

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
10 June 2010 (10.06.2010)

PCT

(10) International Publication Number
WO 2010/065185 A1

- (51) International Patent Classification:
B26B 21/22 (2006.01) *B26B 21/40* (2006.01)
B26B 21/10 (2006.01) *B26B 21/52* (2006.01)
- (21) International Application Number:
PCT/US2009/059585
- (22) International Filing Date:
5 October 2009 (05.10.2009)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
61/119,630 3 December 2008 (03.12.2008) US
61/147,936 28 January 2009 (28.01.2009) US
12/573,033 2 October 2009 (02.10.2009) US
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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, SE, SI, SK, SM,

[Continued on next page]

(54) Title: RAZOR WITH INDEPENDENT SUSPENSION

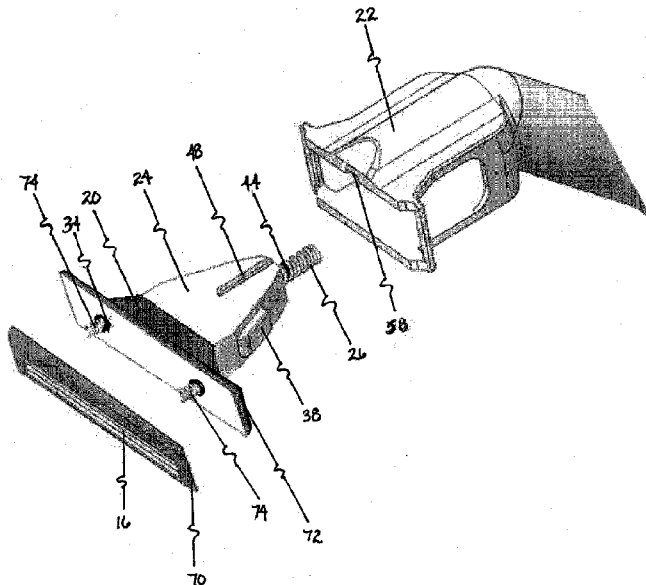
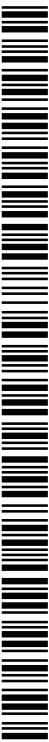


Figure 4

(57) Abstract: Embodiments of the present invention provide a handheld shaving apparatus with a razor head coupled to a body of the apparatus and employing an independent suspension system, which allows the user to maintain control of the razor head while also allowing the head to move in a generally linear fashion to accommodate surface features and imperfections. Further embodiments provide a handheld shaving apparatus with a razor head and body that collectively include one or more biasing mechanisms that permit the razor head to move in an axial and/or generally linear direction while resisting substantial lateral movement of the razor head, reducing the potential for lateral slicing by the razors.



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TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, —
ML, MR, NE, SN, TD, TG).

*before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments (Rule 48.2(h))*

Published:

— *with international search report (Art. 21(3))*

RAZOR WITH INDEPENDENT SUSPENSION

Cross Reference to Related Applications

5 The present application claims priority to U.S. Provisional Patent
Application No. 61/119,630 filed December 3, 2008, entitled "Razor With
Independent Suspension" and U.S. Provisional Patent Application No.
61/147,936 filed January 28, 2009, entitled "Razor With Independent
10 Suspension" and U.S. Patent Application No. 12/573,033 filed October 2, 2009,
entitled "Razor With Independent Suspension," the disclosures of which are
hereby incorporated by reference in their entireties.

Technical Field

Embodiments of the present invention relate to razors and related shaving
devices, and, more specifically, to a shaver having suspension disposed in the
15 handle, the head, or both, and/or between the handle and the head to allow
generally linear and/or axial movement of the head with respect to a portion of
the handle.

Background

Razors used for shaving one's face, legs, etc., have been around for
20 years. Due to various imperfections of the shaving surface, cuts can be a
common and annoying occurrence. To try and solve this problem, razors have
utilized different spring functions such as a flexible head that allows for some
movement of a central portion of the head to accommodate the imperfection. Not
only do these not allow movement of the outer portions of the head, but the
25 spring response in these types of heads is generally not sensitive enough to
address the more subtle imperfections. Other attempts have been made where
the head is coupled to the handle via a leaf spring which may allow movement of
the head in X, Y, and Z directions. Such configurations are challenging to control
and do not adequately maintain a cutting surface position during the shaving
30 process. Finally, heads that pivot are also used, but have similar shortcoming as
those described above. Accordingly, a system is needed that will accommodate

imperfections yet allowing the user to maintain head control during the shaving process and minimize cuts due to imperfections and varying features.

Brief Description of the Drawings

Embodiments of the present invention will be readily understood by the following detailed description in conjunction with the accompanying drawings. Embodiments of the invention are illustrated by way of example and not by way of limitation in the figures of the accompanying drawings.

Figure 1 illustrates a razor with an independent suspension system in accordance with various embodiments;

Figure 2 illustrates an exploded view of a razor with an independent suspension system in accordance with various embodiments;

Figure 3 illustrates a partially exploded view of a razor and a razor head with an independent suspension system in accordance with various embodiments;

Figure 4 illustrates a partially exploded view of a razor head with independent suspension in accordance with various embodiments;

Figures 5a and 5b illustrate razors with an independent suspension system in accordance with various embodiments;

Figures 6a, 6b, 6c and 6d illustrate a razor with an independent suspension system in accordance with various embodiments;

Figure 7 illustrates an anterior view of a razor head in accordance with various embodiments;

Figure 8 illustrates a side view block drawing of a razor head with an independent suspension system in accordance with various embodiments; and

Figures 9a, 9b, 9c and 9d illustrate cutaway side views of a replaceable razor head with an independent suspension system in accordance with various embodiments.

Detailed Description of Embodiments of the Invention

In the following detailed description, reference is made to the accompanying drawings which form a part hereof, and in which are shown by way of illustration embodiments in which the invention may be practiced. It is to be understood that other embodiments may be utilized and structural or logical

changes may be made without departing from the scope of the present invention. Therefore, the following detailed description is not to be taken in a limiting sense, and the scope of embodiments in accordance with the present invention is defined by the appended claims and their equivalents.

5 Various operations may be described as multiple discrete operations in turn, in a manner that may be helpful in understanding embodiments of the present invention; however, the order of description should not be construed to imply that these operations are order dependent.

10 The description may use perspective-based descriptions such as up/down, back/front, anterior/posterior, upper/lower and top/bottom. Such descriptions are merely used to facilitate the discussion and are not intended to restrict the application of embodiments of the present invention.

15 The terms "coupled" and "connected," along with their derivatives, may be used. It should be understood that these terms are not intended as synonyms for each other. Rather, in particular embodiments, "connected" may be used to indicate that two or more elements are in direct physical or electrical contact with each other. "Coupled" may mean that two or more elements are in direct physical or electrical contact. However, "coupled" may also mean that two or more elements are not in direct contact with each other, but yet still cooperate or
20 interact with each other.

For the purposes of the description, a phrase in the form "A/B" or in the form "A and/or B" means (A), (B), or (A and B). For the purposes of the description, a phrase in the form "at least one of A, B, and C" means (A), (B), (C), (A and B), (A and C), (B and C), or (A, B and C). For the purposes of the
25 description, a phrase in the form "(A)B" means (B) or (AB) that is, A is an optional element.

The description may use the phrases "in an embodiment," or "in embodiments," which may each refer to one or more of the same or different embodiments. Furthermore, the terms "comprising," "including," "having," and the
30 like, as used with respect to embodiments of the present invention, are synonymous.

The description may use the phrases "head", "razor head" and/or "the head". These phrases are used herein with respect to components of

embodiments, rather than with respect to anatomical features of the user. Where anatomical features of a user are discussed, phrases including the term "head" will be qualified as such (e.g. "the head of a user", "the user's head", etc.).

Embodiments of the present invention provide a handheld razor having a
5 head coupled to the body of the razor and include an independent suspension system, which can allow the user to maintain control of the razor head while also allowing all or part of the head to move in a generally linear fashion to accommodate features and imperfections.

In one embodiment, as illustrated in the accompanying figures, a razor in
10 accordance with various embodiments may comprise a handle and a replaceable head coupled to the shaft. Disposed within the shaft may be a biasing mechanism that allows for generally axial movement of the head with respect to a portion of the handle (see e.g. direction shown by arrow A, Figures 5a and 5b; axis X-X, Figures 1 and 2). Such embodiments may allow for the head to move
15 in the axial or in a single linear direction and resist substantial lateral movement of the head with respect to the handle. In such embodiments, as a user pulls the razor across the surface of the skin and an imperfection or changing feature is encountered, the head may move in the A direction along the X-X axis yet without moving laterally. This can help avoid a slicing movement that may occur by
20 lateral shifting of the head. In other embodiments, the suspension may be in the head itself and adapted to allow axial movement of the blades or blade bed.

Figure 1 illustrates an embodiment of a razor that allows for axial movement of the razor head with respect to the handle, and in some instances, resistance to lateral movement. Razor **10** may include a handle **12** and a head
25 **14** coupled thereto. Head **14** may include one or more razor blades **16** configured to shave hair close to the skin. Head **14** may be coupled to handle **12** via coupler **18**, wherein coupler **18** may include a biasing component that can allow for axial movement along axis **X-X** with respect to the handle axis **Y-Y**.

In various embodiments, handle **12** may be solid, hollow, or solid in some
30 portions and hollow in others. Handle **12**, head **14**, coupler **18** and/or any component thereof may be constructed of any suitable material known in the art, such as metal, a metal alloy, ceramic, a polymer, an elastomer and/or a plastic/polymer. In some embodiments, handle **12** may be removable and/or fold

for travel/storage. In some embodiments, a head **14** may be coupled to handle **12** without a coupler **18**, and one or more components described below for coupler **18** may instead be one or more components of a handle **12** and/or of a head **14**.

5 **Figure 2** illustrates a partially exploded view of the razor of **Figure 1**. Handle **12** may have a receiver **22** adapted to receive an intermediate member **24** and/or a first member **20**. In some embodiments, a first member **20** may be coupled to a head **14** and to an intermediate member **24**. One or more of these components may be releasably coupled. First member **20** may also be
10 configured to be coupled to receiver **22**, with and/or without intermediate member **24**. In one embodiment, intermediate member **24** may be adapted to receive first member **20** and couple to receiver **22**. A first biasing member **26**, such as a spring, may be disposed between the intermediate member **24** and the receiver **22** and/or the first member **20**. In various embodiments, the first biasing member
15 **26** may include a spring sized to engage a protrusion **44** (Fig. 3) on the intermediate member **24**. In various embodiments, a variety of configurations may be employed to retain biasing member **26** with receiver **22** or intermediate member **24**. In embodiments, a first biasing member **26** may be a rust-resistant stainless steel spring element.

20 In various embodiments, the first member **20** may have tabs **38** adapted to engage intermediate member slots **40** and/or corresponding receiver slots **42** of receiver **22**. In various embodiments, the tabs **38** may be adapted to engage corresponding receiver slots **42** of receiver **22** to help couple the first member **20** to the receiver **22**. Receiver slots **42** may be sized such that axial movement of
25 the intermediate member **24** and thus head **14** may be permitted a desired distance as a result of the compression of first biasing member **26**. Tabs **38** may also be adapted for use by the user in the coupling and uncoupling of head **14** to first member **20**/intermediate member **24**/receiver **22**. In some embodiments, some or all of first member **20** may comprise a flexible or compressible
30 material/component, and force applied to tabs **38** (e.g. by a user pressing one or more tabs **38** inward) may move distal portions of first member **20** inward, causing disengagement of first member **20** from head **14**. Likewise, compression

and/or movement of distal portions of intermediate member **20** may allow a user to position head **14** and first member **20** for engagement.

In various embodiments, the first member **20** may be directly connected to the receiver **22** without use of the intermediate member **24**. In various
5 embodiments, the handle **12** may include the first member **20**, and the head **14** may be removably coupled to the first member **20**. In various embodiments, the axial movement **X-X** may be at an angle with/to and generally intersect the handle axis **Y-Y**. In various embodiments, the axial movement **X-X** may be generally parallel with and/or co-axial with handle axis **Y-Y**.

10 **Figures 3 and 4** illustrate a razor head with an independent suspension system in accordance with various embodiments of the present invention. **Figure 4** shows a partially exploded view of the embodiment shown in **Figure 3**. As shown in **Figure 3**, a coupler **18** may include one or more of first member **20**, intermediate member **24**, a protrusion **44**, a first biasing member **26** and/or a
15 razor head **14**. A razor head **14** in accordance with various embodiments may comprise one or more blades **16** coupled to an anterior section **70**, and anterior section **70** may be coupled to a posterior section **72**. In some embodiments these sections may be coupled by various interior/exterior surface features and/or by mechanical fasteners known in the art. In embodiments, anterior section **70**
20 and posterior section **72** may be mechanically coupled in a manner that limits lateral and/or shifting movement of the anterior section **70** with respect to posterior section **72** while permitting axial movement of the anterior section **70**. One or more head biasing members **74** (see **Figure 4**) may be disposed between anterior section **70** and posterior section **72** such that axial force directed against
25 anterior section **70** compresses one or more head biasing members **74**. In some embodiments, a first biasing member **26** and a head biasing member **74** may both be provided. Other embodiments may include two or more head biasing members **74**, only first biasing member **26**, or any number and combination of either/both.

30 Head biasing members **74** may be disposed between anterior section **70** and posterior section **72** in any suitable number and in any suitable arrangement. For example, embodiments may include one, two, three, four or more head biasing members **74**, which may be positioned at or near the corners, at or near

the center, along a center line, etc. Head biasing members **74** may comprise coiled spring members and/or leaf springs of rust-resistant stainless steel. In embodiments, a head biasing member **74** may be arranged within a razor head at opposite ends to provide differential compression of the spring members as a function of where the axial force is applied (e.g. force applied to one end of the anterior section of the head compresses the proximate spring to a greater degree than the distal spring), thus providing for additional protection against lateral slicing. In some embodiments, a head biasing member **74** may be accommodated and/or retained by a surface feature of anterior section **70** and/or posterior section **72**, such as by a concavity **34** or by a protrusion such as protrusion **44**.

In some embodiments, intermediate member **24** may include a guide ridge **48**. Guide ridge **48** may be accommodated in embodiments by a corresponding guide ridge channel **58** of the receiver **22** to assist the user in coupling the components, to provide additional mechanical stability to the coupled components, and/or to prevent incorrect insertion of intermediate member **24** into receiver **22** (e.g. prevent upside-down insertion of intermediate member **24**). In various embodiments, biasing members such as head biasing members **74** and/or first biasing member **26** may be disposed in various locations between the razor head and the body or handle. Further, the head may be removable from the handle and/or coupler body, such that waste may be minimized upon replacement, and yet axial movement of the blades within the replaceable head may still be accomplished.

Figures 5a and **5b** illustrate razors with an independent suspension system in accordance with various embodiments. Disposed within a shaft **80** may be a biasing mechanism which may include a spring member **82** in cooperation with a seat **84**. The seat **84** may be coupled to the razor head **88** either directly or by an adaptor member **86**. An adaptor member **86** and a razor head **88** may be constructed as a single unit and/or as two, three or more separable or inseparable units. In embodiments, such a biasing mechanism allows for generally axial movement of the razor head **88** with respect to a portion of the shaft **80** (see e.g. direction shown by **arrow A**, **Figures 5a** and **5b**). Such embodiments may allow for the razor head **88** to move in an axial direction and/or

in a single linear direction and to resist substantial lateral or shifting movement of the razor head **88** with respect to the shaft **80** (e.g. movement in a direction perpendicular to arrow A). In such embodiments, as a user pulls the razor across the surface of the skin and encounters an imperfection or changing feature, the head may move in the **A** direction, yet without moving laterally. This helps to prevent slicing movements that may occur by lateral shifting of the head.

Figures 6a, 6b, 6c and 6d illustrate razors with independent suspension systems in accordance with various embodiments. In embodiments, the head **88** may be coupled to the razor handle **80** at one, two or multiple points (as illustrated in **Figures 6a-6d**), and each coupling may include a controlled biasing mechanism **90** allowing for generally axial movements of the head **88**, as illustrated in **Figures 5a and 5b**. In some embodiments, the head **88** may be coupled to the razor handle **80** and/or to the biasing mechanism **90** via one, two, or more adaptor member(s) **86** and/or connecting members **94**. In one embodiment, as illustrated in Figure **6d**, the head **88** may have two or more points of biased coupling with the handle **80**. Providing a biasing mechanism **90** on each side may allow for one side of the head **88** to move axially to accommodate an imperfection whereas the other side may remain generally in the shaving plane to better accommodate anatomical features, surface variations and smaller offset imperfections. In some embodiments, a release member **92** may be provided for uncoupling head **88** from razor handle **80** and/or from biasing mechanism **90**.

Figure 7 illustrates an anterior view of a razor head **700** in accordance with various embodiments of the present invention. A razor head **700** may include a frame **102** providing support for blades **108**, a conditioning member **112**, surface ridges **114**, rivets **110** and one or more retaining elements **104**. One, two, three or more blades **108** may be coupled to the anterior surface of frame **102** using a mechanical fastener such as rivets **110** or by other means known in the art. One or more retaining elements **104** may be disposed partially or completely around a portion of frame **102** and may retain one or more elements, such as blades **108**, against the frame **102**. Conditioning member **112** may be coupled to the anterior surface of frame **102** by an adhesive or other means known in the art. Some embodiments may lack a conditioning member

112. Surface ridges **114** may be coupled to frame **102** using adhesive, fasteners or other means, or may be formed as part of frame **102** in a single unit (e.g. during manufacturing). Surface ridges **114** may function to manipulate the skin of the user to minimize surface variations prior to the passage of the blades over the skin. Conditioning member **112** may comprise a gel, solid, or other composition suitable for soothing, smoothing and/or conditioning skin. As described above, components of razor head **700** may comprise any suitable materials known in the art, including but not limited to rust-resistant stainless steel, plastic, ceramic, metals and/or metal alloys, polymers, etc.

10 **Figure 8** illustrates a side view block drawing of a replaceable razor head **800** with an independent suspension system in accordance with various embodiments. As described above with reference to **Figures 3** and **4**, a razor head **800** may include an anterior section **70** and a posterior section **72**, with one or more spring members **74** disposed between them. The spring members **74** may be positioned to allow the razor head **800** to respond to unevenly applied axial forces with differential compression of the spring members **74**, reducing lateral slicing injuries.

Figures 9a, 9b, 9c and 9d illustrate cutaway side views of various embodiments of a razor head **900** with a biasing mechanism. As shown in **Figure 9a**, one or both of anterior section **70** and posterior section **72** may comprise one or more concavities or other surface features to accommodate an end of a spring member **74**. Alternatively, in some embodiments such as those shown in **Figures 9b and 9c**, anterior section **70** and/or posterior section **72** may comprise a seat **84** to retain an end of a spring member **74**. As shown in **Figures 9b, 9c and 9d**, posterior section **72** may comprise one or more retention elements **46** (e.g. compression fit hook couplers or other suitable features) for retaining one or more components of a shaving apparatus to the head **900**. As shown in **Figures 9b and 9c**, anterior section **70** and posterior section **72** may be retained/coupled together by one or more lateral elements **106**, which may be one or more separate elements and/or may be part of anterior section **70** and/or posterior section **72**.

In various embodiments, the biasing mechanism may be a spring (such as the spring member **74**, illustrated) or another resilient biasing device, such as a

shock absorber. Using a shock absorber, the return of the head to the shaving plane after it is displaced by a feature imperfection may be dampened so that the response may be controlled. In various embodiments, a control rod may be disposed within the spring to help stabilize the head and resist lateral or non-axial movement of the head. In various embodiments the biasing members may be springs, elastomers, or other resilient members.

In various embodiments, the resilience of the biasing mechanism may be preset, while in other embodiments a user may adjust the resilience to suit the movement of the head according to shaving operation. In one embodiment, the tension of a spring, for example, may be adjusted by a dial or some other adjusting means that alters the spring constant. In other embodiments, the adjusting mechanism may influence the amount of resistance applied to a shock absorber as well as the amount of resilient force.

In some embodiments, a razor head with or without a biasing mechanism may be disposable and/or replaceable. In other embodiments, the razor head may be reusable and one or more other components may be disposable and/or replaceable. For example, in an embodiment, a handle **12** may be retained and other components (e.g. coupler **18** and/or razor head **14/88**) may be disposable and/or replaceable. In some embodiments, razor head **14/88** and coupler **18** and/or components of coupler **18** may be replaceable individually and/or as a single unit. In various embodiments all components may be disposable and/or replaceable separately or in pre-assembled groups.

Although certain embodiments have been illustrated and described herein, it will be appreciated by those of ordinary skill in the art that a wide variety of alternate and/or equivalent embodiments or implementations calculated to achieve the same purposes may be substituted for the embodiments shown and described without departing from the scope of the present invention. Those with skill in the art will readily appreciate that embodiments in accordance with the present invention may be implemented in a very wide variety of ways. This application is intended to cover any adaptations or variations of the embodiments discussed herein. Therefore, it is manifestly intended that embodiments in accordance with the present invention be limited only by the claims and the equivalents thereof.

Claims

What is claimed is:

1. A shaving apparatus, comprising:
 - a handle comprising a handle first end adapted with a coupling feature;
 - a coupler coupled to the coupling feature of the handle;
 - 5 a head coupled to the coupler, the head comprising one or more razor blades, wherein the one or more razor blades are disposed generally within a surface plane of the head; and
 - a first biasing element disposed within and/or between the razor blades and the handle, the first biasing element is compressible in response to force
 - 10 applied against the head such that axial movement of the length of the razor blades is allowed in a direction substantially perpendicular to a surface plane the head.
2. The apparatus of claim 1, wherein the biasing element is disposed within
- 15 the head.
3. The apparatus of claim 1, wherein the coupler further comprises one or more coupling elements adapted for releasably coupling the coupler to the head.
- 20 4. The apparatus of claim 3, further including a second biasing element disposed between the coupler and the handle.
5. The apparatus of claim 1, wherein the head further comprises an anterior section and a posterior section.
- 25 6. The apparatus of claim 5, wherein the head further comprises one or more head biasing members disposed between the anterior section and the posterior section to allow for axial movement of the blades.
- 30 7. The apparatus of claim 1, wherein the coupler further comprises a control feature for uncoupling the head from the coupler.

8. The apparatus of claim 1, further including an intermediate element, the intermediate element configured to couple the coupler to the handle.
9. A razor head assembly, comprising:
- 5 an anterior portion with one or more razor blades disposed therein and having a cutting edge of the razor blades positioned for cutting in an outer surface plane of the anterior section;
- a posterior portion having an outer retention element;
- 10 one or more biasing elements disposed between the anterior section and the posterior section, the one or more biasing elements having a first end and a second end, the first end coupled to the anterior section and the second end coupled to the posterior section,
- wherein the anterior section is axially movable in a direction substantially perpendicular to said surface plane; and
- 15 wherein the one or more biasing elements are compressible in response to force applied against the head in a direction substantially perpendicular to said surface plane.
10. The razor head assembly of claim 9, wherein the one or more biasing elements are spring members.
- 20
11. The razor head assembly of claim 10, wherein the one or more biasing elements are rust-resistant and constructed from stainless steel.
- 25
12. The razor head assembly of claim 9, wherein the outer retention element is configured to be releasably coupled to a handle.
13. The razor head assembly of claim 9, wherein at least one of the anterior section and the posterior section further includes a surface feature for engaging a
- 30 first end or a second end of the spring member.
14. The razor head assembly of claim 9, further including a retainer disposed at least partially around both the anterior section and the posterior section.

15. A reusable shaving apparatus comprising:
a handle comprising a handle first end adapted with a coupling feature, the coupling feature having an interior concavity;
an intermediate member releasably locked to the coupling feature of the handle and configured to releasably retain a head assembly comprising one or
5 more blades, the intermediate member being at least partially accommodated within the interior concavity of the coupling feature; and
a biasing element disposed within the interior concavity between the coupling feature and the intermediate member.
- 10 16. The reusable shaving apparatus of claim 15, wherein the biasing element is partially compressed between the intermediate member and the coupling feature, and wherein the biasing element is further compressible to allow axial movement of the head assembly relative to the coupling feature.
- 15 17. The reusable shaving apparatus of claim 16, the biasing element having a first end coupled to the intermediate member.
18. The reusable shaving apparatus of claim 17, the intermediate member further comprising an outer surface feature, wherein the biasing element is
20 retained by the surface feature.
19. The reusable shaving apparatus of claim 16, at least one of the intermediate member and the coupling feature further comprising one or more control features for unlocking the head assembly from the coupling feature.
25
20. The reusable shaving apparatus of claim 19, wherein said one or more control features comprises an aperture or a lateral protrusion.
21. The reusable shaving apparatus of claim 19, wherein at least one of said control features is an aperture configured to accommodate a portion of a head
30 assembly, the portion of the head assembly being accessible while coupled to the intermediate member.

22. The reusable shaving apparatus of claim 15, wherein the intermediate member includes a hollow portion open at one end, the intermediate member configured to releasably accommodate the head assembly at least partially within the hollow portion.

5

23. The reusable shaving apparatus of claim 15, wherein the intermediate member includes at least one exterior surface feature that mates to a corresponding feature of the interior concavity.

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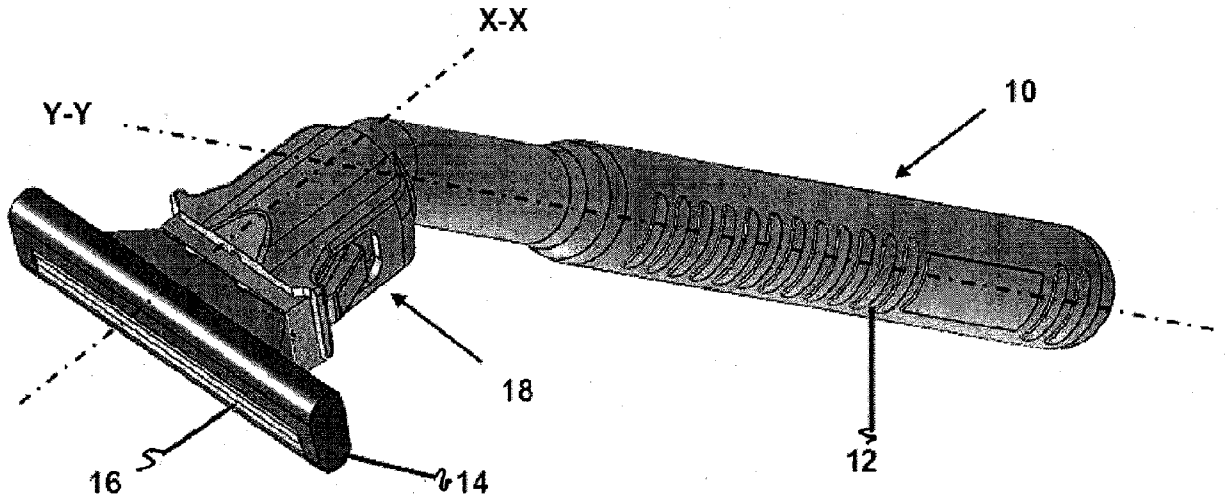


Figure 1

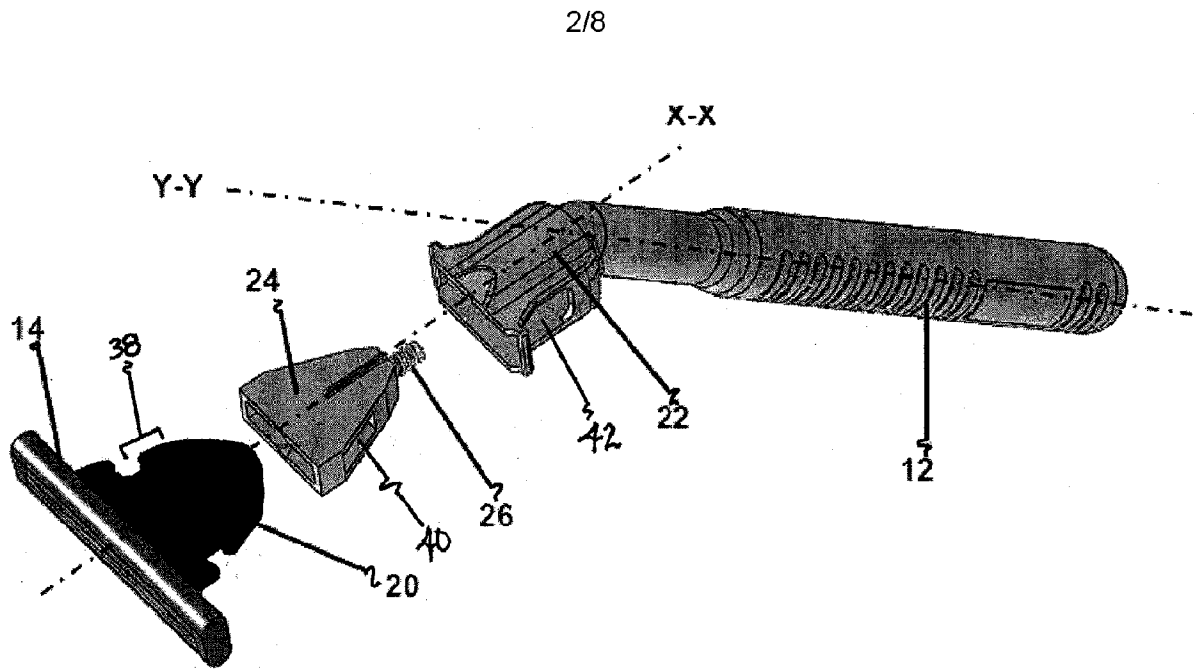


Figure 2

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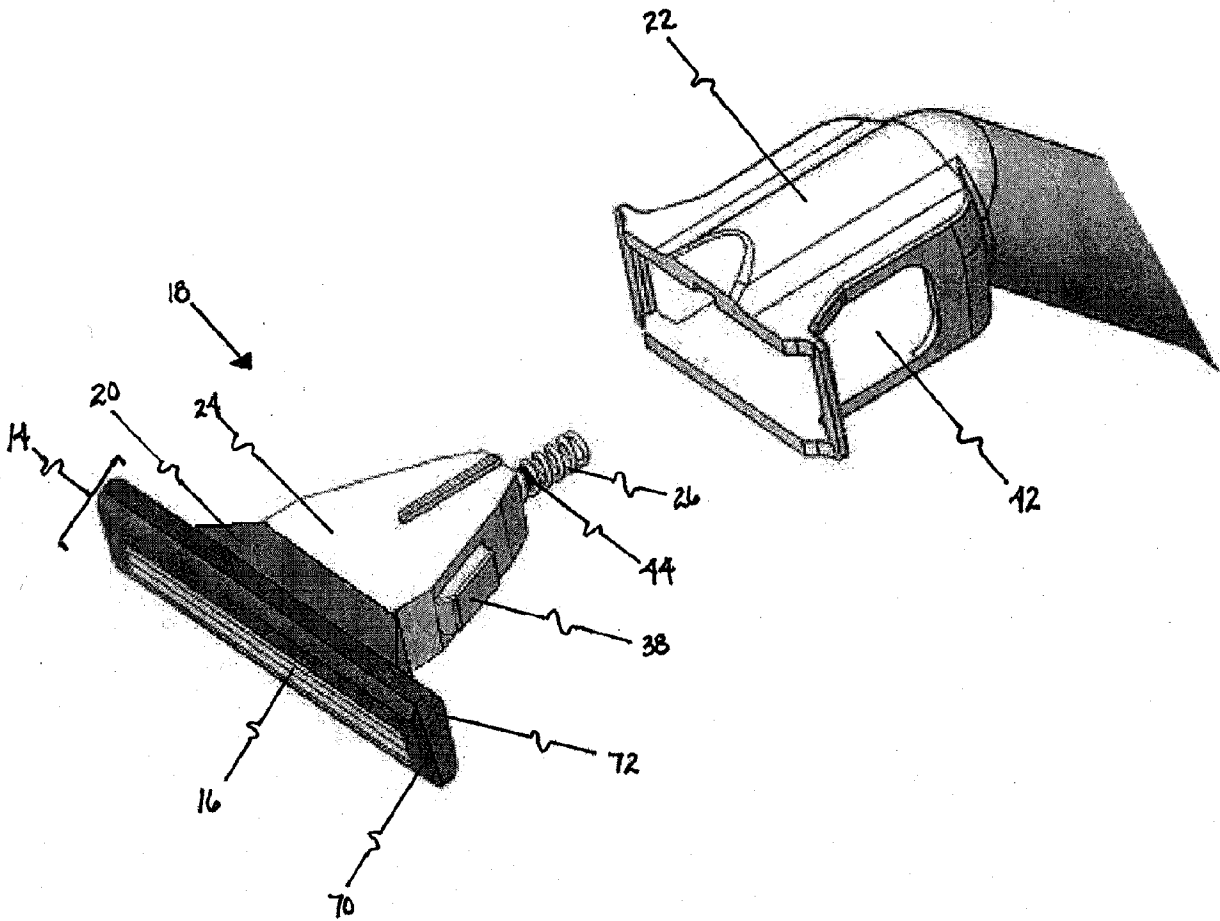


Figure 3

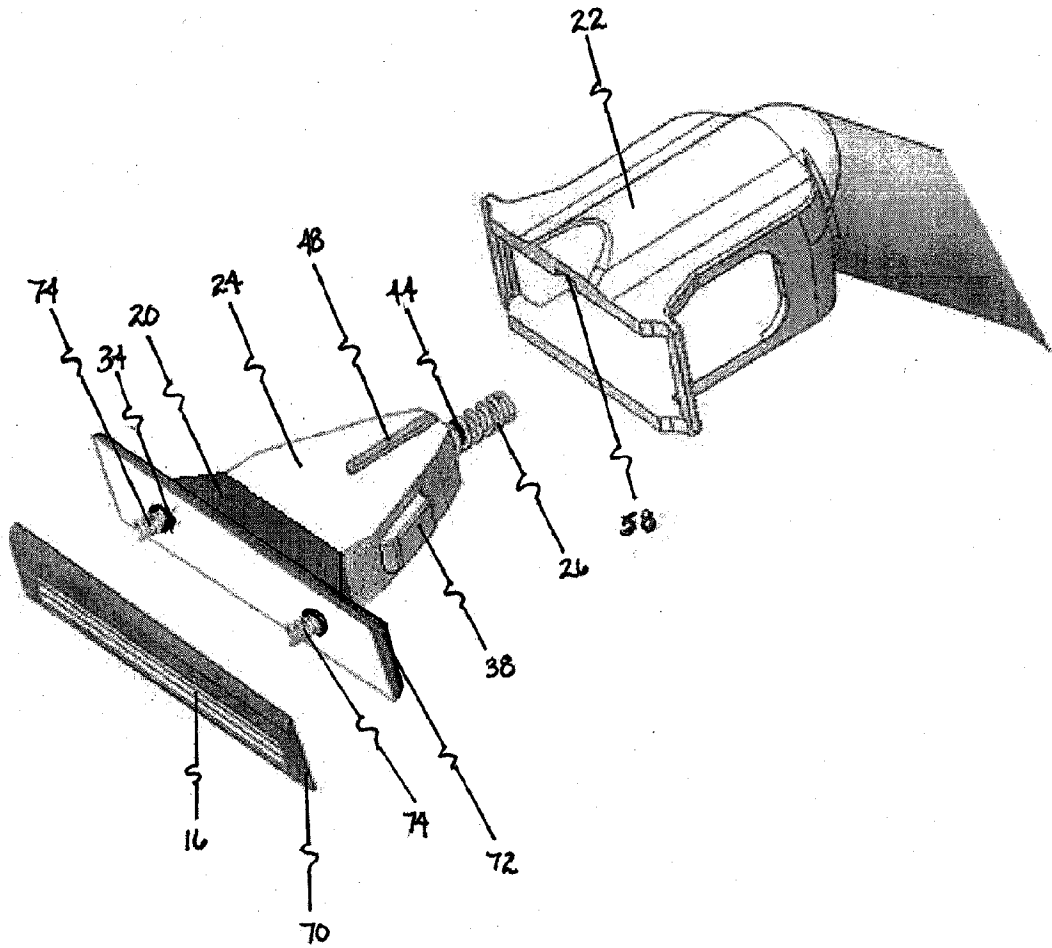


Figure 4

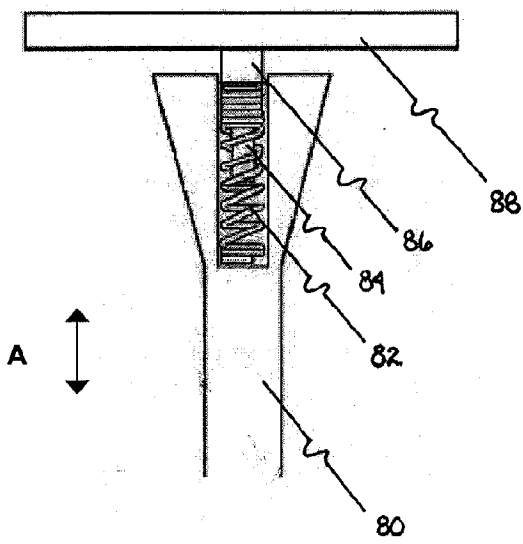


Figure 5a

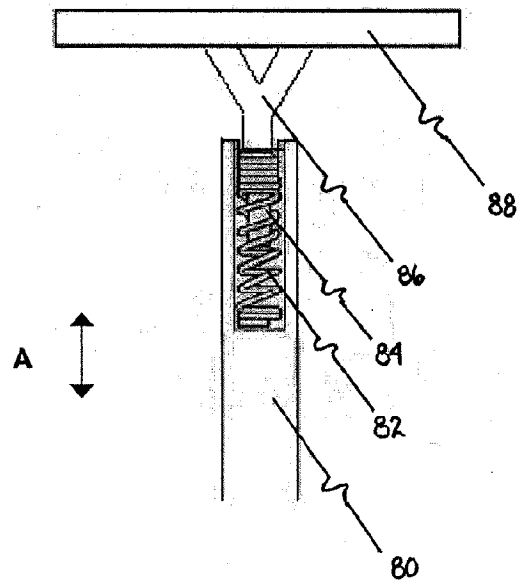


Figure 5b

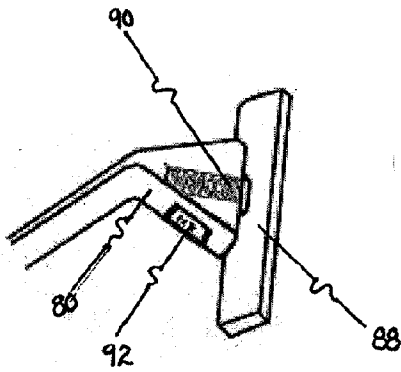


Figure 6a

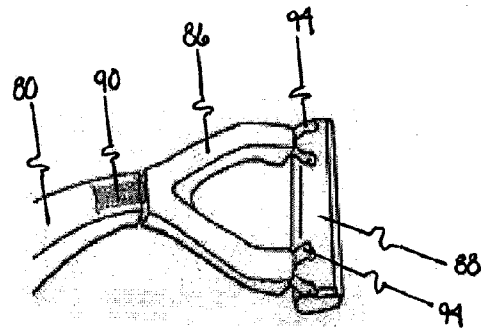


Figure 6b

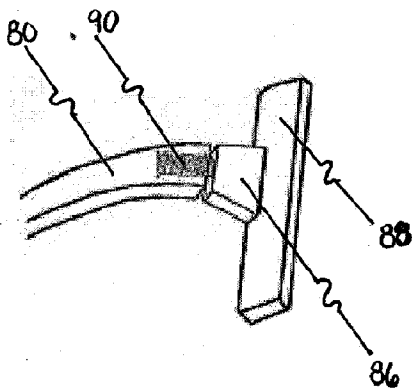


Figure 6c

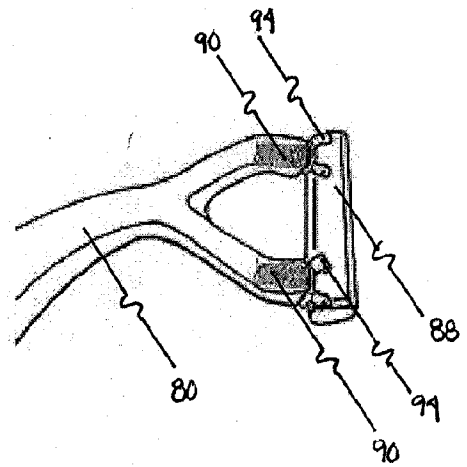


Figure 6d

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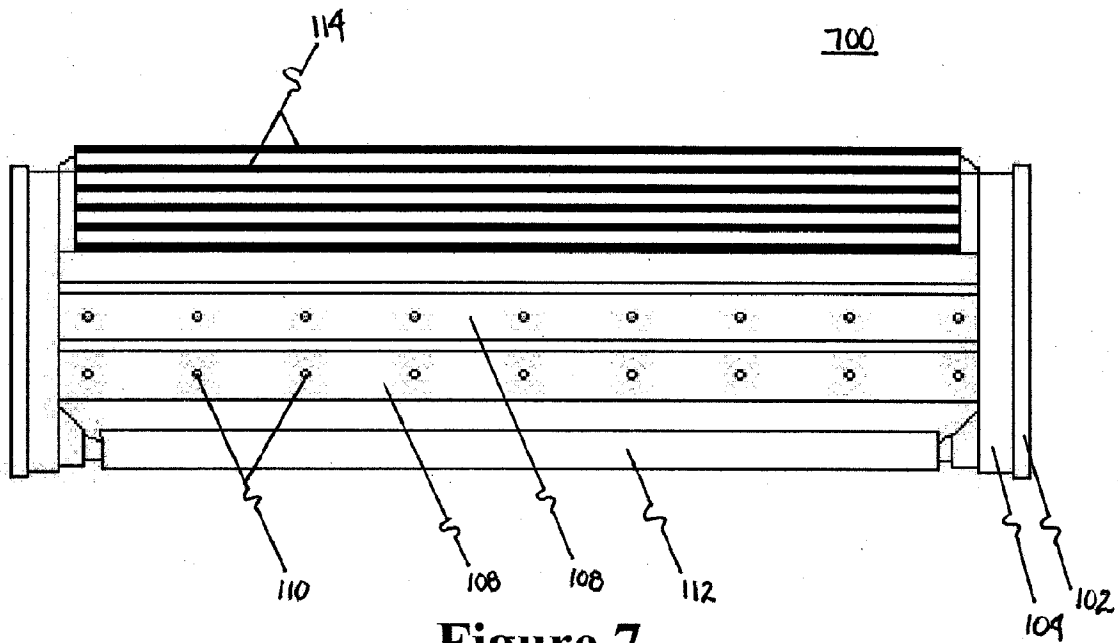


Figure 7

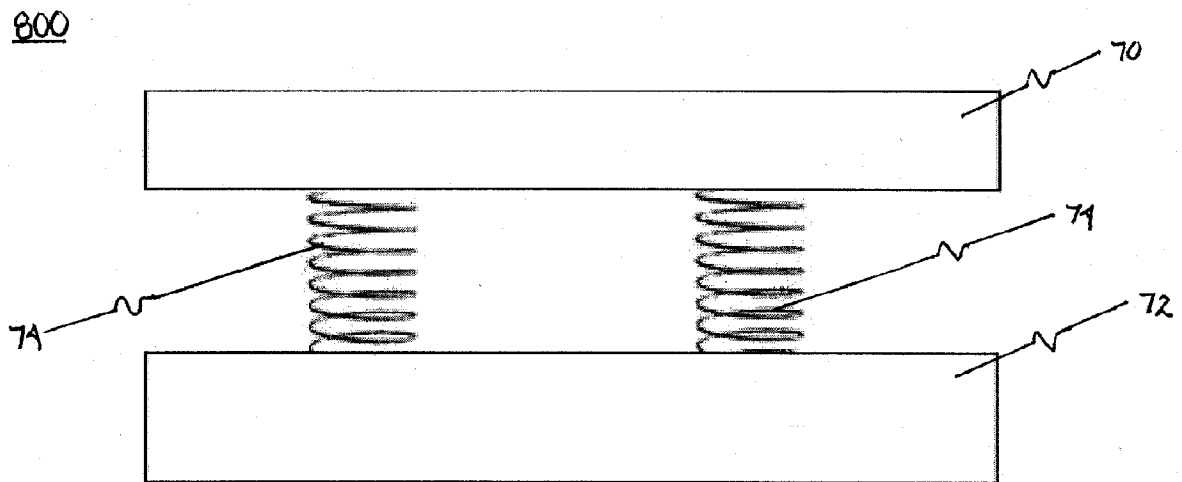


Figure 8

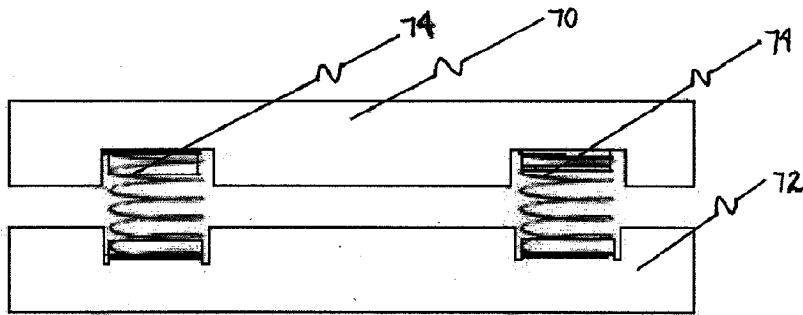


Figure 9a

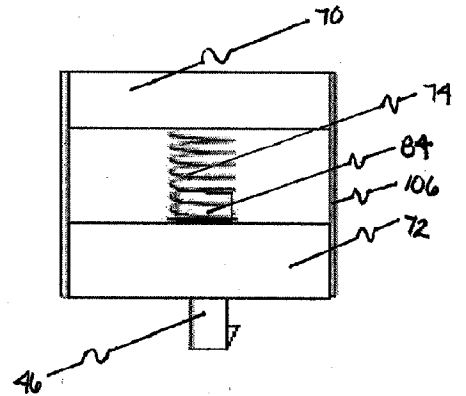


Figure 9b

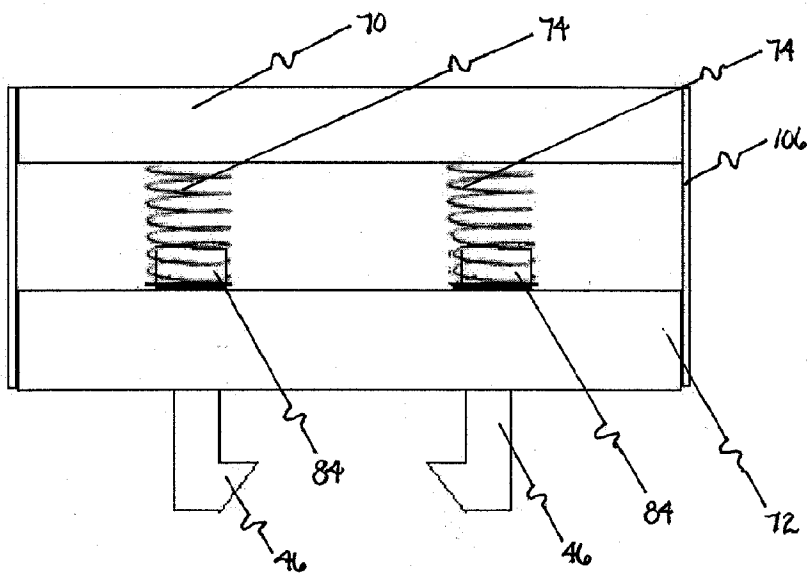


Figure 9c

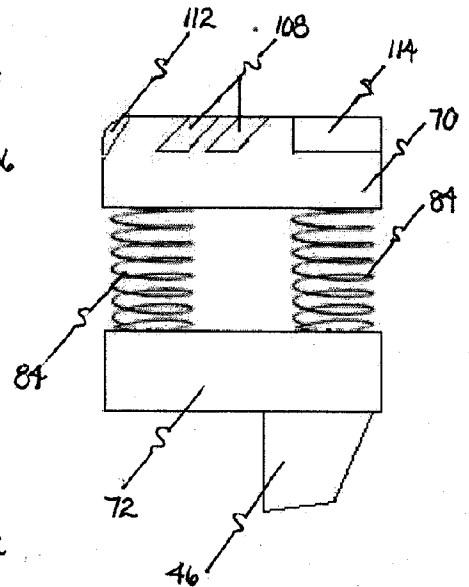


Figure 9d

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/059585**A. CLASSIFICATION OF SUBJECT MATTER***B26B 21/22(2006.01)i, B26B 21/10(2006.01)i, B26B 21/40(2006.01)i, B26B 21/52(2006.01)i*

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B26B 21/22; B26B 21/10; B26B 21/40; B26B 21/52

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

Korean utility models and applications for utility models
Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: razor, handle, head, coupler, biasing, spring, suspension, and similar terms

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 6880253 B1 (GYLLERSTROM, KENNETH VINCENT) 19 April 2005 See abstract, column 7 line 7-column 8 line 11, and figures 6-7.	1,3,7-8 2,4-6
X Y	WO 01-39937 A1 (KONINKLIJKE PHILIPS ELECTRONICS N.V.) 07 June 2001 See abstract, page 5 lines 9-11, and figure 4.	1-3,5-8,9-14 2,4-6
X Y	US 5029391 A1 (ALTHAUS, WOLFGANG; COFFIN, DAVE) 09 July 1991 See figure 2.	15-23 4
A	US 5953825 A1 (CHRISTMAN, THOMAS A.; HAWES, CHRISTOPHER MARTIN) 21 September 1999 See abstract, and figures 1, 4.	1-23

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

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

10 MAY 2010 (10.05.2010)

Date of mailing of the international search report

11 MAY 2010 (11.05.2010)

Name and mailing address of the ISA/KR

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Facsimile No. 82-42-472-7140

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LEE, Eunju

Telephone No. 82-42-481-5469



INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2009/059585**Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)**

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

Claims 1-14: A biasing element disposed within a razor head comprises a common technical feature.

Claims 1-8, 15-23: A biasing element disposed between an intermediate member and a handle comprises a common technical feature.

The only common technical feature between the above mentioned groups of claims is: a biasing element compressible in response to force applied against a head such that axial movement of the length of razor blades is allowed in a direction substantially perpendicular to a surface plane of the head.

However, this feature lacks novelty with respect to the document, US 6880253 B1. Thus, there is no technical relationship left over the prior art among the above groups of inventions, leaving the claims without a single general inventive concept. Hence, there is lack of unity "a posteriori" (PCT Rules 13.1 and 13.2).

1. As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- The additional search fees were accompanied by the applicant's protest and, where applicable, the payment of a protest fee.
- The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/059585

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6880253 B1	19.04.2005	AR 032160 A1	29.10.2003
		AT 312688 T	15.12.2005
		AT 415255 T	15.12.2008
		AU 2001-274347 B2	24.05.2007
		AU 2001-74347 A1	02.01.2002
		BR 0111894 A	09.12.2003
		CA 2413362 C	25.08.2009
		CA 2413362-A1	27.12.2001
		CN 1282529 C	01.11.2006
		CN 1447736 A	08.10.2003
		CZ 20024221 A3	15.09.2004
		DE 60115903 D1	19.01.2006
		DE 60115903 T2	24.08.2006
		DE 60136761 D1	08.01.2009
		EP 1301315 A1	16.04.2003
		EP 1301315 B1	14.12.2005
		EP 1616676 A2	18.01.2006
		EP 1616676 A3	01.02.2006
		EP 1616676 B1	26.11.2008
		ES 2255556 T3	01.07.2006
		ES 2318401 T3	01.05.2009
		JP 2003-535667 A	02.12.2003
		KR 10-0745552 B1	02.08.2007
		MX PA02012636 A	06.10.2003
		PL 360001 A1	06.09.2004
		RU 2269410 C2	10.02.2006
		TW 542774 A	21.07.2003
		TW 542774 B	21.07.2003
		WO 01-98041 A1	27.12.2001
		ZA 200300206 A	13.02.2004
WO 01-39937 A1	07.06.2001	AR 026612 A1	19.02.2003
		AT 235354 T	15.04.2003
		CN 1198707 C0	27.04.2005
		CN 1337899 A0	27.02.2002
		DE 60001815 D1	30.04.2003
		DE 60001815 T2	04.12.2003
		EP 1163089 A1	19.12.2001
		EP 1163089 B1	26.03.2003
		ES 2192546 T3	16.10.2003
		JP 2003-515401 A	07.05.2003
		KR 10-0669144 B1	15.01.2007
		US 2004-0216310 A1	04.11.2004
		US 6671961 B1	06.01.2004
		US 6877227 B2	12.04.2005
		US 5029391 A1	09.07.1991
US 5953825 A1	21.09.1999	AU 1997-13947 B2	17.08.2000
		CA 2242529 C	07.05.2002

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/059585

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		CN 1116967 C	06.08.2003
		CN 1212647 A	31.03.1999
		CN 1212647 C0	31.03.1999
		EP 0960004 A1	29.03.2000
		EP 0960004 A1	01.12.1999
		EP 0960004 B1	20.06.2001
		JP 03-980060 B2	19.09.2007
		JP 2000-503222 A	21.03.2000
		KR 10-0523008 B1	29.12.2005
		WO 97-26119 A1	24.07.1997