

Description

This invention relates to a blade assembly. More specifically the invention relates to a dynamic shaving system and particularly a shaving system in which the span of the blade changes with forces exerted during shaving.

It has long been recognized that shaving a flexible complex surface like the face with an immovable system such as the conventional razor produces nicks, cuts and lack of uniformity of shaving due to the varying face profile of the shaver. Closeness of the shave is dependent upon, among other factors, the angle of contact between face and blade as well as the flow of skin immediately preceding contact with the blade. One of the factors controlling this flow of skin is the distance between the blade edge and the surface of the blade assembly which contacts the face immediately prior to the blade edge. This distance measured by the tangential line between the face engaging points of the blade and the leading surface is known as span. In a two blade system, each blade has a separate span. The leading or bottom blade has a span determined by the tangent line drawn between its edge and the leading edge of the guard bar which is part of the blade support structure and designed to, at least in part, direct skin flow to the blade. The second blade has a span measured by a tangent line drawn between the first and second blade. In the case of the two blade system the first or bottom blade determines the skin flow to the second blade.

Several attempts have been made in the past to control the shaving properties of the blade assembly by providing the blade assembly with flexible or movable components in various combinations.

US-A-4,516,320 discloses a blade assembly with flexible blades and spacer which move downward in response to shaving forces and the guard bar which flexes inward and upward.

US-A-4,443,939 describes a blade assembly in which a cap and guard bar as well as blades and spacer are flexible and tend to conform to the facial curves of shaving pressures applied.

US-A-4,069,580 and US-A-4,409,735 disclose a flexible razor produced by utilizing a flexible guard bar and flexible cap as well as flexible blades and spacers.

A series of ten patents issued to Chester F. Jacobson of which US-A-4,587,729 is the latest, describes a blade assembly with blades which are individually biased and move linearly reciprocally in response to shaving forces. In several of these patents the same type of movement is disclosed for a guard bar.

Reference is also made to our non publish-

ed copending EP-A-0 259 065 of which the present invention is a continuation and which discloses a blade assembly having pivotally mounted first and second blades which pivot and subsequently change the span of each blade in response to the amount of shaving force generated by the user.

According to the invention there is provided a blade assembly comprising a blade supporting means for supporting first and second blades, and a guard bar, said blade supporting means comprising a first blade support adapted to support the first blade, said first blade support including pivoting means which allows movement of the first blade along a predetermined path to change the span of said first blade in response to pressures exerted during shaving, and said blade supporting means further including a second blade support adapted to support the second blade, said second blade support including pivoting means which allows movement of the second blade along a predetermined path to change the span of the second blade independently of the change in span of the first blade, wherein the pivoting means of the first blade support is in the form of a pivot pin preferably extending at least partially through the first blade support and further includes a leaf spring, and/or the pivoting means of the second blade support is in the form of a pivot pin preferably extending at least partially through the second blade support and further includes a leaf spring.

The blade supporting means may further include a frame with a substantially flat bottom portion a front portion and a back portion. Both the front and back portions may extend upward from said bottom portion. A hollow central portion may be defined at either side by inner faces of said front and back portion. The front portion may include the guard bar which is preferably formed on the top of said front portion.

The first blade support may be mounted on said bottom portion and may extend upward to support said first blade. The second blade support may be mounted on said bottom portion and may extend upward to support said second blade.

Preferably a first and second stop depend from the sides of said frame to limit pivotal movement of said first and second blades.

Desirably the shaving edges of the blades are substantially parallel to each other when not subjected to shaving forces.

The leaf spring may project upward from the bottom portion. Shoulders may extend from said bottom portion of said frame to surround a major portion of the length of each of said leaf springs.

The blades may be mounted on said blade supports by staking.

The span of said first and second blades may vary between substantially 0.040 in. (0.1 cm) and

substantially 0.090 in. (0.229 cm) in response to shaving pressure.

The pivot pins preferably extend through receiving holes larger than said pins.

It is desirable that the holes allow limited eccentric movement of said blade supports.

According to another aspect of the invention there is provided a blade assembly comprising in combination:

(a) a frame with an essentially flat bottom portion, a front portion and a back portion both portions extending upward from said bottom portion, a hollow central portion defined at either side by inner faces of said front and back portion, said front portion including a guard bar formed on the top of said portion;

(b) a first blade support mounted on said bottom and extending upward to support a first blade, said blade support including pivoting means in the form of a pivot pin extending through said support which allows movement of the first blade along a predetermined path to change the span of said first blade in response to pressures exerted during shaving; and

(c) a second blade support mounted on said bottom portion and extending upward to support a second blade, said blade support including pivoting means in the form of a pivot pin which allows movement of the second blade along a predetermined path to change the span of said second blade independent of the change in span of said first blade.

Reference is now made to the accompanying drawings, in which:

Figure 1 is a side view of a blade assembly according to our co-pending EP-A-0 259 065, partially in cross-section;

Figure 2 is a plan view of the blade assembly shown in Figure 1;

Figure 3 is a side view partially in cross-section of the blade assembly shown in Figures 1 and 2; and

Figure 4 is a side view partially in cross-section of a blade assembly according to the present invention.

In the drawings a razor blade assembly 10 is mounted upon a handle 19. The blade assembly 10 has razor blade supporting means in the form of a frame comprising a bottom portion 14, a front portion 15 and a back portion 12 with both the front and back portions upstanding from the bottom portion 14. The frame further includes an upper portion 13 which extends from the front portion 15 to the back portion 12. First and second stops 16 and 16' extend outward from opposite side portions 17.

The blade supporting means also includes first and second blade supports in the form of fingers 21 and 21'; razor blades 24 and 24' are mounted

on the fingers 21 and 21' respectively by means of stakes 25 and 25'.

The fingers 21 and 21' are connected to the bottom portion 14 by means of leaf springs 22 and 22'. The movement of the leaf springs 22 and 22' is restricted by matching shoulders 23 and 23' which extend upward from the bottom portion 14. The leaf spring 22 is allowed to flex to "open" the space between guard bar 18 and blade 24; this is shown in Figures 1 and 2. The leaf spring 22' is allowed to flex to "open" the space between the blades 24 and 24'; this is shown in Figure 3.

Conventionally, razor spans for each blade tend to vary between substantially 0.040 in. (0.1 cm) and substantially 0.065 in. (0.165 cm) depending upon the desired predetermined setting. According to a preferred embodiment each individual span can vary between substantially 0.040 in. (0.1 cm) and substantially 0.090 in. (0.229 cm) in response to the pressure exerted during shaving. The pressure acts sequentially against the first blade 24 and then the second blade 24' to increase the distance of the span by exerted forces against the biasing action of the springs 22 and 22'.

As can be seen by reference particularly to Figures 2 and 3, each of the blades 24 and 24' are held in place by the stakes 25 and 25' which extend to the underlying fingers 21 and 21'. The blades 24 and 24' are staked separately.

It should be noted that a cap is not shown in Figure 2 and that with both blades closed, the plan view of the razor shown in Figure 2 is similar to others currently available. As shown in Figure 2, the guard bar 18 extends toward the blades 24 and 24' and is connected to the bottom portion 14 by means of ribs 26.

The embodiment according to the invention as shown in Figure 4 is similar to that shown in the other figures and like parts have been designated with like reference numerals. The fingers 21 and 21' in Figure 4 are provided with specific pivot points 30 and 30'. The pivot points 30 and 30' are in the form of pins extending through the fingers 21 and 21' from each side of the razor or a single pin extending transversely from one side of the blade assembly 10 to the other.

In Figure 4, the blade 24 is shown in a closed position, whilst the blade 24' is shown in an open position.

This embodiment restricts the compressibility of the springs 22 and 22' but also controls precisely the pivot arc of travel of each of the blades 24 and 24' via stops 16 and 16'.

The fingers 21 and 21' can be provided with receiving holes to receive the pins. The holes are preferably larger than the pins and the holes preferably allow limited eccentric movement of the fingers 21 and 21'.

Variations will readily suggest themselves to those skilled in the art. For example, a conventional spacer can be used as stop 16' for maintaining the minimum span of the second blade 24'. Also, the shoulders 23 and 23' can be extended to form abutments for fingers 21 and 21' to control the span. In particular the abutments may limit the maximum span of the blades 24 and 24'.

It should be noted, that in response to shaving pressure the blades move only toward the rear to expand the span and return to their original non-pressurised position in the forward direction after shaving forces have been removed. This invention, therefore, provides a simple mechanical means of altering the skin flow of each blade of a multi blade system in response to pressure during shaving generated by the user.

The blade assembly 10 shown in the drawings is part of a disposable razor wherein the assembly is integral with the handle 19. However, the present invention is equally applicable to blade assemblies in the form of cartridges which can be removed from the handle.

Claims

1. A blade assembly (10) comprising a blade supporting means for supporting first and second blades (24,24'), and a guard bar (18), said blade supporting means comprising a first blade support (21) adapted to support the first blade (24), said first blade support (21) including pivoting means which allows movement of the first blade (24) along a predetermined path to change the span of said first blade (24) in response to pressures exerted during shaving, and said blade supporting means further including a second blade support (21') adapted to support the second blade (24'), said second blade support (21') including pivoting means which allows movement of the second blade (24') along a predetermined path to change the span of the second blade (24') independently of the change in span of the first blade (24), wherein the pivoting means of the first blade support (21) is in the form of a pivot pin (30) extending through the first blade support (21) and further includes a leaf spring 22, and/or the pivoting means of the second blade support (21') is in the form of a pivot pin (30') extending through the second blade support (21') and further includes a leaf spring (22').
2. A blade assembly (10) according to Claim 1, characterised in that the blade support means further includes a frame with a substantially flat bottom portion (14), a front portion (15) and a back portion (12), both portions extending upward from said bottom portion (14), a hollow central portion defined at either side by inner faces of said front and back portion (15,12), and said front portion (15) includes the guard bar (18) which is formed on the top of said front portion (15), and preferably the first blade support (21) is mounted on said bottom portion (14) and extends upward to support said first blade (24), and the second blade support (21') is mounted on said bottom portion (14) and extends upward to support said second blade (24').
3. A blade assembly (10) according to Claim 2, characterised in that a first and second stop (16,16') depend from the sides (17) of said frame to limit pivotal movement of said first and second blades (24,24').
4. A blade assembly (10) according to Claim 1, 2 or 3 characterised in that the shaving edges of the blades (24,24') are substantially parallel to each other when not subjected to shaving forces.
5. A blade assembly (10) according to any one of Claims 2 to 4, characterised in that the leaf spring (22,22') projects upward from the bottom portion (14), and/or characterised in that shoulders (23,23') extend from said bottom portion (14) of said frame to surround a major portion of the length of each of said leaf springs (22,22').
6. A blade assembly (10) according to any preceding claim, characterised in that the blades (24,24') are mounted on said blade supports (21,21') by staking (25,25').
7. A blade assembly according to any preceding claim, characterised in that the span of said first and second blades (24,24') can vary between substantially 0.040 in. (0.1 cm) and substantially 0.090 in. (0.229 cm) in response to shaving pressure.
8. A blade assembly according to any preceding claim, characterised in that the pivot pins (30,30') extend through receiving holes larger than said pins (30,30').
9. A blade assembly according to Claim 8, characterised in that said holes allow limited eccentric movement of said blade supports (21,21').

Revendications

Variations will readily suggest themselves to those skilled in the art. For example, a conventional spacer can be used as stop 16' for maintaining the minimum span of the second blade 24'. Also, the shoulders 23 and 23' can be extended to form abutments for fingers 21 and 21' to control the span. In particular the abutments may limit the maximum span of the blades 24 and 24'.

It should be noted, that in response to shaving pressure the blades move only toward the rear to expand the span and return to their original non-pressurised position in the forward direction after shaving forces have been removed. This invention, therefore, provides a simple mechanical means of altering the skin flow of each blade of a multi blade system in response to pressure during shaving generated by the user.

The blade assembly 10 shown in the drawings is part of a disposable razor wherein the assembly is integral with the handle 19. However, the present invention is equally applicable to blade assemblies in the form of cartridges which can be removed from the handle.

Claims

1. A blade assembly (10) comprising a blade supporting means for supporting first and second blades (24,24'), and a guard bar (18), said blade supporting means comprising a first blade support (21) adapted to support the first blade (24), said first blade support (21) including pivoting means which allows movement of the first blade (24) along a predetermined path to change the span of said first blade (24) in response to pressures exerted during shaving, and said blade supporting means further including a second blade support (21') adapted to support the second blade (24'), said second blade support (21') including pivoting means which allows movement of the second blade (24') along a predetermined path to change the span of the second blade (24') independently of the change in span of the first blade (24), wherein the pivoting means of the first blade support (21) is in the form of a pivot pin (30) extending through the first blade support (21) and further includes a leaf spring 22, and/or the pivoting means of the second blade support (21') is in the form of a pivot pin (30') extending through the second blade support (21') and further includes a leaf spring (22').
2. A blade assembly (10) according to Claim 1, characterised in that the blade support means further includes a frame with a substantially flat bottom portion (14), a front portion (15) and a back portion (12), both portions extending up-

ward from said bottom portion (14), a hollow central portion defined at either side by inner faces of said front and back portion (15,12), and said front portion (15) includes the guard bar (18) which is formed on the top of said front portion (15), and preferably the first blade support (21) is mounted on said bottom portion (14) and extends upward to support said first blade (24), and the second blade support (21') is mounted on said bottom portion (14) and extends upward to support said second blade (24').

3. A blade assembly (10) according to Claim 2, characterised in that a first and second stop (16,16') depend from the sides (17) of said frame to limit pivotal movement of said first and second blades (24,24').
4. A blade assembly (10) according to Claim 1, 2 or 3 characterised in that the shaving edges of the blades (24,24') are substantially parallel to each other when not subjected to shaving forces.
5. A blade assembly (10) according to any one of Claims 2 to 4, characterised in that the leaf spring (22,22') projects upward from the bottom portion (14), and/or characterised in that shoulders (23,23') extend from said bottom portion (14) of said frame to surround a major portion of the length of each of said leaf springs (22,22').
6. A blade assembly (10) according to any preceding claim, characterised in that the blades (24,24') are mounted on said blade supports (21,21') by staking (25,25').
7. A blade assembly according to any preceding claim, characterised in that the span of said first and second blades (24,24') can vary between substantially 0.040 in. (0.1 cm) and substantially 0.090 in. (0.229 cm) in response to shaving pressure.
8. A blade assembly according to any preceding claim, characterised in that the pivot pins (30,30') extend through receiving holes larger than said pins (30,30').
9. A blade assembly according to Claim 8, characterised in that said holes allow limited eccentric movement of said blade supports (21,21').

Revendications



* C L M S *



1. Une cartouche ou ensemble de lames (10) comportant des moyens de support de lames pour le support d'une première et d'une seconde lames (24, 24') et une barre de garde (18), lesdits moyens de support de lames comportant un premier support de lames (21) destiné à supporter la première lame (24), ledit premier support de lame (21) comportant des moyens de pivotement qui permettent à la première lame (24) de se déplacer selon un trajet prédéterminé afin de modifier sa portée suite à des pressions exercées pendant le rasage, et lesdits moyens de support de lames comportant en outre un second support de lames (21') agencé pour supporter la seconde lame (24'), ce second support de lames (21') comportant des moyens de pivotement qui permettent à la seconde lame (24') de se déplacer le long d'un trajet prédéterminé afin de modifier la portée de cette seconde lame (24') indépendamment du changement de portée de la première lame (24), dans lequel les moyens de pivotement du premier support de lames (21) se présentent sous la forme d'un pivot (30) s'étendant à travers le premier support de lame (21) et comporte en outre un ressort à lame (22), et/ou les moyens de pivotement du second support de lames (21') se présente sous la forme d'un pivot (30') s'étendant à travers le second support de lame (21') et comporte en outre un ressort à lame (22').
2. Une cartouche ou ensemble de lames (10) selon la revendication 1, caractérisé en ce que les moyens de support de lames comportent en outre un cadre qui présente une partie inférieure sensiblement plate (14), une partie avant (15) et une partie arrière (12), ces deux parties s'étendant vers le haut à partir de ladite partie inférieure (14), une partie creuse centrale délimitée de chaque côté par les faces internes desdites parties avant et arrière (15, 12), et ladite partie avant (15) comprend la barre de garde (18) qui est formée sur la zone supérieure de ladite partie avant (15), et, de préférence, le premier support de lames (21) est monté sur ladite partie inférieure (14) et s'étend vers le haut afin de supporter ladite première lame (24) et le second support de lames (21') est monté sur ladite partie inférieure (14) et s'étend vers le haut afin de supporter ladite seconde lame (24').
3. Une cartouche ou ensemble de lames (10) selon la revendication 2, caractérisé en ce qu'une première et une seconde butées (16, 16') sont prévues sur les côtés (17) dudit cadre afin de limiter le pivotement desdites première et seconde lames (24, 24').
4. Une cartouche ou ensemble de lames (10) selon la revendication 1, 2 ou 3, caractérisé en ce que les fils des lames ou bords de rasage (24, 24') sont sensiblement parallèles l'un à l'autre lorsqu'ils ne sont pas soumis à des forces de rasage.
5. Une cartouche ou ensemble de lames (10) selon l'une quelconque des revendications 2 à 4, caractérisé en ce que le ressort à lames (22, 22') se prolonge vers le haut à partir de la partie inférieure (14), et/ou caractérisé en ce que des épaulements (23, 23') s'étendent à partir de ladite partie inférieure (14) dudit bâti afin d'entourer une partie prépondérante de la longueur de chacun desdits ressorts à lames (22, 22').
6. Une cartouche ou ensemble de lames (10) selon l'une des revendications précédentes, caractérisé en ce que les lames (24, 24') sont montées sur lesdits supports de lames (21, 21') au moyen d'ergots (25, 25').
7. Une cartouche ou ensemble de lames (10) selon l'une des revendications précédentes, caractérisé en ce que la portée desdites première et seconde lames (24, 24') peut varier sensiblement entre 0,040 pouce (0,1 cm) et sensiblement 0,090 pouce (0,229 cm) en réponse à la pression de rasage.
8. Une cartouche ou ensemble de lames (10) selon l'une des revendications précédentes, caractérisé en ce que les pivots (30, 30') s'étendent à travers des trous récepteurs plus grands que lesdits pivots (30, 30').
9. Une cartouche ou ensemble de lames selon la revendication 8, caractérisé en ce que lesdits trous permettent un mouvement excentrique limité desdits supports de lames (21, 21').

Patentansprüche

1. Rasierklingenanordnung (10), umfassend eine Klingentrageeinrichtung zum Tragen erster und zweiter Rasier-Klingen (24, 24') und eine Schutzleiste (18), wobei die Klingentrageeinrichtung einen ersten Klingenträger (21) aufweist, der die erste Klinge (24) zu tragen vermag und der ein Schwenkmittel aufweist, das eine Bewegung der ersten Klinge (24) längs einer vorbestimmten Bahn zur Änderung des Vorstands der ersten Klinge (24) in Abhängigkeit von während der Rasur ausgeübten Kräften er-



- laubt, und die Klingentrageeinrichtung ferner einen zweiten Klingenträger (21') umfaßt, der die zweite Klinge (24') zu tragen vermag und der ein Schwenkmittel aufweist, das eine Bewegung der zweiten Klinge (24') längs einer vorbestimmten Bahn zur Änderung des Vorstands der zweiten Klinge (24') unabhängig von der Änderung des Vorstands der ersten Klinge (24) erlaubt, wobei das Schwenkmittel des ersten Klingenträgers (21) in Form eines sich durch den ersten Klingenträger (21) erstreckenden Schwenkzapfens (30) vorliegt und ferner eine Blattfeder (22) aufweist und/oder das Schwenkmittel des zweiten Klingenträgers (21') in Form eines sich durch den zweiten Klingenträger (21') erstreckenden Schwenkzapfens (30') vorliegt und ferner eine Blattfeder (22') aufweist.
2. Rasierklingenanordnung (10) nach Anspruch 1, dadurch gekennzeichnet, daß die Klingentrageeinrichtung ferner einen Rahmen mit einem im wesentlichen flachen Bodenteil (14), einem Vorderteil (15) und einem Rückteil (12), von denen die beiden letzteren Teile vom Bodenteil (14) aufwärts abgehen, aufweist, an jeder Seite durch die Innenflächen von Vorder- und Rückteil (15, 12) ein hohler zentraler Abschnitt festgelegt ist, das Vorderteil (15) die an seiner Oberseite angeformte Schutzleiste (18) aufweist, der erste Klingenträger (21) vorzugsweise am Bodenteil (14) montiert ist und sich zur Halterung der ersten Klinge (24) aufwärts erstreckt und der Zweite Klingenträger (21') am Bodenteil (14) montiert ist und sich zur Halterung der zweiten Klinge (24') aufwärts erstreckt.
3. Rasierklingenanordnung (10) nach Anspruch 2, dadurch gekennzeichnet, daß ein erster und ein zweiter Anschlag (16, 16') zur Begrenzung der Schwenkbewegung von erster bzw. zweiter Klinge (24, 24') jeweils von den Seiten (17) des Rahmens abstehen.
4. Rasierklingenanordnung (10) nach Anspruch 1, 2 oder 3, dadurch gekennzeichnet, daß die Rasier-Schneidkanten der Klingen (24, 24') praktisch parallel zueinander liegen, wenn sie keinen Rasierkräften unterworfen sind.
5. Rasierklingenanordnung (10) nach einem der Ansprüche 2 bis 4, dadurch gekennzeichnet, daß die Blattfeder (22, 22') vom Bodenteil (14) nach oben absteht und/oder dadurch gekennzeichnet, daß Schultern (23, 23') so vom Bodenteil (14) des Rahmens abstehen, daß sie einen Hauptteil der Länge jeder der Blattfedern (22, 22') umschließen.
6. Rasierklingenanordnung (10) nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Klingen (24, 24') mittels Niet- oder Verstemmzapfen (25, 25') an den Klingenträgern (24, 24') befestigt sind.
7. Rasierklingenanordnung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß der Vorstand der ersten und zweiten Klingen (24, 24') in Abhängigkeit vom Rasierdruck zwischen praktisch 0,040 in. (Zoll) (0,1 cm) und praktisch 0,090 in. (0,229 cm) variabel ist.
8. Klingenanordnung nach einem der vorangehenden Ansprüche, dadurch gekennzeichnet, daß die Schwenkzapfen (30, 30') Aufnahmebohrungen durchsetzen, die größer bzw. weiter sind als die Zapfen (30, 30').
9. Rasierklingenanordnung nach Anspruch 8, dadurch gekennzeichnet, daß die Bohrungen eine begrenzte exzentrische Bewegung der Klingenträger (21, 21') zulassen.