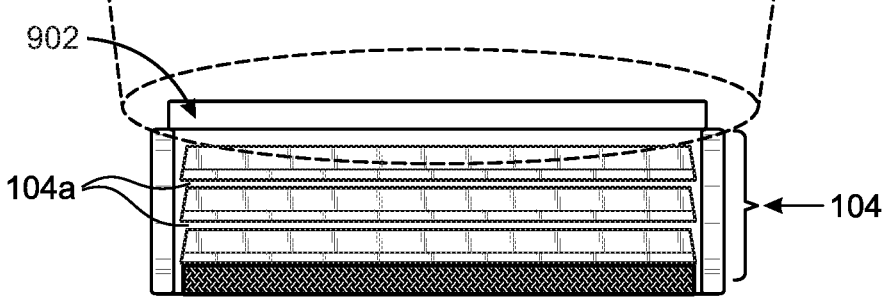

FIG. 10B

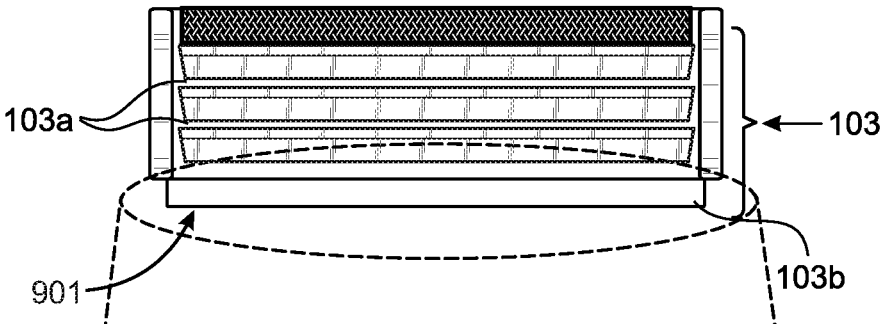

FIG. 11A

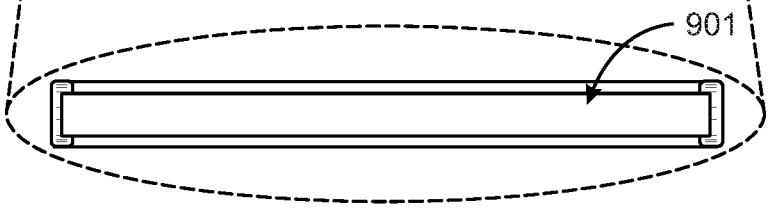

FIG. 11B

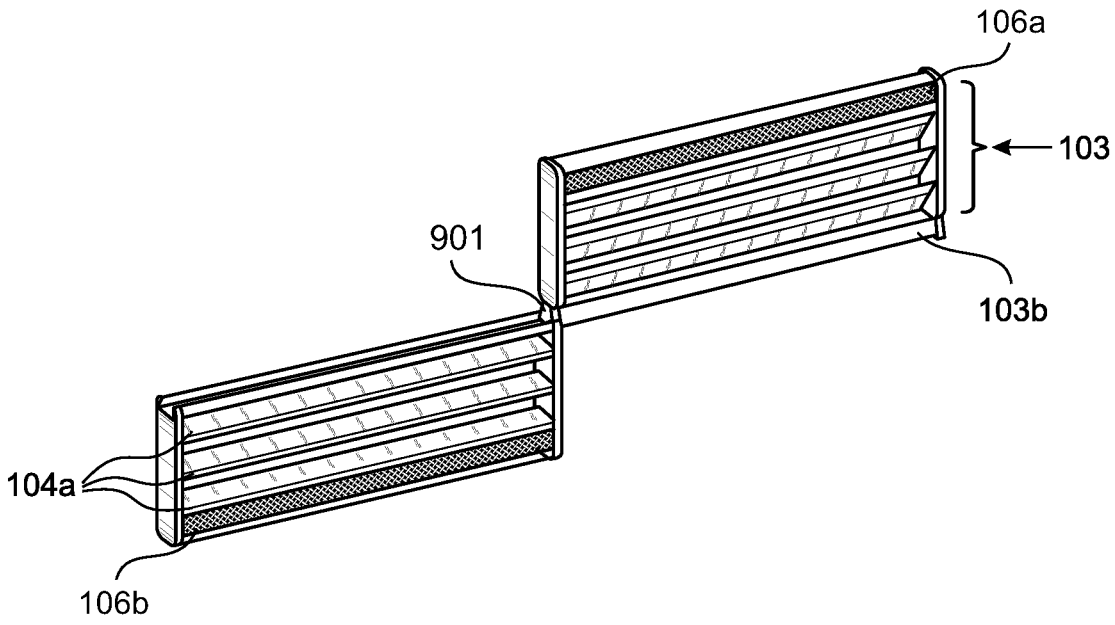

FIG. 12

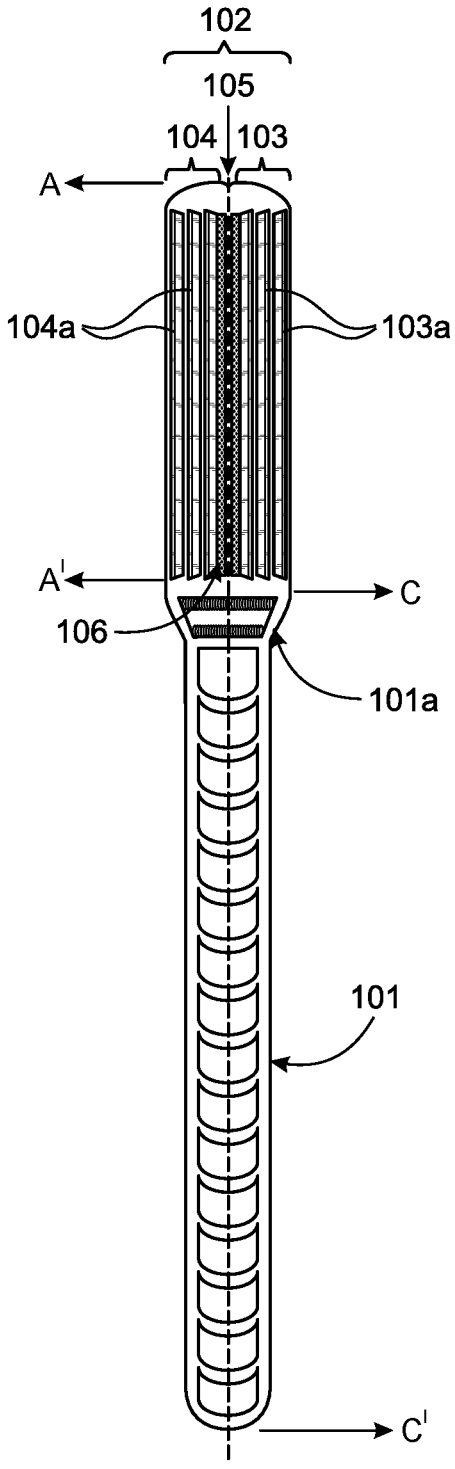

FIG. 13A

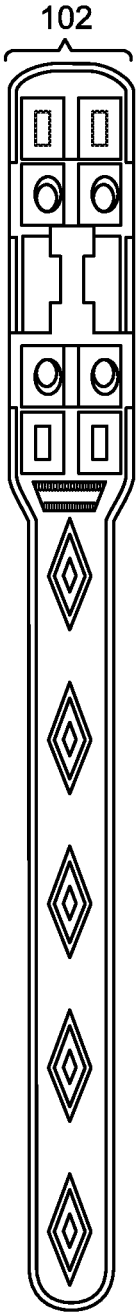

FIG. 13B

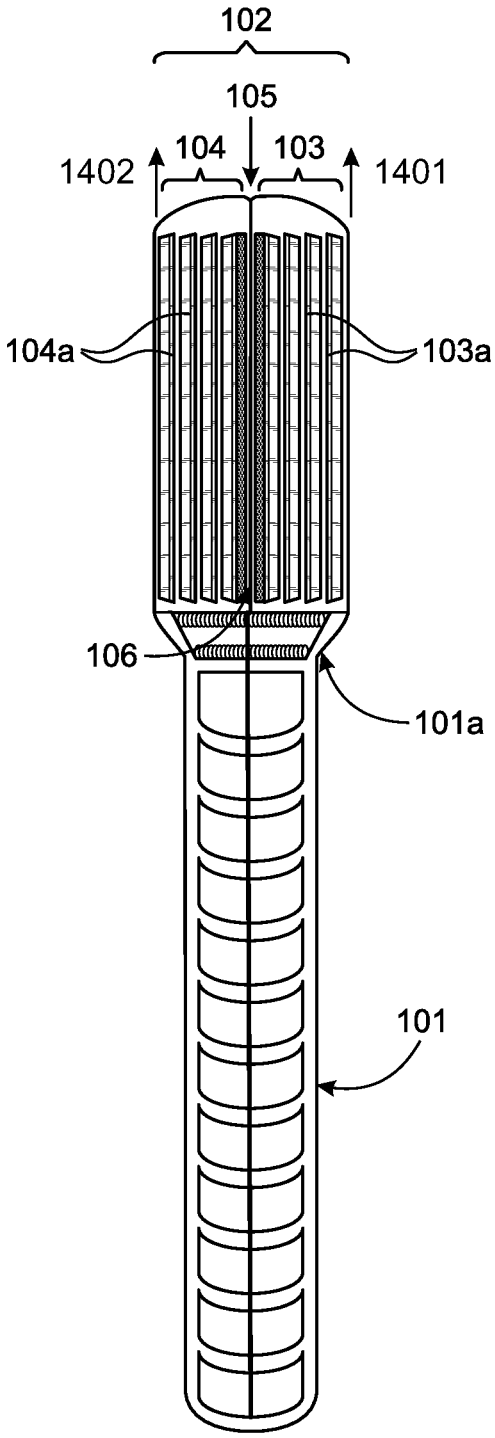

FIG. 14A

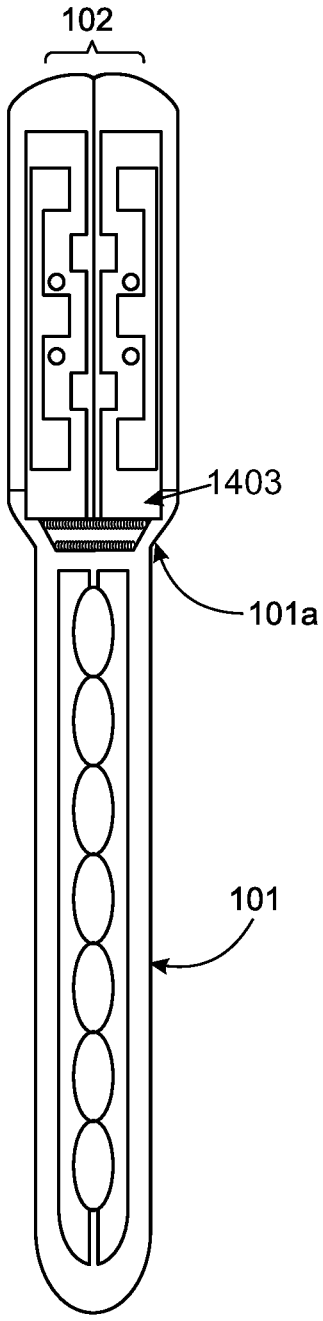

FIG. 14B

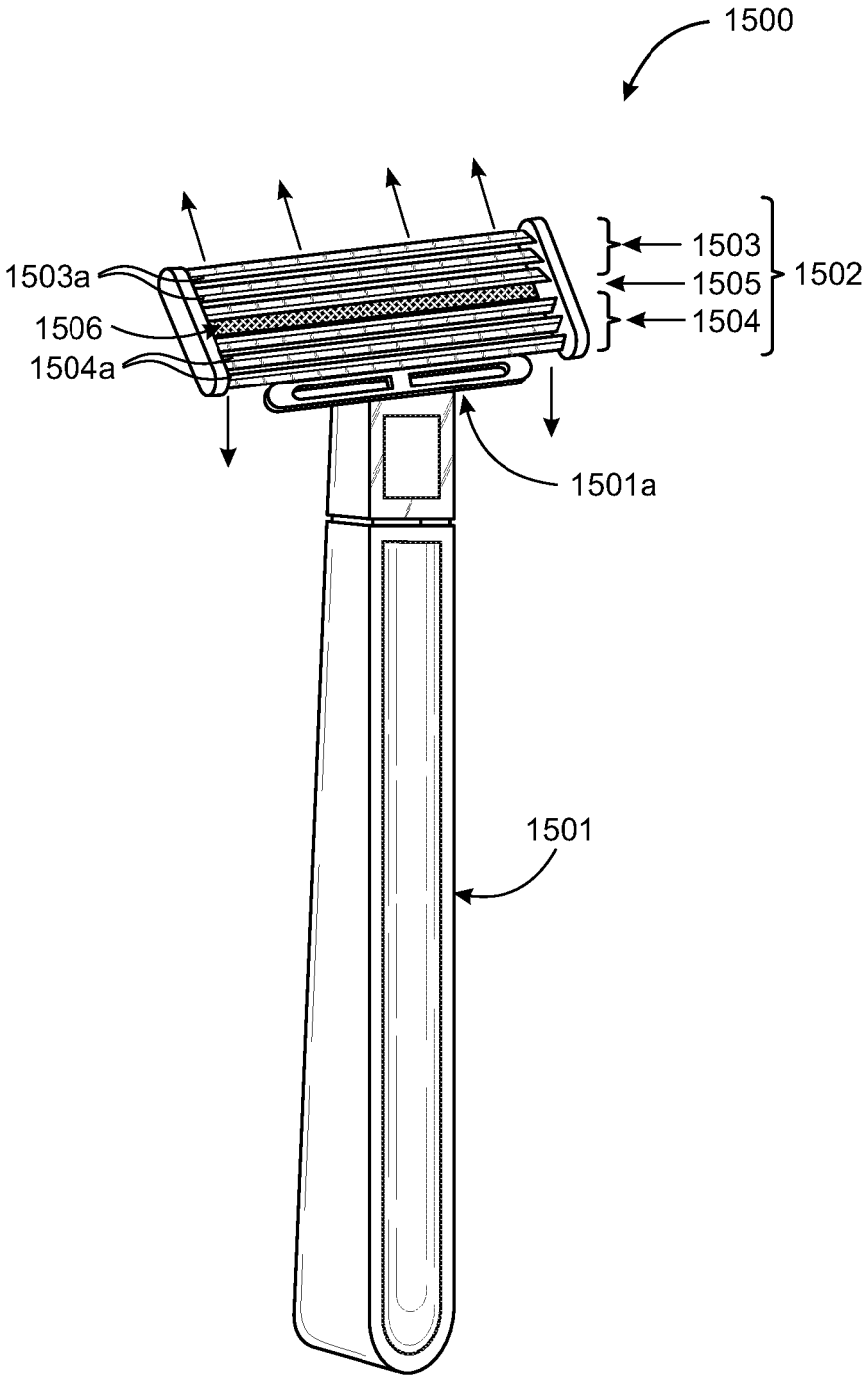

FIG. 15A

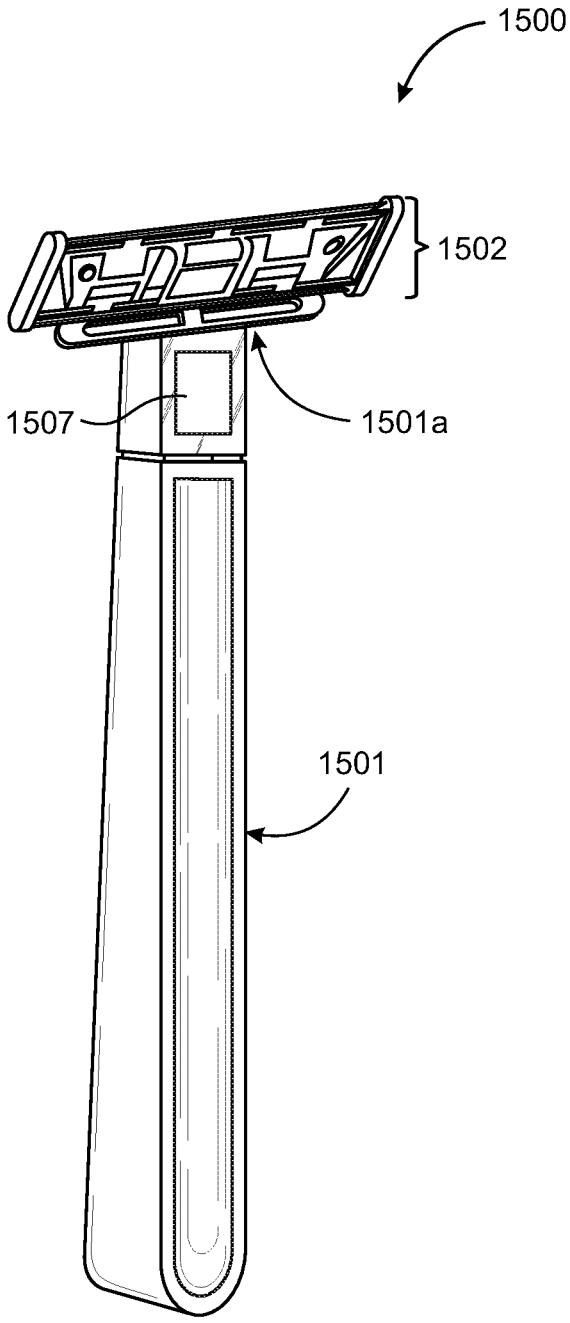

FIG. 15B

SHAVING APPARATUS

CROSS-REFERENCE TO RELATED APPLICATIONS

This application claims priority to and the benefit of the provisional patent application titled "Shaving Apparatus", application No. 62/684,183, filed in the United States Patent and Trademark Office on Jun. 12, 2018. The specification of the above referenced patent application is incorporated herein by reference in its entirety.

BACKGROUND

The apparatus disclosed herein, in general, relates to a shaving apparatus. More particularly, the apparatus disclosed herein relates to a disposable razor cartridge comprising blades positioned in opposing directions on at least two sub-cartridges connected to each other in a rigid connection, or a detachable connection on an upper end of a handle.

Safety razors and shaving implements were initially made for the purpose of reducing the skill required for injury-free shaving, thereby eliminating the everyday need for a professional barber. As such, several designs have been made over the years to improve the ease of use of shaving implements. From the initial single blade straight edge safety razor design of the 18^{th} century to the more recent triple blade or four blade razor cartridge design, the contemporary razor has undergone several design changes resulting in improved ergonomics, reduced injury risk, and enhanced ease of use.

Conventional safety razor cartridges comprise a cartridge, a guard member, a handle, and lubricating strips or elastomeric members. The guard member protects the blade and a user from accidental cuts when the razor is not being used. The lubricating strips or elastomeric members deform when contacting the skin of the user. The cartridge is provided with two or more sets of blades that are restrained using retaining clips. However, the two or more sets of blades included in most safety razor cartridges are unidirectional, for example, angled downward relative to the cartridge. Such a design permits a user to only shave in a single direction necessitating additional maneuvering of the handle, for example, flipping the handle and/or twisting the handle, to shave in an opposing direction, thereby reducing ease of use. A shaving implement, which is designed to allow a user to shave in multiple directions, is therefore desired.

Hence, there is a long felt but unresolved need for a shaving apparatus, which is designed to allow a user to shave in multiple directions without requiring any additional maneuvering of the handle of the shaving apparatus.

SUMMARY OF THE INVENTION

This summary is provided to introduce a selection of concepts in a simplified form that are further disclosed in the detailed description of the invention. This summary is not intended to identify key or essential inventive concepts of the claimed subject matter, nor is it intended for determining the scope of the claimed subject matter.

Several embodiments of the apparatus disclosed address the above recited need for a shaving apparatus that allows a user to shave in multiple directions without requiring any additional maneuvering of the handle of the shaving apparatus.

According to one embodiment of the present disclosure, a shaving apparatus including a handle and a cartridge connected to an upper end of the handle is provided. The cartridge includes at least two sub-cartridges connected to each other in a rigid connection or a detachable connection. Each of the sub-cartridges includes one or more blades extending outwardly at an acute angle relative to a face of the sub-cartridge and projecting generally away from a central longitudinal axis of the cartridge. The blades of a first of the two sub-cartridges are parallel to the blades of a second of the two sub-cartridges and positioned in a direction that opposes a direction of the blades of the second of the two sub-cartridges.

In an embodiment of the present disclosure, the shaving apparatus comprises a handle and a cartridge connected to an upper end of the handle. The cartridge is oriented substantially collinear to a longitudinal axis of the handle and includes at least two sub-cartridges connected to each other in a rigid connection, or a detachable connection. Each of the sub-cartridges includes one or more blades extending outwardly at an acute angle relative to a face of the sub-cartridge and projecting generally away from a central longitudinal axis of the cartridge. The blades of a first of the two sub-cartridges are parallel to the blades of a second of the two sub-cartridges and positioned in a direction that opposes a direction of the blades of the second of the two sub-cartridges.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing summary, as well as the following detailed description of the invention, is better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, exemplary constructions of the invention are shown in the drawings. However, the invention is not limited to the specific methods and structures disclosed herein. The description of a method step or a structure referenced by a numeral in a drawing is applicable to the description of that method step or structure shown by that same numeral in any subsequent drawing herein.

FIG. **1**A exemplarily illustrates a front elevation view of a shaving apparatus.

FIG. **1**B exemplarily illustrates a cross-sectional view of a cartridge of the shaving apparatus shown in FIG. **1**A.

FIG. **2** exemplarily illustrates a front perspective view of an embodiment of the shaving apparatus.

FIG. **3** exemplarily illustrates a rear perspective view of the shaving apparatus.

FIG. **4** exemplarily illustrates a rear perspective view of an embodiment of the shaving apparatus.

FIG. **5**A exemplarily illustrates a front elevation view of a cartridge.

FIG. **5**B exemplarily illustrates a front elevation view of an embodiment of the cartridge.

FIGS. **6**A-**6**H exemplarily illustrate front elevation views of different embodiments of the cartridge.

FIG. **7** exemplarily illustrates a front elevation view of an embodiment of the shaving apparatus.

FIG. **8** exemplarily illustrates a rear perspective view of the embodiment of the shaving apparatus shown in FIG. **7**.

FIG. **9**A exemplarily illustrates a top left from side perspective view of a first sub-cartridge detached from a second sub-cartridge of the embodiment of the shaving apparatus shown in FIGS. **7**-**8**, showing a tapered sliding dovetail male tongue as elements of a sliding dovetail joint.

FIG. **9**B exemplarily illustrates a top left front side perspective view of a second sub-cartridge detached from a

first sub-cartridge of the embodiment of the shaving apparatus shown in FIGS. **7-8**, showing a tapered sliding dovetail female groove as elements of a sliding dovetail joint.

FIG. **10**A exemplarily illustrates an enlarged view of a connection member of the second sub-cartridge of the embodiment of the shaving apparatus shown in FIGS. **7-8**.

FIG. **10**B exemplarily illustrates a front elevation view of the second sub-cartridge of the embodiment of the shaving apparatus shown in FIGS. **7-8**.

FIG. **11**A exemplarily illustrates a front elevation view of the first sub-cartridge of the embodiment of the shaving apparatus shown in FIGS. **7-8**, showing a tapered sliding dovetail male tongue of the first sub-cartridge configured to engage with the tapered sliding dovetail female groove of the second sub-cartridge.

FIG. **11**B exemplarily illustrates an enlarged view of the tapered sliding dovetail male tongue of the first sub-cartridge of the embodiment of the shaving apparatus shown in FIGS. **7-8**.

FIG. **12** exemplarily illustrates a top left front side perspective view showing engagement of the tapered sliding dovetail male tongue of the first sub-cartridge and the tapered sliding dovetail female groove of second sub-cartridge of the embodiment of the shaving apparatus shown in FIGS. **7-8**.

FIG. **13**A exemplarily illustrates a front elevation view of an embodiment of the shaving apparatus.

FIG. **13**B exemplarily illustrates a rear elevation view of the embodiment of the shaving apparatus shown in FIG. **13**A.

FIG. **14**A exemplarily illustrates a front elevation view of an embodiment of the shaving apparatus.

FIG. **14**B exemplarily illustrates a rear elevation view of the embodiment of the shaving apparatus shown in FIG. **14**A.

FIG. **15**A exemplarily illustrates a front elevation view of an embodiment of the shaving apparatus.

FIG. **15**B exemplarily illustrates a rear elevation view of an embodiment of the shaving apparatus shown in FIG. **15**A.

DETAILED DESCRIPTION OF THE INVENTION

Shaving apparatuses, for example, safety razors generally refer to shaving implements that contain a handle and a shaving head assembly. The shaving head assembly comprises designs having a single blade to ones having four or five blades that are spaced apart. Because the blade used in a shaving apparatus is small, a support structure configured to restrain movement of the blade is required. The support structure includes a simple screw thread fastener in combination with a cap member or a more complex assembly containing multiple blade support members and retaining clips. As used herein, the shaving head assembly comprising a set of blades and its corresponding support structure is referred to as a "sub-cartridge". Furthermore, two or more "sub-cartridges" either detachably or rigidly connected to each other are collectively referred to as a "cartridge".

FIG. **1**A exemplarily illustrates a front elevation view of a shaving apparatus **100**. The shaving apparatus **100** comprises a handle **101** and a cartridge **102** connected to an upper end **101***a* of the handle **101**. In an embodiment, the cartridge **102** is rigidly connected to the upper end **101***a* of the handle **101**. In another embodiment, the cartridge **102** is detachably connected to the upper end **101***a* of the handle **101**, for example, using fasteners such as buttons, buckles, latches, snap fasteners, etc. Additionally, the cartridge **102** is oriented substantially perpendicular to the handle **101**. In an embodiment, the handle **101** is extrusion molded from semi-rigid polymeric materials that do not wear under normal shaving conditions, for example, a blend of polyphenylene oxide (PPO) and polystyrene, high impact polystyrene, polypropylene, ABS, polytetrafluoroethylene (PTFE), high density polyethylene (HPDE), acetal, nylon, or any combination thereof. In an embodiment, the polymeric material is filled with materials such as silicone, molidium disulfide, or other lubricating agents known to those skilled in the art for reducing friction against the surface of the skin. Although a longitudinal axis A-A' of the cartridge **102** is shown positioned substantially perpendicular to a longitudinal axis C-C' of the handle **101**, in other embodiments, as exemplarily illustrated in FIGS. **13**A-**14**B, the cartridge **102** is oriented substantially parallel relative to the handle **101** for improving flexibility, maneuverability, or providing an ergonomic design to the shaving apparatus **100**. In another embodiment, the cartridge **102** is detachably connected to the upper end **101***a* of the handle **101**, for example, by a bridle joint, a mortise and tenon joint, a finger joint, a dovetail joint, etc. As exemplarily illustrated in FIG. **1**A, the cartridge **102** comprises at least two sub-cartridges, namely, a first sub-cartridge **103** and a second sub-cartridge **104** rigidly connected to each other, thereby creating a 2-in-1 cartridge **102**. In an embodiment, the first sub-cartridge **103** comprises a first long side **103***b* and a second long side **103***c* opposite to the first long side **103***b*, as illustrated in FIG. **9**A. Similarly, the second sub-cartridge **104** comprises a first long side **104***b* and a second long side **104***c* opposite to the first long side **104***b*, as illustrated in FIG. **9**B. The cartridge **102** further comprises one or more guard members **102***a* configured to prevent accidental cuts to a user's skin during use. For example, both the first sub-cartridge **103** and the second sub-cartridge **104** comprise a guard member **102***a* positioned on the second long side **103***c* of the first sub-cartridge **103** and on the second long side **104***c* of the second sub-cartridge **104**.

The first sub-cartridge **103** comprises one or more blades **103***a*, for example, two blades, and the second sub-cartridge **104** comprises one or more blades **104***a*, for example, two blades. In an embodiment, the blades **103***a*, **104***a* of the first and second sub-cartridges **103**, **104** are manufactured using a suitable blade manufacturing process. Blade manufacturing processes are well known in the industry which comprise melting steel, pouring the steel to produce flat rolled coil, annealing the steel, and sharpening the coil edges. Annealing comprises heating the coil to temperatures ranging between 1,967-2,048° F. (1,075-1,120° C.) and subsequently quenching it in water to a temperature between −76-−112° F. (−60-−80° C.) to harden it. Next, the quenched steel is tempered at a temperature ranging between (482-752° F. (250-400° C.). The blades **103***a*, **104***a* are then die stamped to form an appropriate shape. In an embodiment, the blades **103***a*, **104***a* are about 1.5 inches (3.81 cm) wide and about 3 mm deep. The blades **103***a* and **104***a* comprise cutting edges **103***d* and **104***d*, respectively, as illustrated in FIG. **1**A. The cutting edge **104***d* is adapted to cut hair that is pressed against the cutting edge **104***d* when the user shaves a portion of his/her face using a downward motion of the shaving apparatus **100**. Similarly, the cutting edge **103***d* is adapted to cut hair that is pressed against the cutting edge **103***d* when the user shaves a portion of his/her face using am upward motion of the shaving apparatus **100**. In an embodiment, the cutting edges **103***d*, **104***d* of each of the blades **103***a*, **104***a* is about 1 mm deep.

In an embodiment, the first and the second sub-cartridges **103**, **104** comprises one or more blades **103***a*, **104***a* respectively. Further, as shown in FIG. **1**B, the blades **103***a*, **104***a* extend outwardly at an acute angle "a", relative to a corresponding face **102***b*, **102***c* of the sub-cartridge and project generally away from a central longitudinal axis A-A' of the cartridge **102**. The blades **103***a* of the first sub-cartridge **103** are parallel to the blades **104***a* of the second sub-cartridge **104**. Furthermore, the blades **103***a* of the first sub-cartridge **103** are positioned in a direction that opposes a direction of the blades **104***a* of the second sub-cartridge **104**. A center portion **105** of the cartridge **102** is parallel to the blades **103***a* of the first sub-cartridge **103** and the blades **104***a* of the second sub-cartridge **104**. The shaving apparatus **100** further comprises a lubricating strip **106** illustrated in FIG. **2** positioned on the center portion **105** of the cartridge **102** between the first sub-cartridge **103** and the second sub-cartridge **104**. In an embodiment, the lubricating strip **106** includes a shaving aid, which provides, for example, lubricity, skin moisturizing and conditioning properties, and the like. The oppositely positioned blades **103***a* and **104***a* of the first sub-cartridge **103** and the second sub-cartridge **104** respectively, of the shaving apparatus **100** allow a user to shave, for example, hair on a body part, for example, face, hands, legs, etc., in opposing directions. For example, the user shaves a portion of his/her face using a downward motion of the shaving apparatus **100** during which the blades **104***a* of the second sub-cartridge **104** cut hair from the face that contact blades **104***a*. Alternatively, in an example, when the user moves the shaving apparatus **100** in an upward direction, the blades **103***a* of the first sub cartridge **103** cuts hair from the face that contact blades **103***a*.

FIG. **1**B exemplarily illustrates a cross-sectional view of a cartridge **102** of the shaving apparatus shown in FIG. **1**A. As disclosed in the detailed description of FIG. **1**A, the first and the second sub-cartridges **103**, **104** comprise one or more blades **103***a*, **104***a* respectively. Further, the blades **103***a*, **104***a* are oriented such that the blades **103***a*, **104***a* of the cartridge **102** extend outwardly at an acute angle relative to a corresponding face **102***b*, **102***c* of the sub-cartridge and project generally away from a central longitudinal axis A-A' of the cartridge **102**.

FIG. **2** exemplarily illustrates a front perspective view of an embodiment of the shaving apparatus **200**. In this embodiment, the shaving apparatus **200** comprises a handle **201** having a structure that is different from the handle **101** exemplarily illustrated in FIG. **1**A. Furthermore, in this embodiment, the shaving apparatus **200** further comprises a cartridge **202** having a structure that is different from the cartridge **102** exemplarily illustrated in FIG. **1**A. The cartridge **202** is connected to the upper end **101***a* of the handle **201** of the different structure as disclosed in the detailed description of FIG. **1**A. The cartridge **202** comprises the first sub-cartridge **203**, the second sub-cartridge **204**, and the lubricating strip **106** positioned on the center portion **105** of the cartridge **202** as disclosed in the detailed description of FIG. **1**A. The first sub-cartridge **203** and the second sub-cartridge **204** comprise blades **203***a* and **204***a* respectively, positioned in opposing directions as disclosed in the detailed description of FIG. **1**A.

FIG. **3** exemplarily illustrates a rear perspective view of the shaving apparatus **100**. In an embodiment, the shaving apparatus **100** further comprises a button **107** positioned proximal to the upper end **101***a* of the handle **101** for detaching the cartridge **102** from the upper end **101***a* of the handle **101**.

FIG. **4** exemplarily illustrates a rear perspective view of an embodiment of the shaving apparatus **100**. In this embodiment, the shaving apparatus **100** includes a two button **107** mechanism positioned proximal to the upper end **101***a* of the handle **101** for detaching a corresponding sub-cartridge **103**, **104** (exemplarily illustrated in FIG. **2**) of the cartridge **102** from the upper end **101***a* of the handle **101**. For example, a first button **107***a* of the two-button mechanism **107** is configured to detach a first sub-cartridge **103** and a second button **107***b* of the two-button mechanism **107** is configured to detach a second sub-cartridge **104** of the cartridge **102**.

FIG. **5**A exemplarily illustrates a front elevation view of the cartridge **102** of the shaving apparatus **100** exemplarily illustrated in FIG. **1**A. The cartridge **102** comprises the first sub-cartridge **103** and the second sub-cartridge **104** rigidly connected to each other. Four blades **103***a* are mounted on the first sub-cartridge **103** and four blades **104***a* are mounted on the second sub-cartridge **104**. The blades **103***a* of the first sub-cartridge **103** and the blades **104***a* of the second sub-cartridge **104** face outwardly with respect to the center portion **105** of the cartridge **102**. The direction of the blades **103***a* of the first sub-cartridge **103** are in a direction opposite to the blades **104***a* of the second sub-cartridge **104**. For example, the blades **103***a* of the first sub-cartridge **103** are positioned to face outwardly in an upward direction, while the blades **104***a* of the second sub-cartridge **104** are positioned to face outwardly in a downward direction as exemplarily illustrated in FIG. **5**A. The lubricating strip **106** is positioned on the center portion **105** of the cartridge **102** between the first sub-cartridge **103** and the second sub-cartridge **104**.

FIG. **5**B exemplarily illustrates a front elevation view of an embodiment of the cartridge **502**. The structure of the cartridge **502** exemplarily illustrated in FIG. **5**B, is different from the structure of the cartridge **102** exemplarily illustrated in FIG. **5**A. The cartridge **502** comprises the first sub-cartridge **503** and the second sub-cartridge **504** connected to each other in a rigid connection as disclosed in the detailed description of FIG. **1**A and FIG. **5**A. In this embodiment, three blades **503***a* are mounted on the first sub-cartridge **503** and three blades **504***a* are mounted on the second sub-cartridge **504**.

FIGS. **6**A-**6**H exemplarily illustrate front elevation views of different embodiments of the cartridge **602**. The cartridge **602** comprises two sub-cartridges, namely, the first sub-cartridge **603** and the second sub-cartridge **604** connected to each other in a rigid connection. In an embodiment as exemplarily illustrated in FIG. **6**A, the first sub-cartridge **603** comprises two blades **603***a* and the second sub-cartridge **604** comprises two blades **604***a*. The double blade **603***a* of the first sub-cartridge **603** and the double blade **604***a* of the second sub-cartridge **604** are positioned angularly to face outwardly with respect to the center portion **605** of the cartridge **602**. The double blade **603***a* of the first sub-cartridge **603** is positioned in a direction that opposes the direction of the double blade **604***a* of the second sub-cartridge **604**. For example, the double blade **603***a* of the first sub-cartridge **603** is positioned to face outwardly in an upward direction, while the double blade **604***a* of the second sub-cartridge **604** is positioned to face outwardly in a downward direction as exemplarily illustrated in FIG. **6**A.

In another embodiment as exemplarily illustrated in FIG. **6**B, the first sub-cartridge **603** comprises three blades **603***a* and the second sub-cartridge **604** comprises three blades **604***a*. The three blades **603***a* of the first sub-cartridge **603** and the three blades **604***a* of the second sub-cartridge **604**

are oriented to face outwardly with respect to the center portion **605** of the cartridge **602**. The three blades **603***a* of the first sub-cartridge **603** are positioned in a direction that opposes the direction of the three blades **604***a* of the second sub-cartridge **604**. For example, the three blades **603***a* of the first sub-cartridge **603** are positioned to face outwardly in an upward direction, while the three blades **604***a* of the second sub-cartridge **604** are positioned to face outwardly in a downward direction as exemplarily illustrated in FIG. **6**B.

In another embodiment as exemplarily illustrated in FIG. **6**C, the first sub-cartridge **603** comprises four blades **603***a* and the second sub-cartridge **604** comprises four blades **604***a*. The four blades **603***a* of the first sub-cartridge **603** and the four blades **604***a* of the second sub-cartridge **604** are oriented to face outwardly with respect to the center portion **605** of the cartridge **602**. The four blades **603***a* of the first sub-cartridge **603** are positioned in a direction that opposes the direction of the four blades **604***a* of the second sub-cartridge **604**. For example, the four blades **603***a* of the first sub-cartridge **603** are positioned to face outwardly in an upward direction, while the four blades **604***a* of the second sub-cartridge **604** are positioned to face outwardly in a downward direction as exemplarily illustrated in FIG. **6**C.

In another embodiment as exemplarily illustrated in FIG. **6**D, the first sub-cartridge **603** comprises three blades **603***a* and the second sub-cartridge **604** comprises five blades **604***a*. The three blades **603***a* of the first sub-cartridge **603** and the five blades **604***a* of the second sub-cartridge **604** are oriented to face outwardly with respect to the center portion **605** of the cartridge **602**. The three blades **603***a* of the first sub-cartridge **603** are positioned in a direction that opposes the direction of the five blades **604***a* of the second sub-cartridge **604**. For example, the three blades **603***a* of the first sub-cartridge **603** are positioned to face outwardly in an upward direction, while the five blades **604***a* of the second sub-cartridge **604** are positioned to face outwardly in a downward direction as exemplarily illustrated in FIG. **6**D.

In another embodiment as exemplarily illustrated in FIG. **6**E, the first sub-cartridge **603** comprises two blade **603***a* and the second sub-cartridge **604** comprises three blades **604***a*. The two blade **603***a* of the first sub-cartridge **603** and the three blades **604***a* of the second sub-cartridge **604** are oriented to face outwardly with respect to the center portion **605** of the cartridge **602**. The two blade **603***a* of the first sub-cartridge **603** is positioned in a direction that opposes the direction of the three blades **604***a* of the second sub-cartridge **604**. For example, the two blade **603***a* of the first sub-cartridge **603** is positioned to face outwardly in an upward direction, while the three blades **604***a* of the second sub-cartridge **604** are positioned to face outwardly in a downward direction as exemplarily illustrated in FIG. **6**E.

In another embodiment as exemplarily illustrated in FIG. **6**F, the first sub-cartridge **603** comprises three blades **603***a* and the second sub-cartridge **604** comprises four blades **604***a*. The three blades **603***a* of the first sub-cartridge **603** and the four blades **604***a* of the second sub-cartridge **604** are oriented to face outwardly with respect to the center portion **605** of the cartridge **602**. The three blades **603***a* of the first sub-cartridge **603** are positioned in a direction that opposes the direction of the three blades **604***a* of the second sub-cartridge **604**. For example, the three blades **603***a* of the first sub-cartridge **603** are positioned to face outwardly in an upward direction, while the four blades **604***a* of the second sub-cartridge **604** are positioned to face outwardly in a downward direction as exemplarily illustrated in FIG. **6**F.

In another embodiment as exemplarily illustrated in FIG. **6**G, the first sub-cartridge **603** comprises three blades **603***a* and the second sub-cartridge **604** comprises six blades **604***a*. The three blades **603***a* of the first sub-cartridge **603** and the six blades **604***a* of the second sub-cartridge **604** are oriented to face outwardly with respect to the center portion **605** of the cartridge **602**. The three blades **603***a* of the first sub-cartridge **603** are positioned in a direction that opposes the direction of the six blades **604***a* of the second sub-cartridge **604**. For example, the three blades **603***a* of the first sub-cartridge **603** are positioned to face outwardly in an upward direction, while the six blades **604***a* of the second sub-cartridge **604** are positioned to face outwardly in a downward direction as exemplarily illustrated in FIG. **6**G.

In another embodiment as exemplarily illustrated in FIG. **6**H, the first sub-cartridge **603** comprises four blades **603***a* and the second sub-cartridge **604** comprises six blades **604***a*. The four blades **603***a* of the first sub-cartridge **603** and the six blades **604***a* of the second sub-cartridge **604** are oriented to face outwardly with respect to the center portion **605** of the cartridge **602**. The four blades **603***a* of the first sub-cartridge **603** are positioned in a direction that opposes the direction of the six blades **604***a* of the second sub-cartridge **604**. For example, the four blades **603***a* of the first sub-cartridge **603** are positioned to face outwardly in an upward direction, while the six blades **604***a* of the second sub-cartridge **604** are positioned to face outwardly in a downward direction as exemplarily illustrated in FIG. **6**H.

FIG. **7** exemplarily illustrates a front elevation view of an embodiment of the shaving apparatus **700**. The shaving apparatus **700** comprises a handle **701** and a cartridge **702** connected to an upper end **701***a* of the handle **701** as disclosed in the detailed description of FIG. **1**A. In this embodiment, the cartridge **702** comprises at least two sub-cartridges, namely, a first sub-cartridge **703** and a second sub-cartridge **704** connected to each other in a detachable connection, thereby creating a 2-in-1 cartridge **702**. In an embodiment, the first sub-cartridge **703** comprises a first long side **703***b* and a second long side **703***c* opposite to the first long side **703***b*. Similarly, the second sub-cartridge **704** comprises a first long side **704***b* and a second long side **704***c* opposite to the first long side **704***b*. Moreover, two separate lubricating strips **706***a*, **706***b* are provided on each sub-cartridge **703**, **704** respectively. The lubricating strips **706***a*, **706***b* are positioned proximal to the center portion **705** of the cartridge **702**.

FIG. **8** exemplarily illustrates a rear perspective view of the embodiment of the shaving apparatus shown in FIG. **7**. In an embodiment, the shaving apparatus **700** further comprises a button **707** positioned proximal to the upper end **701***a* of the handle **701** for detaching the cartridge **702** from the upper end **701***a* of the handle **701**.

FIG. **9**A exemplarily illustrates a top left front side perspective view of the first sub-cartridge **103** detached from the second sub-cartridge **104** of the embodiment of the shaving apparatus **100** shown in FIGS. **7**-**8** showing a tapered sliding dovetail male tongue **901** as an element of a sliding dovetail joint. FIG. **9**B exemplarily illustrates a top left front side perspective view of the second sub-cartridge **104** detached from the first sub-cartridge **103** of the embodiment of the shaving apparatus **100** shown in FIGS. **7**-**8** showing a tapered sliding dovetail female groove **902** as an element of a sliding dovetail joint. The first sub-cartridge **103** comprises a tapered sliding dovetail male tongue **901** located in the first long side **103***b* and the second sub-cartridge **104** comprises a tapered sliding dovetail female groove **902** located in the first long side **104***b*. The tapered sliding dovetail male tongue **901** of the first sub-cartridge **103** and the tapered sliding dovetail female groove **902** of

the second sub-cartridge **104** together form a sliding dovetail joint, as illustrated in FIG. **7**. The tapered sliding dovetail male tongue **901** comprises a narrow end **901***a* as illustrated in FIG. **9**A. The tapered sliding dovetail male tongue **901** is inserted into the tapered sliding dovetail female groove **902**, providing a tight fit of the sliding dovetail joint. The sliding dovetail joint restrains movement of the first sub-cartridges **103** when compared to the second sub-cartridge **104**.

As illustrated in FIGS. **9**A and **9**B, the number of blades in the first and the second cartridges **103** and **104** are equal. The first sub-cartridge **103** comprises three blades **103***a* and the second sub-cartridge **104** comprises three blades **104***a*. The direction of the blades **103***a* of the first sub-cartridge **103** opposes the direction of the blades **104***a* of the second sub-cartridge **104**. In this embodiment, the shaving apparatus **100** further comprises a lubricating strip **106***a* positioned on the second long side **103***c* of the first sub-cartridge **103**, and a lubricating strip **106***b* positioned on the second long side **104***c* of the second sub-cartridge **104**.

Upon attachment, the first sub-cartridge **103** and the second sub-cartridge **104** form the cartridge **102**. The center portion **105** of the cartridge **102** between the first sub-cartridge **103** and the second sub-cartridge **104** comprises one or more lubricating strips **106***a* and **106***b*. In an embodiment, the lubricating strips **106***a* and **106***b* are positioned on a portion of the cartridge **102** other than the center portion **105** of the cartridge **102** constituted by the connection portion **901** of the first sub-cartridge **103** and the connection portion **902** of the second sub-cartridge **104**. In an embodiment, a position of the lubricating strip **106***a* on the first sub-cartridge **103** differs from a position of the lubricating strip **106***b* on the second sub-cartridge **104**. In an embodiment, the lubricating strips **106***a* and **106***b* are absent from the first sub-cartridge **103** and the second sub-cartridge **104**. In another embodiment, at least one lubricating strip **106***a* or **106***b* is positioned on the first sub-cartridge **103** or the second sub-cartridge **104** respectively.

FIG. **10**A exemplarily illustrates an enlarged view of the tapered sliding dovetail female groove **902** located on the first long side **104***b* of the second sub-cartridge **104** of the embodiment of the shaving apparatus **100** shown in FIGS. **7-8**. FIG. **10**B exemplarily illustrates a front elevation view of the second sub-cartridge **104** of the embodiment of the shaving apparatus **100** shown in FIGS. **7-8**.

FIG. **11**A exemplarily illustrates a front elevation view of the first sub-cartridge **103** of the embodiment of the shaving apparatus **100** shown in FIGS. **7-8**, showing the tapered sliding dovetail male tongue **901** of the first sub-cartridge **103** configured to engage with the tapered sliding dovetail female groove **902** of the second sub-cartridge **104**. FIG. **11**B exemplarily illustrates an enlarged view of the tapered sliding dovetail male tongue **901** of the first sub-cartridge **103** of the embodiment of the shaving apparatus **100** shown in FIGS. **7-8**. In an embodiment, the tapered sliding dovetail male tongue **901** is positioned on the first long side **103***b* of the first sub-cartridge **103** as exemplarily illustrated in FIG. **11**A. In an embodiment, the tapered sliding dovetail male tongue **901** and the tapered sliding dovetail female groove **902** are interchangeably positioned on the second sub-cartridge **104** and first sub-cartridge **103**, respectively.

FIG. **12** exemplarily illustrates a top left front side perspective view showing engagement of the tapered sliding dovetail male tongue **901** of the first sub-cartridge **103** and the tapered sliding dovetail female groove **902** of the second sub-cartridge **104** exemplarily illustrated in FIGS. **11**A and **10**B respectively, of the embodiment of the shaving apparatus **100** shown in FIGS. **7-8**. Upon the establishment of the detachable connection, the first sub-cartridge **103** and the second sub-cartridge **104** collectively form the cartridge **102**. In an embodiment, the first sub-cartridge **103** is detachably connected to the second sub-cartridge **104** by fasteners, for example, buttons, buckles, latches, snap fasteners, etc. In another embodiment, the first sub-cartridge **103** is detachably connected to the second sub-cartridge **104**, for example, by a bridle joint, a mortise and tenon joint, a finger joint, etc. The first sub-cartridge **103** can be detached from the second sub-cartridge **104** by sliding the tapered sliding dovetail male tongue **901** of the first sub-cartridge **103** out of the sliding dovetail female groove **902** between the set of two groove extensions **902***a* of the second sub-cartridge **104** shown in FIGS. **10**A-**10**B.

FIG. **13**A exemplarily illustrates a front elevation view of an embodiment of the shaving apparatus **100**. FIG. **13**B exemplarily illustrates a rear elevation view of the embodiment of the shaving apparatus **100** shown in FIG. **13**A. In this embodiment, the shaving apparatus **100** comprises a handle **101**. Furthermore, in this embodiment, the shaving apparatus **100** further comprises a cartridge **102** connected at an upper end **101***a* of the handle **101** such that a longitudinal axis A-A' of the cartridge **102** is oriented substantially collinear to a longitudinal axis C-C' of the handle **101**. The cartridge **102** is shaped in a generally elliptical geometric configuration. The cartridge **102** comprises a single sub-cartridge **103** and a lubricating strip **106** positioned at an end portion of the cartridge **102**. The sub-cartridge **103** comprises a set of three blades **103***a* oriented outward and in an upward direction and the sub-cartridge **104** includes a set of three blades **104***a* oriented outward and in a downward direction.

FIG. **14**A exemplarily illustrates a front elevation view of an embodiment of the shaving apparatus **100**. FIG. **14**B exemplarily illustrates a rear elevation view of the embodiment of the shaving apparatus **100** shown in FIG. **14**A. The cartridge **102** comprises the first sub-cartridge **103**, the second sub-cartridge **104**, and a lubricating strip **106** positioned on a center portion **105** of the cartridge **102**. Furthermore, the cartridge **102** is shaped in a generally cuboidal geometric configuration. The first sub-cartridge **103** and the second sub-cartridge **104** comprise a set of four blades **103***a* and a set of four blades **104***a* respectively, positioned in opposing directions. For example, the blades **103***a* of the first sub-cartridge **103** are oriented outward and in a sideward, for example, left side direction whereas the blades **104***a* of the second sub-cartridge **104** are oriented outward and in a sideward, for example, right side direction. In an embodiment, the first sub-cartridge **103** and the second sub-cartridge **104** are replaceable. The first sub-cartridge **103** and the second sub-cartridge **104** are configured to be individually slid out of a back support **1403** of the handle **101** in a direction of arrows **1401** and **1402** show in FIGS. **14**A and **14**B. New replacement cartridges, for example, another first sub-cartridge **103** and another second sub-cartridge **104** are slid back into the back support **1403** of the handle **101** in a direction opposite to the direction of arrows **1401** and **1402**.

In certain embodiments, the handle **101** is injection molded from semi-rigid polymeric materials that do not wear under normal shaving conditions, such as a blend of PPO and polystyrene, high impact polystyrene, polypropylene, ABS, polytetrafluoroethylene (PTFE), high density polyethylene (HPDE), acetal, nylon, or any combination thereof. The polymeric material is also filled with materials such as silicone, molidium disulfide, or other lubricating agents known to those skilled in the art for reducing friction

against the surface of the skin. Those of skill in the art will appreciate that various shaving aids/skin engaging members can be used with embodiments of the present disclosure.

FIG. **15**A exemplarily illustrates a front elevation view of an embodiment of the shaving apparatus **1500**. FIG. **15**B exemplarily illustrates a rear elevation view of the embodiment of the shaving apparatus **1500** shown in FIG. **15**A. The embodiment is similar to the embodiment of the shaving apparatus **1500**, disclosed in FIGS. **2-3**, with the only differences being that the cartridge **1502** is inclined at an acute angle relative to the handle **1501**, and the blades **1503***a* of the first sub-cartridge **1503** are angled downwards, and the blades **1504***a* of the second sub-cartridge **1504** are angled upwards. In an embodiment, the cartridge **1502** includes the first sub-cartridge **1503** with a set of four blades **1503***a* and the second cartridge **1504** with a set of four blades **1504***a* separated by a lubricating strip **1506** at a center portion **1505** of the cartridge **1502**. The cartridge **1502** is inclined at an angle ranging between 0 to 90 degrees relative to the handle **1501** based on design considerations.

In an embodiment, the blades **1503***a* and **1504***a* of the shaving apparatus shown in FIGS. **15**A and **15**B are about 1.5 inches (3.81 cm) to about 2 inches (5.08 cm) wide and about 1.5 mm to about 3 mm deep. The cutting edge of each of the blades **1503***a* and **1504***a* is about 0.5 mm to about 1 mm deep. In an embodiment, the thickness of each of the blades is about 0.25 mm to about 2.5 mm. In an embodiment, the length of the handle **1501** is about 3 inches (7.62 cm) to about 4.5 inches (11.43 cm).

The foregoing examples have been provided merely for explanation and are in no way to be construed as limiting of the shaving apparatus **100** disclosed herein. While the shaving apparatus **100** has been described with reference to various embodiments, it is understood that the words, which have been used herein, are words of description and illustration, rather than words of limitation. Furthermore, although the shaving apparatus **100** has been described herein with reference to particular means, materials, and embodiments, the shaving apparatus **100** is not intended to be limited to the particulars disclosed herein; rather, the shaving apparatus **100** extends to all functionally equivalent structures, methods and uses, such as are within the scope of the appended claims. While multiple embodiments are disclosed, it will be understood by those skilled in the art, having the benefit of the teachings of this specification, that the shaving apparatus **100** disclosed herein is capable of modifications and other embodiments may be effected and changes may be made thereto, without departing from the scope and spirit of the shaving apparatus **100** disclosed herein.

I claim:

1. A shaving apparatus comprising:

a handle;

a cartridge connected to an upper end of said handle, wherein a central lateral axis of said cartridge is coincident with a central longitudinal axis of said handle, wherein said cartridge comprises:

a pair of sub-cartridges, wherein each of said pair of sub-cartridges comprises one or more blades extending outwardly at an acute angle and projecting generally away from a central longitudinal axis of said cartridge, wherein a first sub-cartridge of said pair of sub-cartridges and a second sub-cartridge of said pair of sub-cartridges are in a detachable engagement with each other, wherein the detachable engagement comprises a sliding dovetail joint having a tapered sliding dovetail male tongue and a tapered sliding dovetail female groove, and wherein one of the tapered sliding dovetail male tongue and the tapered sliding dovetail female groove is located at a lower long side of said first sub-cartridge and facing toward the upper end of said handle, and the other of the tapered sliding dovetail male tongue and the tapered sliding dovetail female groove is located at an upper long side of said second sub-cartridge and facing away from the upper end of said handle.

2. The shaving apparatus of claim **1**, wherein said second of said pair of sub-cartridges is a lower sub-cartridge comprising said one or more blades angled substantially downwardly from said central longitudinal axis of said cartridge.

3. The shaving apparatus of claim **1**, wherein said first of said pair of sub-cartridges is an upper sub-cartridge comprising said one or more blades angled substantially upwardly from said central longitudinal axis of said cartridge.

4. The shaving apparatus of claim **1**, wherein said cartridge further comprises a first guard member positioned adjacent an upper long side of said first sub-cartridge and a second guard member positioned adjacent a lower long side of the second sub-cartridge.

5. The shaving apparatus of claim **1**, wherein said cartridge further comprises a first lubricating strip positioned adjacent an upper long side of said first sub-cartridge and a second lubricating strip positioned adjacent a lower long side of the second sub-cartridge.

6. The shaving apparatus of claim **1**, wherein said cartridge is connected perpendicular relative to said handle with said central longitudinal axis of said cartridge at a right angle to said central longitudinal axis of said handle.

7. The shaving apparatus of claim **1**, wherein a number of blades of said first of said pair of sub-cartridges and a number of blades of said second of said pair of sub-cartridges are equal.

8. The shaving apparatus of claim **1**, wherein said first of said pair of sub-cartridges and said second of said pair of sub-cartridges have an unequal number of blades.

9. The shaving apparatus of claim **1**, wherein said first of said pair of sub-cartridges is adjacent to and disposed above said second of said pair of sub-cartridges.

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