Field Analysis Study - Arshriya Koul

Field of Technology Description

My field of technology focuses on facial razors that aid with increasing/decreasing mobility of range and increasing/decreasing pivotability in order to achieve any type of shaving strokes/techniques that are desired by the user. Additionally, all razors in this set have the underlying ability to provide the user with a comfortable and safe shaving experience. When looking solely at facial razors filed within the last 10 years, the modernization of facial razors is prominent, as when compared to very old inventions, the current facial razors include so many additional features to enhance the very simple function of the razor (i.e. shaving itself). For example, it was through reading about the modernization of this field that demonstrated how comfortable, pivotable facial razors can be created through changes in the number of blades used, the angle at which the blades are maneuvered to be in, the type of technology used to initiate rotatability, the manual and automatic features embedded in the razors to allow for ease and safety for the user, and much more (to be described later). Overall, all the modern facial razors ("*modern*" in this context means patents on facial razors filed within the last 10 years) that were focused on in this project provide easy and safe shaving through increasing/decreasing its level of rotatability, mobility, and pivotability across planes, as well as providing further movement and accessibility in areas of the user's demand and desire.

Field of Technology: Facial Razors (Pivotable razors that allow for safe, easy, and comfortable shaving)

- Limited to patents that were filed within the last 10 years

US Patent Number	**Title**	**Assignee**	**Number of Claims**	**Which Claims are Independent**
US9073226B2	Pivoting razor	Gillette Co LLC	14	Claim 1
US9731426B2	Rotating type razor	Hak Ho Kim, Gi Dong Kang	4	Claim 1
US20140237828A1	Razor with three-axis multi-position capability	Thomas J. Bucco	18	Claim 1
US20160001455A1	Shaving razor pivot lock	Gillette Co LLC	20	Claim 1; Claim 12
US20200269453A1	Trimmer Razor	Leaf Shave Co	20	Claim 1; Claim 17; Claim 19
US10906196B2	Razor with pivoting head	LEAF SHAVE Co LLC, Leaf Shave Co	12	Claim 1
US20150360375A1	Shaving razor	Zachary R. Wertz	21	Claim 1; Claim 20
US7937837B2	Razor head having	BIC Violex SA	11	Claim 1; Claim

	two shaving heads			6; Claim 11

Descriptions:

US9073226B2

This patented invention is intended to overcome the problem of how facial razors cannot maintain a close position to the surface of the skin. This invention ensures that the razor will adapt to the curvature of the surface it is applied upon in order to maintain a close position, and more importantly so that the individual on which the razor is being applied upon feels no discomfort. The manner in which the invention achieves this is by two features working together to ensure that the razor function does not appear loose. Essentially, the razor's biasing plunger is secured by a stabilizing bore. The stabilizing bore can be considered to be the feature that prevents the biasing plunger from moving in the lateral direction and assists the razor to maintain close contact with the surface on which it is applied. However, if the biasing plunger is jammed in the stabilizing bore, then this may reduce the closeness and comfort provided by the razor and can limit the mobility and range of the razor, overall becoming inefficient. Moreover, the manner in which the stabilizing bore is able to prevent the biasing plunger from jamming is by the difference in the cross-sectional sizes of the two features. It is significant to note that the largest cross-section of the biasing plunger has a shape that is different from the shape of the smallest cross-section of the stabilizing bore.

US9731426B2

This patented invention is intended to overcome the problem of how facial razors can only function if used in some distinct manner and motion. Thus, this invention provides complete rotatability and mobility so that a user is no longer constrained by how they must hold the razor and can maintain close contact with the surface on which the razor is being applied with ease and comfort. With this invention, the user can rotate the razor blade cartridge by 180 degrees without the handle being held upside down.

The mover of this razor is a rotating body in which there is a handle unit that is flexible to do the required motion needed for complete rotatability; moreover, the handle unit is shaped in such a way that its silicon packing prevents any slippage and increased grip. Additionally, the mover consists of a button unit that is configured to come into close contact with the surface it is being applied on. If this button unit is moved toward the razor blade cartridge, then it allows for the rotation of the razor blade cartridge. The lower jaw of one's face is a distinct location in which mobility of up to 180 degrees is required; therefore, when the user pushes down on the button unit, it is moved forward to the razor blade cartridge, attacking the exact problem identified in facial razors that do not provide such mobility. The feature of this invention that allows for almost absolute flexibility in rotation is the rotating body unit. This rotating body unit is composed of components that allow for range of motion. The rotating cylinder of this rotating body unit has a first elastic member that has a spiral coil shape. This form of this feature allows for the function of outward expansion (i.e. rotatability), as when the coupling member comes into contact with the spiral coiled first elastic member, outward expansion of the razor blade cartridge is seen. Since the coupling member needs to maintain very close contact with the first elastic member in order to allow for the free mobility of the razor cartridge, there also exists a coupling bolt in the rotating cylinder that ensures the coupling member will remain at a very close approximation to the first elastic member.

US20140237828A1

This patented invention recognizes that though there exist razors with blade cartridges that are positioned in a manner to pivot around an axis parallel to the blades of the razor in order to allow for close contact with the surface of application, there still exists this limited range of motion for users. In order to tackle this limited range of motion, this patented invention allows the user to rotate across several axes simultaneously. The end of the handle of the razor has a pivot sphere on which the blade cartridge is rotatably positioned so that there is freedom to pivot around the three axes of the handle. The pivot does not necessarily need to be spherical in shape; however, the "exemplary" embodiment of the pivot sphere would be spherical in shape. The blade cartridge is connected to the pivot sphere by the clevis. The clevis includes two opposed legs, and each leg has a hole. The holes are sized such that the clevis can wrap around the pivot sphere and keep the sphere locked into the clevis. However, though the sphere is locked in the clevis, the legs of the clevis allow for complete rotational movement because the maximum diameter of the pivot sphere is greater than the distance between the legs, which causes there to be no "real" fixture of the pivot sphere to the clevis; transitively, there exists no "real" fixture of the pivot sphere to the blade cartridge. Essentially, the recesses and the clevis work together to ensure that the sphere remains in its fixed position. The manner in which one can lessen the free rotation of the blade cartridge is by adding one or more stop points on the pivot sphere that when they once interact with the clevis, free rotation is no longer possible.

US20160001455A1

This patented invention intends to increase the efficiency and ability of wet shaving razors to come into close contact with the surface it is being applied upon, as well as achieve this goal in a way that then makes the experience comfortable for the user. This invention has a pivot locking mechanism in its razor cartridge that provides accurate, comfortable trimming. Instead of allowing for further mobility like a biasing plunger or a pivot sphere may accomplish, this invention locks the cartridge pivot and lessens the range of mobility for the user to allow for the user to determine when the blade has achieved the closest point of contact and in subsequent fashion manually lock the pivot for trimming at said point.

Although this patented invention's key mechanism is its ability to lock the cartridge pivot so that the user is able to determine the closest point of contact, the cartridge is still allowed to pivot about an axis that is parallel to the blade's edge. The gripping portion of the handle assists the razor cartridge to have both a forward and rearward pivot position. To have both these positions allows the blade to follow the contours of the surface it is being applied upon. There is also a cartridge biasing member, and when no force is being applied to the razor, the cartridge may be biased in the forward pivot position. While it is demonstrated that the cartridge's ability to pivot is aided by the forward and rearward pivot positions along the blade edge, it is important to note that this state of how mobile and pivotable the cartridge has become is best used for when longer shaving strokes are needed. So, though the cartridge has this ability to have both a forward and rearward position, the ability to do safe, comfortable, and most importantly, shorter shaving strokes comes from the existence of a pivot locking mechanism. Essentially, the users can prevent the cartridge biasing member from being in performance to then allow for manual positioning of the razor onto the application surface. Additionally, this pivot locking mechanism has a pusher member that can slide toward and away from the razor cartridge, thus allowing the razor to be in an engaged and disengaged position, respectively. The pusher member may be locked/released by the application of pressure from the user's finger. When engaged, with respect to the handle, the opposite surface of the cartridge puts the cartridge in a forward position preventing the razor cartridge from pivoting. On the

other hand, when disengaged, with respect to the handle, the forward position allows the razor cartridge to pivot. It is in the intermediate position (between the engaged and disengaged positions), in which the user may be able to manually adjust or further limit the range that the cartridge can pivot.

US20200269453A1

This patented invention intends to overcome the issue of being unable to reach certain areas of the body (i.e. under the nose). Since trimmer razors typically have little to no material surrounding the blade that is supposed to come into contact with the surface that it is supposed to be applied upon, a trimmer razor allows the user to correctly position the device in order to maximize hair removal with ease and comfort. An additional advantage of trimmer razors in comparison to other razors with more blade cartridges is that it is able to provide precision shaving. The minimal material surrounding the blade of the trimmer razor allows the trimmer razor to maximize the accuracy of the shave. One variation of this invention could also allow the blade cartridge to be pivotable.

The seat of the trimmer razor holds the razor blade. Arising from the seat, there exist two protrusions; these two protrusions help with the positioning of the razor blade, as the razor blade can rest against them. Moreover, when the handle of the trimmer razor rotates, the razor is in an open position, in which the cover is spaced from the seat. This allows the user to remove or insert a new blade within the head. When the handle of the trimmer razor rotates again, the razor is in a closed position, in which the cover is clamped to the seat. This allows the user to do precision shaving.

The following explanation will give greater detail of what occurs in order for the trimmer razor to be in an open or closed position. When the handle of the trimmer razor rotates, the two receiving screw members that are threaded into and held within the top and base part of the handle are affected. The top part of the handle connects to the receiving screw members that are accordingly affected when the handle is rotated. The receiving screw member in the base of the handle is affected by the same movement/measure that the top receiving screw member was affected by. There also exists a fastener that is defined by the movement of the receiving screw members. The fastener then aids the extension arrangement of the razor to operate the cover in order for the razor to be in an open or closed position.

US10906196B2

This patented invention allows for the user to use both sides of the razor blade when shaving. Essentially, in this invention, there exists at least one razor blade that has multiple cutting edges to give the user a very close and precise shaving ability. In addition, this invention includes a pivoting head so that the user does not manually have to guide the razor on a specific plane to ensure a precise trim/shave. The head of the razor is attached to the first and second extension members from the handle of the razor by at least two pins. The extension members allow for the head of the razor to freely move and rotate about the handle. Since the extension members allow for the pivoting of the head relative to the handle, the blades of the razor can then accordingly apply pressure onto the application surface at the right angle to provide for the maximization of precise shaving. In this patented invention, the razor blade has two directionally opposed razor edges giving it the characteristic of having multiple cutting edges, which demonstrates how this invention is following the popular trend of double-edged razors. Instead of having a razor blade with two different directional razor edges, this patented invention can also have two half blades that can be designed to fit the frame and cover of the head. The cover of the razor is pivotable relative to the frame; in the closed position, the cover ensures that the blades remain in the head, while in the open position, the cover is pivoted relative to the frame to allow for the blades to be replaced.

US20150360375A1

This invention intends to allow the user to avoid abrasion and nicks that may occur from shaving carefreely and without precision. Since users do not wish to embark on such a time-consuming learning curve that would eventually make them be able to shave with more precision in order to avoid any extent of injury upon the face, multiple blades and pivoting heads allow for a quick shave that will dismiss the notion of injury.

This patented invention has a handle that is pivotally connected to the head of the razor and adapts to the unique surface of the user's face. Additionally, this invention has a pivotable blade door that is attached to the body of the razor to allow for the retaining head of the razor to have a gripping surface, in order to allow for close contact to its application surface. The invention can either have a single or double edge razor blade and is manually used. Irrespective of the forces being applied upon the handle, the head of the manually razor is able to maintain its position and angle against the surface upon which it is being applied upon because of the pivot portion of the razor's retaining head. The retaining head of the razor also has a "clamping" feature that prevents the blade from moving when shaving and provides the user with the angle that s/he needs and desires. In the retaining head, there exists a compartment that is the cavity of the blade. This cavity may include a flat/curvy wall that lets the user slide across any given "bumpy" surface. Additionally, the cavity contains an arch feature that can lock the blade in place and secure the angle upon which the blade was being used at. Lastly, the cavity also includes "a screw to screw" feature that again secures the movement of the blade to allow for the best optimal precision trimming when shaving. Essentially, these aforementioned features allow for the user to pivot the blade to an angle that maximizes precision trimming for the user, while also having measures in place (i.e. angling the resting surface away from application surface, which will be discussed further down) to ensure that no extent of injury occurs.

Other features of the invention that aid in securing the position of the blade are the blade positioning features as well as the locking mechanism of the razor. The blade positioning features are placed in the resting surface, which can receive a blade, and the gripping surface of the blade to ensure that the shaving blade is correctly and tightly positioned. In order to ensure the best optimal shave, the blade resting surface is angled away from the application surface and the handle in order to become more "nick-proof" while allowing for precision trimming. The locking mechanism is able to hold the blade in a clamped position because it has a spring-loaded rounded plunger.

US7937837B2

This patented invention is a razor that has two shaving heads. The heads can either be widely spaced (when the heads are pivotally mounted together) or in a position where the heads are close to each other to form a small acute angle. The ability to pivotally move these heads to be widely spaced or very close together allows the razor to be multi-purposeful, essentially allowing the average user to shave across different surfaces/planes/areas of the human body. Essentially, this razor is combining both the ability to do normal shaving and precise shaving into one compact body. It gives the average user the ability to go back-and-forth in the different types of shaving activities s/he wants to engage in.

There are two states that the razor can be in. The first state is the closed position, wherein the first shaving head can do the shaving, and the second shaving head is not available to do so. There exists a latching mechanism to provide support in securing the first shaving head to allow for an easy, accurate, and comfortable shaving experience for the user. The support of the latching mechanism has a rotational axis, and when the latching mechanism is near perpendicular to the handle axis of the razor, the shaving

experience for the user is favorable. Moreover, the back end of the razor has two parallel arms. The defined space between these two parallel arms is called the housing. To get into the closed position, the razor uses a "stop wall" that extends out of the parallel arms. The stop wall and its protrusions allow the razor to go into the closed position. Furthermore, the second state is the open position, wherein the second shaving head is available to do shaving. The reason that there exists two states with this razor is because each state can be used for certain types of shaving; additionally, the availability of which razor head is dependent upon what type of shaving the user wishes to pursue. Before we discuss this, it is important to note that the heads have different sizes. The first shaving head (standard head) has a larger width than the second shaving head (narrow head). The standard head is to be used in normal shaving (i.e. the shaving of the legs) while the narrow shaving head is to be used in accurate trimming of particular areas that need easy access and mobility (i.e. the shaving of the mustache). Therefore, the user would be in the closed position (where only the standard head is available) when doing normal shaving, and the user would be in the open position (where the narrow head is available) to do accurate, precise shaving.

Themes

One of the themes in my patent set include how the patented inventions in US9073226B2, US9731426B2, US20140237828A1, US20160001455A1, US20150360375A1, and US7937837B2 are able to overcome the problem of how facial razors cannot maintain a close position to the application surface nor adapt to the curvature of said application surface. An additional element of this theme is that the patented inventions listed previously also are focused to make the experience comfortable for the user of the razor. In US9073226B2, the patented invention achieves comfort and close shaving by the stabilizing bore and biasing plunger working together to ensure that the razor function does not appear to be loose. In US9731426B2, the patented invention achieves the theme by preventing the user from being constrained by how they must hold the razor to maintain close contact. In US20140237828A1, the patented invention focuses more on achieving complete rotatability across several axes, which aids the patented invention to achieve the bigger-picture goal of allowing the user to maintain close contact with ease and comfort, as the razor can adjust to any contours on the specific application surface. In US20160001455A1, the patented invention concentrates more on making wet shaving more efficient and easy for the user by creating a pivot locking mechanism that would allow for manual adjustment so that the user can determine the closest point of contact to the application surface with ease. In US20150360375A1, the patented invention achieves close and comfort shaving by having a handle that is pivotally connected to the razor head such that it can adapt to varying application surfaces. Also, this patented invention has a pivotable blade door that is attached to the razor body such that the retaining head has a gripping surface to further allow for maintenance of close contact to the application surface. In US7937837B2, the patented invention achieves close contact and comfort for the user by allowing the user to pivotally move the two shaver heads to be widely spaced or to be closely bound. It is up to the user's discretion in which position s/he wishes the shaver heads to be in, and this choice is based upon what type of application surface the shaving is being executed upon.

Another theme in my patent set is that some patented inventions have a key characteristic/feature within the invention that is secured by another feature. And, this securitization occurs so that the patented invention can allow for the continued maintenance of close contact on the surface of which it is being applied. This theme is achieved by US9073226B2, US20140237828A1, US20150360375A1, and US7937837B2. In US9073226B2, the invention has a biasing plunger that is secured by the stabilizing bore. The stabilizing bore prevents the biasing plunger from moving in the lateral direction so that the

razor can continue maintaining close contact with the application surface. In US20140237828A1, the clevis holds the pivot sphere (a more defined version of the attachment portion) in place. Though the clevis secures the pivot sphere, the pivot sphere is not truly fixed in its motion by the clevis, thus allowing the razor to always be in close proximity to the application surface because it can move across several dimensional planes. In US20150360375A1, the clamping feature of the retaining head holds the razor blade in place, which again aids the razor to support the user in close shaving. Additionally, the locking mechanism also helps to hold the razor blade in a clamped position because it has a spring-loaded rounded plunger to achieve the same function of close shaving. Lastly, in US7937837B2, there exists a latching mechanism that helps to secure the first shaving head to allow for an easy and comfortable shaving experience for the user.

Moreover, another theme in my patent set is complete rotatability and pivotable movements. This theme is achieved by US9731426B2, US20140237828A1, US20200269453A1, US10906196B2, and US20150360375A1. In US9731426B2, we see how with this patented invention, the razor blade cartridge can be rotated by 180 degrees without the handle being held upside down. In US20140237828A1, the no real fixture between the pivot sphere and clevis allows for the freedom to rotate and pivot around three axes simultaneously. In US20200269453A1, though this invention focuses more on maximizing the accuracy and precision of the shaving experience for the user, there is one variation of this invention that could allow the blade cartridge to be freely pivotable. In US10906196B2, the pivoting head allows for free mobility and rotation relative to the movement of the handle. Lastly, in US20150360375A1, its multiple blades, pivoting heads, and especially the pivot portion of the retaining head allows for complete rotational movement across various application surfaces.

Another theme within my patent set is that some patented inventions (i.e. US9731426B2 and US20160001455A1) have increased grip of its handle unit so that it can provide support for when the razor blade cartridge is being used. In US9731426B2, the handle unit has silicon packaging that allows for increased grip so that when the rotation of 180 degrees needs to be executed by the razor blade cartridge, the user is less likely to let the razor slip out of his/her hand. And, in US20160001455A1, the gripping portion of the handle unit supports the razor blade cartridge to move in both a forward and rearward position.

Furthermore, another theme that exists in my patent set is that US20140237828A1, US20160001455A1, and US20150360375A1 all consist of some type of stopping mechanism that helps to limit mobility instead of increasing pivotable movement. In US20140237828A1, there exists stop points that can be added on the pivot sphere such that when these stop points do come to interfere with the pivot sphere, the ability to freely rotate is lowered. In US20160001455A1, there is a pivot locking mechanism that when enabled, shorter shaving strokes are only able to be executed, effectively lowering the range of movement on the specific application surface that the user is operating on. In US20150360375A1, there is a “screw to screw” feature that lessens the range of movement that the razor blade is capable of so that more concentrated trimming can occur within a bounded and precise surface area.

Another theme within my patent set is that US20200269453A1, US10906196B2, and US7937837B2 all have the same goal to achieve, which is to provide the user with the ability to be very accurate with their shave, essentially enabling precise trimming by said patented inventions. In US20200269453A1, since trimmer razors typically have minimal material surrounding the blade of the trimmer razor, the accuracy of the shave increases substantially. In US10906196B2, there exists multiple cutting edges on the razor blade that allow for very precise trimming/shaving. Lastly, in US7937837B2,

there exists two shaving heads, and essentially, when the narrow head is available (i.e. the user is utilizing the open position), accurate, detailed shaving can be achieved.

Another theme in my patent set is that the patented inventions of US20200269453A1, US10906196B2, and US20150360375A1 all have two states in which their razor can be in (the most common terminology for these two states are the "open" and "closed" positions, though these terms may not always be used). One state allows for the removal/insertion of the blade, and the other state allows for the clamping of the blade to the razor cartridge/head of the razor. In US20200269453A1, when the handle of the trimmer razor is rotated, the razor enters an open position, wherein the cover is spaced away from the seat of the razor such that removal/insertion of a new blade can be executed. Also, when the handle of the trimmer razor rotates once again when already induced in the open position, the razor is now in a closed position, in which the user can execute precise and accurate trimming because the cover is tightly bound to the seat. In US10906196B2, it has a closed position in which the cover pushes the blades to stay within the head of the razor, and it has an open position in which the blades can be replaced. Lastly, in US20150360375A1, the more common terms of "open" position and "closed" position are not used but are replaced with how the blade positioning feature can be placed into a "resting" and "gripping" surface, respectively. Essentially, when the blade positioning feature is placed in the resting surface, then the razor can receive a blade; however, when the blade positioning feature is placed in the gripping surface, then it ensures that the blade is correctly and tightly positioned for the user.

The last theme in my patent set is that the patented inventions of US20160001455A1, US20200269453A1, and US20150360375A1 all have some sort of feature that can be engaged manually. Essentially, all razors blatantly need the user to move the handle such that there is movement across the application surface; however, the three aforementioned patented inventions have features that need additional manual support beyond that of simply moving the razor handle across the application plane. In US20160001455A1, the user is given the manual ability to adjust and/or further limit the range in which the cartridge can pivot when the razor cartridge is between the engaged and disengaged position. In US20200269453A1, in order for the user to get the trimmer razor in an open or closed position, it needs to manually induce the rotation of the handle. This idea demonstrates the previous statement's claim on how the manual movement of pushing the razor blade forward via the razor handle is not going to fall under the scope of what a manual ability is in this theme. This is because all facial razors need an individual to use the handle to push the razor forward on the application surface; however, the rotation of the handle cannot be considered "movement" that enables forward or backward motion of the razor on its application surface. Essentially, the patented invention of US20200269453A1 follows the definition of manual ability in this theme in the fact that though it does need the user to use the handle in order to move on the surface plane, it also needs rotational ability of the handle (a different, additional manual movement) to get to be in its closed and open position. Lastly, in the patented invention of US20150360375A1, the features that induce additional manual movement are the blade door, slot, and angle adjusting mechanism. To specify further, this invention allows the user to manually pry open the blade door, as well as manually set the longitudinal opening of the slot, and manually set the angle adjusting mechanism.

<u>Design Arounds</u>

US Patent Number	Claim 1 of Patent	Design Around Explanation
US9073226B2	"...*wherein* ***the largest cross-section of the penetrating portion has a shape which differs from the shape of the smallest cross-section of the stabilizing bore*** *in order to lower the contact area between the penetrating portion of the biasing plunger and the stabilizing bore,*"	It is stated in the description of the invention that the stabilizing bore needs to be at least slightly larger than the biasing plunger in order for the biasing plunger to pass through it. So, the difference in the shapes of the stabilizing bore and the biasing plunger lowers the contact surface between them, which helps to reduce the chances of the biasing plunger to stick to the stabilizing bore. Therefore, an efficient design around would be to create an identical invention but to ensure that no difference exists between the largest cross-section of the penetrating portion of the biasing plunger and smallest cross-section of the stabilizing bore so that it does not infringe claim 1. To maintain the close proximity and comfort that this facial razor provides, a difference exists in the shapes of the devices; however, by this design around of reducing the distance between the biasing plunger and stabilizing bore to zero (effectively ensuring that no difference exists among the cross-sections), there may exist a limit in the mobility of the invention because chances of jamming may be greater. Yet, to fix this arising problem, we can add a thin layered cloth that can withstand the activity of wet shaving in between both of the devices to prevent any sort of jamming, as this thin-layered, frictionless, and wet-shaving withstanding cloth will prevent the biasing plunger and stabilizing bore from sticking to one another when there distance has effectively reduced to 0. With these actions taken, we have successfully designed around the first claim of the patent whilst ensuring that the invention is fully operational in its purpose to provide close contact to the application surface as well as comfortable shaving. This is the easiest available alternative because it would be very difficult to change the technologies in this invention (the biasing plunger and stabilizing bore) as the switching costs would be high; however, if we keep these technologies and add a small element (i.e. the fictional cloth), we can effectively keep the defining features of this invention and ensure that the cross-sections of the shapes do not differ by any extent such that it does not match with the design and

		implementation specified in the first claim of the patent.
US9731426B2	"*...the handle unit being configured to outwardly expose a portion of the button unit received therein, wherein* ***the button unit is configured to rotate the razor blade cartridge when the button unit moves toward the razor blade cartridge****,*"	The manner in which this invention is set to induce rotatability is via its button unit moving toward the razor blade cartridge. Essentially, we know that claim 1 proclaims that it is when the button unit is moved toward the razor blade cartridge that the rotation of the razor blade cartridge is enabled. The easiest manner in which we can design around this is to ensure for the following functionality to occur: the rotation of the razor blade cartridge is enabled when the button unit is moved away from the razor blade cartridge (no longer toward). Essentially, this design around has simply changed the mechanics around (changing the enablement of rotation being dependent on the button unit moving away instead of toward the razor blade cartridge) while maintaining the same operation and providing the same level of rotatability (by 180 degrees). This is the easiest available alternative because no technology needs to be added or removed. If this new design around invention can be manufactured and built without infringing other patents, this razor needs to simply change the mechanics of the button unit such that rotatability is induced when the button unit is moved away instead of toward the razor blade cartridge.
US20140237828A1	"*...and* ***a cartridge having a clevis*** *with first and second opposed legs, spaced from one another,*"	In this patented invention, the pivot sphere and clevis act as a ball and socket, respectively, in order to provide free range and mobility when the razor is being used. The specific mechanics of this razor claim that the maximum diameter of the pivot sphere needs to be greater than the distance between the legs so that there is no "real" fixture of the pivot sphere to the clevis, thus allowing rotation across several axes. So, if we were to remove the clevis altogether, then we need to ensure that the pivot sphere can rotate across several axes without a clevis that has opposing legs to hold the pivot sphere in a position that allows free rotation. Additionally, it is important to note that claim 1 of the patent never explicitly states "a pivot sphere" but broadens the term to any attachment portion, which effectively limits the ability to design around the pivot sphere because so many

		variations exist under the phrase “any attachment portion.” Therefore, a manner in which to accomplish this may be to combine the function of the clevis as a layer of the pivot sphere. The pivot sphere can essentially develop a clevis-like layer that is attached to the blade cartridge and is mechanically a part of the pivot sphere now. So, this layer will hold the pivot sphere in place but will not restrict the pivot sphere because it is essentially part of the pivot sphere. This fictional, yet developable layer is not some new design/innovation but requires some additional costs to be incurred due to the fact it will be a new component. However, these costs can be offset from the fact that the manufacturing of the clevis and its corresponding legs are no longer needed. This is the easiest available alternative because the first claim of this patent is overall broad, as it does not list many features and does not have specific subset features within those broader features that can be changed in a manner that can help with designing around. However, since the first claim is broad and covers many variations, my design around is a slightly broader invention as we are now removing the clevis altogether and adding the function provided by the clevis to the pivot sphere via this fictional layer.
US20160001455A1	“*...a* ***pivot locking mechanism*** *positioned on the head of the handle,* ***the pivot locking mechanism having a pusher member*** *that slides toward and away from the cartridge between an engaged position and a disengaged position*”	The first claim of this patent provides many details on an integral component of the invention: the pivot locking mechanism. This component plays a significant role in this invention because this invention is competitive with other razors due to the fact that it allows the user to personally determine the closest point of contact for them and then use the limited mobility feature (provided by the pivot locking mechanism) to ensure shorter razor strokes to maximize trimming efficiency. However, we can eliminate the pivot locking mechanism and still allow for a razor that lets the user determine the mobility level/range needed to achieve the desired strokes so that efficient trimming can occur. This can be accomplished by removing the pivot locking mechanism altogether and adding a pivot sphere with add-on stop points to then be considered the integral components of this invention. In this “new” invention, the manner in which one can

		lessen the mobility of the razor is by adding more stop points onto the pivot sphere, such that then when the pivot sphere interacts with said stop points, more concentrated shaving (i.e. shorter shaving strokes) can be accomplished. This is the easiest available alternative because a pivot sphere with add-on stop points are the easiest technologies that can replace the functionality of the pivot locking mechanism. Although these additional technologies may incur more costs because of the added manufacturing needed (if manufacturing is possible without infringing), it is the next best alternative because an engaged and disengaged position can still be reached via the number of stop points engaged on the pivot sphere by the user. The functionality of the razor stays the same and it uses combinations of previous technologies that can work in tandem with one another.
US20200269453A1	"*...an extension arrangement connecting the cover to the handle* ***so that, upon rotation of the handle, the cover is movable*** *between an open position in which the cover is spaced from the seat and a closed position in which the cover is clamped to the seat.*"	In this patented invention, the rotation of the handle determines whether the razor is in a closed position to do precision trimming or in an open position so that the removal/insertion of a new blade may occur. However, we can remove the dependency of the user's desired position on the rotation of the handle and add a new technology, a pusher member/button unit, then when engaged and disengaged, the user can still get to the closed and open position s/he desires. Additionally, this new add-on can be locked/released by the application of the user's finger. This thus allows the trimmer razor to still have the two operational positions for the user's ease; however, this new design around has effectively removed the path of getting to the positions from the rotational aspect of the handle and has added a new dependency that has allowed for the same functions to remain. This is the easiest available alternative because it is adding a small component, button unit/pusher member, that is able to remove the dependency of the desired position on the rotation of the handle, which essentially means that adding this small component offsets the cost of implementing that previous structure and function of the rotation on the handle. It has effectively removed the dependency that is listed in the claims; and from previous

		inventions, it can be confidently stated that a button unit/pusher member can accomplish getting the razor to be in the positions (closed or open) desired by the user.
US10906196B2	"*...one razor blade* ***separation member*** *provided between the frame and the cover of the head, wherein the at least one razor blade* ***separation member is pivotally attached to the frame****,*"	The separation member that is pivotable relative to the frame can be removed and replaced with a sort of dial that can perform the same key functions provided by the separation member. Before explaining how this dial can replace the need for the separation member, let us examine the role that the separation member plays. In this patented invention, the separation member is configured to separate the blades from each other in the head of the razor. By separating these blades in a position desirable to the user, the user can then accordingly apply pressure onto the application surface at the appropriate angle to provide the most efficient, precise shaving experience. However, we can remove the function of the separation member by adding a small functional dial in the middle of the handle of the razor, such that it can be turned with the user's discretion. Essentially, when the user needs a specific angle from the multiple blades in the razor, the user can then twist the dial in order to achieve the exact angle that will provide the user with the most optimal angle. Although this adds a manual factor to the razor instead of purely being automatic via the separation member adhering to the contours of the application surface, it actually provides the user with the ability to determine what will provide the most efficient shave with also allowing the user to continuously twist and untwist the dial until s/he believes that the razor gives the most efficient shaving experience. So, it does give choice back to the user. This is the easiest available alternative because the separation member has many key functions that are integral to the razor. However, this replacement dial can still perform the functions that are provided by the separation member and does give back choice to the user. The costs of adding this dial and removing the separation member should net out to zero if manufacturing this product can be done without infringement. Essentially, it is hard to design around the other features of this claim, such as the cover and frame (as those features are especially broad);

		therefore, the separation member is one of the integral characteristics of the patented invention that we can design around because its ability can be transferred to a sort of dial.
US20150360375A1	"...***a locking mechanism to engageably hold the blade door in a closed position*** *that tensions the shaving blade between the blade resting surface and the blade gripping surface.*"	In this patented invention, the retaining head of the razor has a "clamping" feature that prevents the blade from moving when shaving and provides the user with the angle that s/he needs and desires. In the retaining head, there exists a compartment that is the cavity of the blade. This cavity includes a flat/curving wall that lets the user slide across any given "bumpy" surface. Additionally, the cavity contains an arch feature that may lock the blade in place and secure the angle upon which the blade was being used at. In order to do the best optimal design around, we change the components existing within the retaining head and remove the retaining head altogether such that the new head still contains a cavity body but acts more as a rotating body unit that has numerous elastic members. However, the manner in which the elastic members can be prevented from excessive outward expansion is to have the elastic members come into close contact with the bumpy surface within the cavity. This design around is fully functional because the rotating body unit that replaces the retaining head of this patented invention will preserve a cavity that now will contain spiral-coiled members to maintain outward expansion/range of motion. Within the rotating body unit, there exists a cavity that will contain the elastic members. The spiral-coiled shape of the elastic members will allow for the function of rotatability, as we will also add coupling members that when they come in contact with the first elastic member, the razor blade cartridge experiences outward expansion. Additionally, the design around ensures that unrestrained outward expansion can be controlled (similar to the function of the clamping retaining head that serves as "tension" system to prevent the razor from moving when being used), as the cavity of the rotating body unit of the design around will have a bumpy wall such that when the elastic members come into contact with said wall with protrusions, there is a limit in how much rotatability can be achieved. This is the easiest available

		alternative because it maintains the overall main functional role provided by this razor as there still exist multiple blades and pivoting heads, which allow for a quick shave and avoidance of any nicks/other levels of shaving injuries. However, while maintaining the razor's main operational goal, the design around has maintained the shape of the cavity while changing the retaining pivotable head into a rotating body unit that contains elastic members that interact with a bumpy wall, instead of clamping and "screw-to-screw" features that interact with a flat/curving wall. This is the easiest available design around because though the overall function of the razor is preserved, we have effectively replaced some key features of the razor with other technologies that work together to achieve the same desired function while still maintaining other original features in the patented invention (i.e. the cavity and wall). The design around is not considered to be a variation of the patented invention but rather an invention that is varied enough such that with its additional "new" technologies, the product can be considered its own subset within the broad region of razors. Though the switching costs if manufacturing of this product is desired and allowed would be high, it is the easiest available alternative because if the retaining and clamping head along with the "screw-to-screw" feature were kept, there are not many technologies/devices that can be added that would work well in tandem with the aforementioned features that could then achieve the same operational goal.
US7937837B2	"*...a* ***stop wall disposed on a top side of the razor*** *extending between the at least two parallel arms, and against which the support abuts in the closed position,*"	In the patented invention, there exists a "stop wall" that extends out of the invention's parallel arms, and this feature is described to have many protrusions that allow the razor to go into a closed position. Essentially, the stop wall provides support in doing standard shaving because it supports the closed position of the razor. However, we can change the composition of the stop wall while maintaining its operational function. Since we want to maintain the ability of the stop wall to provide support in standard shaving, which is achieved by limiting the mobility in comparison to what the razor can accomplish in its open position (where accurate,

		precise shaving can take place), we can then replace the stop wall with a pivot locking mechanism that is engaged and disengaged when needing to do standard shaving and precise shaving. So, basically the manually locking of the standard shaving head is needed for the closed position whilst the open position will occur only when the narrow head needs to be locked in. Fundamentally, this design around is removing the stop wall and its protrusions as well as the latching mechanism by combining all the functions of these joint features into one pivot locking mechanism. With a pivot locking mechanism, the user can lock the shaver head's pivot in order to lower the range of mobility via a pusher member that would have to be attached to the razor. Essentially, when the user then feels as though s/he has determined the closest point of contact, the user can then lock whichever shaving head is needed upon the varied application surface. This is the easiest available design around because before it took the stop wall and its protrusions, as well as a latching mechanism, to ensure that the razor could be supported in a closed position; however, now the pivot locking mechanism easily can provide this support as it is up to the user's choice to engage and disengage the pusher member (via pressure from the user's finger) to pivotally move these shaver heads to be widely spaced or very close together so that the user can then shave across different application surfaces. Essentially, the design around has combined the functionalities of the three aforementioned features (stop wall, its protrusions, and a latching mechanism) all into one feature (a pivot locking mechanism), effectively making the invention a broader product that requires less technologies (because if manufacturing can be achieved without infringement of other technologies, then the user only has to develop two technologies [i.e. pivot locking mechanism and pusher member] instead of three) and less switching costs to be incurred.

Claims Analysis

Within my final set of eight patents, there exists one patent, US20200269453A1, that has a broad claim 1 that encompasses (is a superset of) the claim 1 of patent US10906196B2. Before diving into how claim 1 of patent US10906196B2 has the same features in the first claim of patent US20200269453A1 and more detailed and nuanced attributes (effectively proving that it is a subset of US20200269453A1), let me provide a brief explanation on what features are contained in the first claim of US20200269453A1.

In the first claim of US20200269453A1, it is stated that the razor head is connected to a handle. The head of this razor also holds a base member that has a seat extending from it and a cover connected to this said seat. Additionally, the functionality of this razor is explicitly seen when rotating the handle, as the cover transitions from an open position to a closed position. In said closed position, the cover is fixed to the seat. Essentially, when the handle of the trimmer razor rotates, the razor is in an open position, such that the cover is spaced from the seat. In this position, the user can achieve the removal/insertion of a new blade within the head. Yet, when the handle of the trimmer razor rotates again, the razor is in a closed position, in which the cover is clamped to the seat. In this position, the user can efficiently accomplish precision shaving. A last notable feature of this patented invention is that it has an extension arrangement that operates the cover in order for the razor to be in the aforementioned open and closed positions.

Now that we have built an idea of what is contained in the first claim of US20200269453A1, let's examine the same general features listed above as well as the additional features in the first claim of US10906196B2 that then effectively prove how US10906196B2 is a subset (a variation within) the first claim of US20200269453A1. In the first claim of US10906196B2, it is stated there exists a head that is operatively connected to the handle and a cover that can be rotated to achieve an open position, in which the same functionality can be achieved as in the first claim of US20200269453A1, essentially meaning that the blades can be replaced in this open position. In addition, replicating the same ability that this feature could accomplish in the broader first claim of US20200269453A1 when rotated, the first claim of US10906196B2 also states that when the razor is in the closed position, the cover is pivoted relative to the frame of the blade so that the blades may remain in the head of the razor. However, the first claim of US10906196B2 is narrower than the first claim of US20200269453A1 because in the first claim of US10906196B2 there is no longer one single extension arrangement but rather extension members that allow for the pivoting of the head relative to the handle. This then allows the blade to receive the applied pressure at the accurate angle to achieve precise shaving. Also, the first claim of US10906196B2 is narrower than US20200269453A1 because it has the additional feature of an added razor edge that gives this patented invention the multiple cutting edges characteristic. Overall, by having the same general features listed in US20200269453A1, as well as a few variations and add-ons (such as the additional extension members and the additional razor edge), it has been proved that US10906196B2 has a narrower first claim when compared to the first claim of US20200269453A1.

While it is only US10906196B2 that has a narrower first claim than US20200269453A1, let us prove that the other patents within my set do not fall in one another's region. For the first claim of US9073226B2, it is a fairly broad claim with the features of a stabilizing bore, biasing plunger, and the biasing plunger's penetrating portion that has a size restriction/range placed on it. There are no other patents in my set that list any of these features and additional features that would effectively deem them to be a subset within the region covered by this patent. In addition, it is important to note that though this patent has a stabilizing bore and biasing plunger that work together to ensure free range of movement, it is due to the fact that other inventions listed in my set of patents can achieve the same operation with other types of technologies that then declare those other patents to not be a subset of this patent.

In the first claim of US9731426B2, the features listed in this invention include a handle unit, a razor blade cartridge that includes a razor blade, a fixing space for the razor blade, a rotatable coupler, a mover that includes a rotating body unit (in which there exists a rotating cylinder, first elastic member, a coupling member, a coupling bolt, and a connector), button unit, and receiving spaces within the handle unit. Within this first claim, there exists more features only because the claim expands upon the more integral attributes needed for this invention. Therefore, the additional features listed underneath the key components of the invention effectively make the first claim narrow. And, since very narrow inventions can be granted and not infringe other broad inventions that it may be a subset of, the first claim of this patented invention demonstrates this phenomenon. Additionally, it is due to the fact that since this patented invention has very narrow scope, it does not infringe other patents within my set that have a handle, razor blade cartridge, and a mover (which can be considered to be a very broad region) in which this patented invention is a very small subset.

In the first claim of US20140237828A1, the features of this patented invention include a handle with a gripping portion, an attachment portion, an operative cartridge for rotation, and a cartridge including a clevis with two opposed legs and recesses. The first claim of this invention is very broad and covers a lot of possible variations by the manner in which it does not explicitly state the attachment portion's head being "a pivot sphere" but rather broadens the invention's scope by generalizing the pivot sphere to be an attachment portion that rotates via the support of the cartridge. This invention's first claim is broad and would appropriately be considered a subregion within razors that have pivotable application and rotatable movement; however, in comparison with all other patents in my set wherein the the only replacement (attachment/detachment) that truly occurs is of the razor blades itself, this invention's scope that comes from the first claim is an exclusive region with no overlapping parts. Though this razor has similar overarching features that are needed in all razors that wish to allow for free range of mobility, this invention really goes about the manner in which it achieves this function in a way that does not infringe upon any other patent in this set.

In the first claim of US20160001455A1, the features in the first claim of this patented invention include a handle with a gripping portion, a cartridge attached to the handle that has a forward and rearward position, and a pivot locking mechanism that has a pusher member and a latching device. Unlike most of the other patents within my set, this patented invention focuses more on providing the user the ability to do short, precise movements/strokes instead of full-on rotatability (but, it still can provide rotatability in its disengaged position). Due to the fact that it is more focused on providing the user with the manual ability to determine the closest point of contact to then do more precise shaving, its features align with this function (demonstrating how form meets function). So, when compared to other patents within my set, it will be noticeable that this invention may share say the feature of having a handle with grip, yet it does not share any other features like the pivot locking mechanism and pusher member, as the other patents wish to provide a razor that automatically determines the angle at which the razor needs to be in when being pivoted around different and various application surfaces. This patented invention is more so focused on providing concentrated and precise shaving that can be determined by the user's discretion, and with said focus, it has features listed in the first claim that provides scope within a different hemisphere, thus effectively making it unable to infringe other patents in my set.

In the first claim of US20150360375A1, the features of the first claim of this patented invention include a plane body including a slot, a blade resting surface, a blade door that is attached to the plane body, a retaining head with a handle attached to it, and a locking mechanism to hold the blade door in a closed position. This invention is so different from all the other inventions listed in my set even though it

accomplishes the majority of what my patent set achieves (i.e. the ability to freely rotate and pivot across many various application surfaces).The defining feature that makes this invention unique such that it does not infringe other patents that accomplish the similar goal of rotatability and multiple blades rotating to perform efficient shaving is by its retaining head listed in the first claim that is defined in the description to contain a cavity. And, this cavity provides optimal precision trimming and shaving, as the cavity contains a flat/curvy wall that lets the user slide across any given application surface. Though this invention can be a subregion within the broader scope of razors that can achieve rotatability across several axes with multiple blades, it is so unique in its structure that it would be considered to have a narrower scope that does not overlap with any other scope achieved by other patents in my set.

In the first claim of US7937837B2, the features of the first claim of this patented invention include a handle with at least two parallel arms to define a housing, a first and second shaver head, a latching mechanism with protrusions, and a stop wall. The two main functions provided by this patented invention is to do standard/normal shaving, as well as accurate, precise shaving. These functions are provided by a specific one of the two shaver heads being engaged to do the desired shaving. And, it is important to note that this razor falls under the broader region of razors that provide easy access/mobility/rotatability across axes because this razor can do accurate, precise shaving (i.e. the narrow shaving head is engaged). However, the first claim of this patented invention does not infringe other patents in my set because this razor has features that define the invention and are not listed in any other patent within my set. For example, though there have been a few patents with multiple blades, there has not been a patent within my set that has the characteristic of two shaver heads that are still functionally able to provide precise shaving and rotatability across various application surfaces. And, it is due to the fact that the technology in this patent differs from the technology in other patents in my set by a substantial margin that still provides the same ending operation that demonstrates how this patent does not infringe any other patent within my set.

Appendix

US9073226B2

What is claimed is:

1. A razor comprising a pivotable blade unit which is biased into a rest position by a biasing plunger, the razor comprising a stabilizing bore in which a penetrating portion of the biasing plunger is configured to reciprocate, wherein the largest cross-section of the penetrating portion has a shape which differs from the shape of the smallest cross-section of the stabilizing bore in order to lower the contact area between the penetrating portion of the biasing plunger and the stabilizing bore, wherein the largest cross-section of the penetrating portion of the biasing plunger comprises at least one sharp or rounded vertex and wherein the shape of the vertex in the largest cross-section of the penetrating portion is different to the shape of the corresponding vertex in the smallest cross-section of the stabilizing bore.

US9731426B2

1. A rotating type razor comprising a handle unit provided at one side and a razor blade cartridge provided at another side, the razor further comprising a mover configured to rotate the razor blade cartridge,

wherein the mover includes:

a rotating body unit having an end coupled to the razor blade cartridge;

a button unit having an end configured to come into close contact with the rotating body unit; and

the handle unit having a first receiving space in which the rotating body unit is received and a second receiving space in which the button unit is received, the handle unit being configured to outwardly expose a portion of the button unit received therein, wherein the button unit is configured to rotate the razor blade cartridge when the button unit moves toward the razor blade cartridge,

wherein the razor blade cartridge includes:

a razor blade;

a razor blade fixing structure configured to provide a fixing space in which the razor blade is fixed; and

a rotatable coupler having an end pivotally rotatably pin-coupled to the razor blade fixing structure and another end defining a coupling region,

wherein the rotating body unit includes:

a rotating cylinder having an insertion space formed in a central region thereof;

a first elastic member configured to be inserted into the insertion space of the rotating cylinder;

a coupling member inserted into the insertion space of the rotating cylinder and part of a body of the coupling member is inserted into the first elastic member;

a coupling bolt coupled to the rotating cylinder by passing through the coupling member; and

a connector having an end coupled to the coupling region of the rotatable coupler and another end coupled to the rotating cylinder;

wherein the razor blade cartridge is rotated by 180 degrees about the handle unit as a rotation axis by the mover so as to be variable in position when shaving an upper jaw and when shaving a lower jaw in a state in which the move has a fixed orientation.

US20140237828A1

1. A personal grooming apparatus comprising:

a handle having a gripping portion and an attachment portion operative to rotably support a cartridge for rotational movement around at least two axes; and

a cartridge having a clevis with first and second opposed legs, spaced from one another, each of the first and second legs having a respective recess in a side facing the opposing leg, the respective recesses sized, shaped and positioned such that the attachment portion is received simultaneously in both recesses, with the cartridge being pivotably mounted upon the attachment portion with freedom of motion around as least two axes.

US20160001455A1

1. A shaving razor comprising:

a handle having a gripping portion extending along a longitudinal axis and a head;

a cartridge mounted to the handle, the cartridge having a shaving surface with at least one blade having a blade edge, and an opposing surface, the cartridge having a forward and a rearward pivot position relative to the handle;

a pivot locking mechanism positioned on the head of the handle, the pivot locking mechanism having a pusher member that slides toward and away from the cartridge between an engaged position and a disengaged position wherein the pusher member in the engaged position directly contacts the opposing surface of the cartridge forcing the cartridge in the forward position preventing the cartridge from pivoting with respect to the handle, and the pusher member in the disengaged position is spaced apart from the opposing surface of the cartridge in the forward position allowing the cartridge to pivot relative to the handle, wherein the pivot locking mechanism comprises a latch that locks the pusher member in the engaged position and the latch has an upper portion extending from a body of the latch that facilitates the latch pivoting to release the latch from the base member allowing the pusher member to slide to the disengaged position.

US20200269453A1

1. A trimmer razor, comprising:

a handle;

a head operatively connected to the handle, the head comprising a base member, a seat extending from the base member, and a cover connected to the seat; and

an extension arrangement connecting the cover to the handle so that, upon rotation of the handle, the cover is movable between an open position in which the cover is spaced from the seat and a closed position in which the cover is clamped to the seat.

US10906196B2

1. A shaving razor, comprising:

a handle;

a head pivotally attached to the handle, the head including a frame and a cover pivotally attached to the frame; and

at least one razor blade separation member provided between the frame and the cover of the head, wherein the at least one razor blade separation member is pivotally attached to the frame, wherein, when the cover is rotated into an open position such that a portion of the cover is moved away from the frame, the at least one separation member is independently movable relative to the frame and the cover of the head after the cover has been opened,

wherein the at least one separation member includes at least one stop member that extends therefrom, and the frame includes at least one stop member that extends therefrom, the stop members being configured to retain a razor blade on each of the at least one separation member and the frame, and

wherein a stepped locking abutment extends from the frame and is configured to position at least two razor blades in a stepped arrangement within the head.

US20150360375A1

1. A shaving device, comprising:

a plane body having a slot defined in a contacting surface and having a blade resting surface shaped to receive a shaving blade and that opens to the slot to present a cutting edge of the shaving blade, the blade resting surface being distally angled at a shaving angle to the contacting surface and obliquely angled away from the handle;

a blade door pivotally attached to the plane body to form a retaining head having blade gripping surface that corresponds to the blade resting surface;

a handle that is proximally attached to the retaining head; and

a locking mechanism to engageably hold the blade door in a closed position that tensions the shaving blade between the blade resting surface and the blade gripping surface.

US7937837B2

1. A razor comprising:

a handle having a longitudinal axis and a back end, wherein the back end includes at least two parallel arms defining a housing;

a first shaver head having one or more blades, mounted at a front end of the handle;

a second shaver head having a first side and a second side mounted on a support which has two lateral faces, a first side, and a second side and which is mounted between the at least two parallel arms and pivotable with respect to the handle between an open position, wherein the support projects outward from the back end of the handle to allow shaving with the second shaver head and a closed position, wherein the support is retracted within the handle when received in the housing;

a latching means for holding the support in the closed position, the latching means including a protrusion protruding from an internal face of each of the arms, the protrusion of each of the arms biasing a respective one of the two lateral faces of the support; and

a stop wall disposed on a top side of the razor extending between the at least two parallel arms, and against which the support abuts in the closed position,

wherein the stop wall and the arms delimiting a through aperture provided on the housing to allow the support retracted in the recess to be pushed open through the through aperture in order to pivot the second shaver head to the open position,

wherein when the second shaver head is in the closed position, the first side of the second shaver head is covered by the stop wall while the second side of the second shaver head, a majority of the first side of the support, and the second side of the support are all exposed, and

wherein the one or more blades of the first shaver head define a first plane and a working portion of the second shaver head defines a second plane, wherein the first plane is perpendicular to the longitudinal axis and the second plane is perpendicular to the handle axis when the second shaver head is in the open or closed position.