

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 858 869 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
23.10.2002 Bulletin 2002/43

(51) Int Cl.7: **B26B 21/22**, B26B 21/40

(21) Application number: **98100715.6**

(22) Date of filing: **16.01.1998**

(54) **Razor heads having independently flexible blades**

Rasierköpfe mit unabhängig biegsamen Klingen

Têtes de rasoir avec lames flexibles indépendantes

(84) Designated Contracting States:
DE FR GB

(30) Priority: **17.01.1997 US 785263**

(43) Date of publication of application:
19.08.1998 Bulletin 1998/34

(73) Proprietor: **WARNER-LAMBERT COMPANY**
Morris Plains New Jersey 07950 (US)

(72) Inventor: **Lembke, Max Arthur**
Perivale Middx UB6 7HZ (GB)

(74) Representative: **Tesch, Rudolf, Dr. et al**
Warner-Lambert Company,
Legal Division,
Patent Department,
c/o Gödecke AG,
Mooswaldallee 1
79090 Freiburg (DE)

(56) References cited:
EP-A- 0 314 266 **EP-A- 0 470 720**

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 0 858 869 B1

Description

[0001] The present invention is directed to razor heads comprising flexible blades, and more particularly, to razor heads with at least two blades adapted to flex in response to shaving forces.

BACKGROUND OF THE INVENTION

[0002] Shaving systems such as safety razors have found widespread use for providing close and comfortable shaves. Safety razors typically include one or two blades disposed between a guard and a cap. In many instances, each of these elements is typically rigidly fixed relative to one another and disposed in skin-engaging contact during shaving. In recent years, dynamic shaving systems have been introduced which permit one or more of the skin-engaging elements of the shaving system to move in response to forces encountered during shaving.

[0003] It would be desirable to provide a razor head in which at least two blades thereof are flexible, and more particularly, are adapted to independently flex in response to shaving forces to allow the blades to better conform to the contours of the skin surface in order to achieve greater comfort and closeness.

[0004] It would also be desirable to provide a razor head in which a blade thereof is flexible and, more particularly, the center portion of the blade has a greater stiffness compared to the end portions thereof so as to provide a flatter curve along the length of the blade in response to shaving forces.

[0005] EP-0 470 720 A1 describes a razor head with two blades, which are flexibly supported by a single blade platform. Spacers are provided to maintain a distance between the two blades. In response to shaving forces, both blades will deflect simultaneously.

SUMMARY OF THE INVENTION

[0006] The present invention provides a razor head as defined in claim 1.

[0007] Preferred embodiments of the present invention provide razor heads having independent flexible blades in which at least one blade is designed to have different stiffnesses along its length, for example, to have greater stiffness in the center compared to the end portions thereof so as to produce a flatter curve in response to shaving forces.

[0008] Still other embodiments of the present invention provide razor heads having independent flexible blades in which the blade support is provided with a skin-engaging shaving aid material.

[0009] These and other embodiments of the present invention are described below with reference to the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS**[0010]**

FIG. 1 is an exploded perspective view of one embodiment of a razor head of the present invention.

FIG. 2 is an enlarged front elevational view of a blade element shown in FIG. 1.

FIG. 3 is an enlarged side elevational view of a blade element taken along line 3-3 of FIG. 2.

FIG. 4 is an enlarged cross-sectional view taken along line 4-4 of FIG. 1 in which the razor head is assembled.

DETAILED DESCRIPTION

[0011] One embodiment of the present invention, illustrated in FIG. 1, comprises a razor head 10 generally comprising a blade support 20 and at least two, and preferably, three flexible blade elements 30 such as a leading blade element, a middle blade element, and a trailing blade element.

[0012] As used herein, the term "razor head" is meant to include cartridges adapted to be connected to a separate razor as well as the operative cutting portion of a disposable razor wherein the handle and cutting portion are formed as a single unit. Also, as used herein, the term "flexible" is used to indicate a bending capability of a blade along the blades longitudinal axis in response to shaving forces. As such, the flexible blade elements of the present invention differs from generally rigid blades which may deflect vertically or angularly in response to shaving forces.

[0013] As shown in FIGS. 1-3, blade elements 30 comprise a generally elongate blade 40 attached to a generally corrugated flexible member 50. The illustrated blade 40 comprises a cutting edge 42, a central opening (not shown) and cutouts (not shown) at each end portion 44 and 46 through which interlocking projections 52 of flexible member 50 can extend for securing blade 40 to flexible member 50. Such a configuration is ideally suited for assembly by plastic insert molding. As shown best in FIG. 3, cutting edge 42 of blade 40 extends outwardly from flexible member 50, i.e., the portion of blade 40 containing cutting edge 42 is cantilevered from flexible member 50.

[0014] As shown in FIG. 2, flexible member 50 preferably comprises a generally sinusoidal configuration, and particularly, a generally rectangular sine wave configuration, in which portions thereof provide a generally flat top surface for supporting blade 40. Flexible member 50 also comprises tabs 54 and 56 which extend outwardly beyond the end portions 44 and 46 of blade 40. As explained in greater detail below, tabs 54 and 56 are movably supported in blade support 20 so that blade el-

elements 30 can be repetitively flexed therebetween in response to shaving forces. When such shaving forces are removed, the inherent resiliency of blade element 30 is preferably sufficient to return the blade element to an original position.

[0015] From the present description it will be appreciated by one skilled in the art that by varying height H, width W, thickness T of a flexible member, as well as the spacing V between vertical portions of a flexible member, the stiffness can be increased or decreased. In addition, from the present description those skilled in the art will appreciate that other factors will also affect the stiffness of the flexible member, e.g., the inherent stiffness of the type of material used. It will also be appreciated that varying the number of interlocking, projections which attach the flexible member to the blade will also affect the stiffness of the resulting blade element.

[0016] Preferably, the blade elements are designed to have a varying stiffness along their length. For example, it is presently believed to be preferable to provide a blade element having a greater stiffness in the center portion compared to the end portions to provide a flexible blade having a flatter curve in the central portion. In particular, since the guard bar is generally rigid it will flatten the skin in front of the blade and a stiffer center portion will correspond more closely to the configuration of the skin, limiting the variation in blade protrusion (i.e., amount the blade edge extends from a tangent line connecting a cap and a guard) and limiting the variation in the effective shaving angle between the blade and the skin.

[0017] With reference again to FIG. 1, blade support 20 comprises a frame 60 and a base 70. The illustrated frame 60 comprises a cap 62, a guard 64, and sides 66. Desirably, cap 62, guard 64 and sides 66 are formed as a single unit, e.g., formed from an injected molded polymeric material such as polyethylene, polyvinyl chloride or combinations thereof. From the present description it will be appreciated that instead of a guard being integrally formed with the frame, the guard can be attached or integrally formed with the base. To retain the blade elements in the blade support, the frame and the base are suitably attached to each other, e.g., by adhesives, thermal bonding or a snap-fit.

[0018] As illustrated in FIG. 4, blade elements 30 are disposed, when assembled, in a vertically spaced relation, as well as disposed in a horizontally spaced relation across the width of the blade support. In particular, frame 60 and base 70 cooperate to provide a generally rigid support which generally does not flex or bend as a result of shaving forces. The present invention translates forces on the blades into deflection while the cap and guard remain stationary. Specifically, base 70 is provided at its ends with steps 72, and sides 66 of frame 60 are provided with corresponding slots 68 (best shown in FIG. 1) to movably hold each blade element 30 therebetween. This illustrated blade support arrangement permits inward movement of tabs 54 and 56 in response

to shaving forces along the length of blade element 30 without disengaging the tabs from the slots. Although the blade elements are illustrated as separate, from the present description it will be appreciated by those skilled in the art that the blade elements can be attached at their end portions, e.g., the flexible elements can be molded as a unit with their end portions attached so that the blades are disposed in spaced vertical relation and spaced horizontal relationship across the width, and the molded unit can be provided with a single tab on each end which is retained in a blade support.

[0019] From the present description, it will also be appreciated by those skilled in the art that the present invention eliminates the need for a separate spacer element installed between adjacent blades of unitary dynamic razor systems, e.g., shaving systems where the cap and guard, as well as the blades flex as one. In addition, the independently flexible blade elements of the present invention allow the blades to have a greater flexibility without compromising structural integrity.

[0020] As shown in FIG. 1, blade support 20 preferably comprises wash through slots for rinsing shaving debris from the spaces between the blades. Specifically, frame 60 desirably has a rear wall 61 having openings 63, and base 70 desirably has openings 73 which, in conjunction with the openings in flexible member 50, provide passageways for rinsing shaving debris from the spaces between the blades.

[0021] Razor head 10 of the present invention is assembled by inserting blade elements 30 sequentially in frame 60. Specifically, the rear trailing blade element is inserted first, the middle blade element is inserted next, and the leading blade element inserted last. The base is then attached to the frame to secure the blade elements therein. The base is suitably attached to a separate razor for wet shaving.

[0022] The blade elements being similarly configured reduce the cost of the shaving system by reducing the number of different elements of the razor head, and thus, the tooling required and the cost and time required for assembly. In particular, the similarly configured blade elements of the present invention reduce the complexity for forming the razor head in that individual blade elements can be readily inserted in the desired slots of the blade support. Also, by increasing the number of blade edges in contact with a skin surface, shaving forces are distributed over a greater area in order to provide a more comfortable shave.

[0023] Another preferred embodiment of the present invention comprises a razor head, as described above, in which shaving system 10 further comprises a skin-engaging shaving aid material. Preferably, a shaving aid material 80 is attached to cap 62 of blade support 20.

[0024] A number of different materials have been suggested for use as shaving aids. The term "shaving aid," as used herein, refers equally either to the active ingredient combined within a delivery system, such as a water-insoluble micro-porous matrix structure or to the ac-

tive ingredient alone. Previously suggested active ingredients include those disclosed in U.S. Patent No. 4,170,821 to Booth. A shaving aid may comprise one or various combinations of the following:

A. A lubricating agent for reducing the frictional forces between the razor and the skin, e.g., a micro-encapsulated silicone oil.

B. An agent which reduces the drag between the razor parts and the shaver's face, e.g., a polyethylene oxide in the range of molecular weights between 100,000 and 6,000,000; a non-ionic polyacrylamide; and/or a natural polysaccharide derived from plant materials such as "guar gum."

C. An agent which modifies the chemical structure of the hair to allow the razor blade to pass through the whiskers very easily, e.g., a depilatory agent is one example.

D. A cleaning agent which allows the whisker and skin debris to be washed more easily from the razor parts during shaving, e.g., a silicon polyethylene oxide block copolymer and detergent such as sodium lauryl sulphate.

E. A medicinal agent for killing bacteria, or repairing skin damage and abrasions.

F. A cosmetic agent for softening, smoothing, conditioning or improving the skin.

G. A blood coagulant for the suppression of bleeding that occurs from nicks and cuts.

H. An astringent for constricting blood vessels thereby stemming the flow of bodily fluids such as lymph, which may exude from skin which has been irritated during shaving.

Alternatively, the shaving aid may comprise one or more of the shaving aids disclosed in U.S. Patent No. 5,056,221 to Thoene, U.S. Patent No. 4,044,120 to Rowsell et al., U.S. Patent No. 5,095,619 to Davis et al., or Japanese Patent. Application No. Hei 7 [1995] - 24156 to Miyazaki, et al.

[0025] Other active ingredients may include various pigments, i.e., titanium dioxide, fragrances, aloe vera, flavoring agents, mineral oils, essential oils and other oils derived from plants. In addition to one or more active ingredients, the shaving aids of the present invention may also comprise other compounds or blends of compounds such as water-insoluble polymers such as polystyrene and polypropylene.

Claims

1. A razor head (10) comprising:

a blade support (20); and

at least two flexible blade elements (30) each

comprising a longitudinal axis and opposite end portions, (44, 46) supported by said blade support, **characterised in that** said blade elements (30) and said blade support (20) are adapted to permit independent bending of said blade elements (30) along said longitudinal axis in response to shaving forces.

2. A razor head (10) according to claim 1 wherein at least one of said blade elements (30) comprises a blade (40) attached to a flexible member (50).

3. A razor head (10) according to claim 2 wherein said flexible member (50) comprises areas of reduced thickness.

4. A razor head (10) according to claim 2 wherein said flexible member (50) comprises a corrugated configuration.

5. A razor head (10) according to claim 2 wherein said flexible member (50) comprises a generally rectangular sine wave configuration.

6. A razor head (10) according to claim 1 wherein at least one of said blade elements (30) comprises a first portion of first stiffness and a second portion of a second stiffness which is different from said first stiffness.

7. A razor head (10) according to claim 6 wherein at least one of said blade elements (30) comprises a greater stiffness in a center portion than at an end portion (44, 46) thereof.

8. A razor head (10) according to claim 1 comprising three flexible blade elements (30).

9. A razor head (10) according to claim 1 wherein said blade support (20) is generally rigid.

10. A razor head (10) according to claim 1 wherein said blade support (20) comprises a guard element (64) and a cap element (62).

11. A razor head (10) according to claim 10 comprising a pair of sides (66), each side (66) of which comprises at least one inwardly facing slot (68) for receiving said blade elements.

12. A razor head (10) according to claim 11 wherein said blade elements (30) comprise at least one outwardly extending tab at each end portion which is received in respective said inwardly facing slot (68) of said side (66).

13. A razor head (10) according to claim 12 wherein said blade support (20) comprises a base (70) dis-

posed between said sides (66), said base (70) comprising steps (72) for retaining said blade elements (30) in vertically offset relation in said slots (68) of said sides (66).

14. A razor head (10) according to claim 1 wherein said blade support (20) comprises a shaving aid (80).
15. A razor head according to claim 14 wherein said shaving aid (80) comprises at least one material selected from the group consisting of a lubricating agent, a medicinal agent, a vitamin, a cosmetic agent, a coagulant, an astringent, a cleaning agent, a skin conditioner, and blends thereof.

Patentansprüche

1. Rasierkopf (10), umfassend:

eine Klingenhalterung (20); und

wenigstens zwei flexible Klingenelemente (30), welche jedes eine longitudinale Achse und gegenüberliegende Endbereiche (44,46), welche durch die Klingenhalterung gehalten sind, umfassen,

dadurch gekennzeichnet, dass die Klingenelemente (30) und die Klingenhalterung (20) ausgebildet sind, ein unabhängiges Verbiegen der Klingenelemente (30) entlang der longitudinalen Achsen in Reaktion auf Rasierkräfte zu ermöglichen.

2. Rasierkopf (10) gemäß Anspruch 1, wobei wenigstens eines der Klingenelemente (30) eine Klinge (40) umfasst, welche an einem flexiblen Glied (50) angebracht ist.
3. Rasierkopf (10) gemäß Anspruch 2, wobei das flexible Glied (50) Bereiche reduzierter Dicke umfasst.
4. Rasierkopf (10) gemäß Anspruch 2, wobei das flexible Glied (50) eine geriffelte Konfiguration umfasst.
5. Rasierkopf (10) gemäß Anspruch 2, wobei das flexible Glied (50) eine im Allgemeinen rechteckige Sinuswellen-Konfiguration umfasst.
6. Rasierkopf (10) gemäß Anspruch 1, wobei wenigstens eines der Klingenelemente (30) einen ersten Bereich einer ersten Steifigkeit und einen zweiten Bereich einer zweiten Steifigkeit, welche von der ersten Steifigkeit verschieden ist, umfasst.
7. Rasierkopf (10) gemäß Anspruch 6, wobei wenigstens eines der Klingenelemente (30) eine größere

Steifigkeit in einem Zentralbereich als in einem Endbereich (44,46) davon umfasst.

8. Rasierkopf (10) gemäß Anspruch 1, welcher drei flexible Klingenelemente (30) umfasst.
9. Rasierkopf (10) gemäß Anspruch 1, wobei die Klingenshalterung (20) im Allgemeinen starr ist.
10. Rasierkopf (10) gemäß Anspruch 1, wobei die Klingenshalterung (20) ein Schutzelement (64) und ein Kappenelement (62) umfasst.
11. Rasierkopf (10) gemäß Anspruch 10, welcher ein Paar von Seiten (66) umfasst, wobei jede der Seiten (66) wenigstens einen nach innen gerichteten Schlitz (68) zum Aufnehmen der Klingenelemente umfasst.
12. Rasierkopf (10) gemäß Anspruch 11, wobei die Klingenelemente (30) wenigstens einen sich nach außen erstreckenden Fortsatz an jedem Endbereich umfassen, welcher in dem jeweiligen nach innen gerichteten Schlitz (68) der Seite (66) aufgenommen wird.
13. Rasierkopf (10) gemäß Anspruch 12, wobei die Klingenshalterung (20) eine Basis (70) umfasst, welche zwischen den Seiten (66) angeordnet ist, wobei die Basis (70) Stufen (72) zum Halten der Klingenelemente (30) in vertikal versetzter Beziehung in den Schlitz (68) der Seiten (66) umfasst.
14. Rasierkopf (10) gemäß Anspruch 1, wobei die Klingenshalterung (20) eine Rasierhilfe (80) umfasst.
15. Rasierkopf (10) gemäß Anspruch 14, wobei die Rasierhilfe (80) wenigstens ein Material umfasst, welches aus einer Gruppe ausgewählt ist, welche aus einem Schmiermittel, einem medizinischen Mittel, einem Vitamin, einem kosmetischen Mittel, einem Gerinnungsmittel, einem Adstringens, einem Reinigungsmittel, einem Hautbehandlungsmittel und Mischungen daraus besteht.

Revendications

1. Une tête de rasoir (10) comprenant :

un support (20) de lame ; et
au moins deux éléments (30) de lame flexible, chacun comprenant un axe longitudinal et des parties d'extrémités opposées (44, 46) supportées par ledit support de lame, **caractérisés en ce que** lesdits éléments (30) de lame et ledit support (20) de lame sont aptes à permettre la flexion indépendante desdits éléments (30) de

lame le long dudit axe longitudinal en réponse aux forces de rasage.

2. Une tête (10) de rasoir selon la revendication 1 dans laquelle au moins l'un des éléments (30) de lame comprend une lame (40) fixée à un organe (50) flexible. 5
3. Une tête (10) de rasoir selon la revendication 2 dans laquelle ledit organe (50) flexible comprend des zones d'épaisseur réduite. 10
4. Une tête de rasoir (10) selon la revendication 2 dans laquelle ledit organe (50) flexible présente une configuration nervurée. 15
5. Une tête (10) de rasoir selon la revendication 2 dans laquelle ledit organe (50) flexible comprend une configuration sensiblement rectangulaire en onde sinusoïdale. 20
6. Une tête (10) de rasoir selon la revendication 1 dans laquelle au moins l'un desdits éléments (30) de lame comprend une première partie avec une première rigidité et une deuxième partie avec une deuxième rigidité qui est différente de la première rigidité. 25
7. Une tête (10) de rasoir selon la revendication 6 dans laquelle au moins l'un des éléments (30) de lame présente une rigidité plus grande dans une partie centrale que dans une partie d'extrémité (44, 46) de l'élément de lame. 30
8. Une tête (10) de rasoir selon la revendication 1 comprenant trois éléments (30) de lame flexible. 35
9. Une tête de rasoir (10) selon la revendication 1 dans laquelle ledit support (20) de lame est sensiblement rigide. 40
10. Une tête de rasoir (10) selon la revendication 1 dans laquelle ledit support (20) de lame comprend un élément (64) de protection et un élément (62) de capuchon. 45
11. Une tête de rasoir (10) selon la revendication 10 comprenant deux côtés latéraux (66), chaque côté (66) comprenant au moins une rainure (68) tournée vers l'intérieur pour recevoir lesdits éléments de lame. 50
12. Une tête de rasoir (10) selon la revendication 11 dans laquelle lesdits éléments (30) de lame comprennent au moins une patte s'étendant vers l'extérieur à chaque partie d'extrémité, et qui est reçue dans ladite rainure (68) respective tournée vers l'intérieur dudit côté (66). 55
13. Une tête de rasoir (10) selon la revendication 12 dans laquelle ledit support (20) de lame comprend une base (70) disposée entre lesdits côtés latéraux (66), ladite base (70) comprenant des gradins (72) pour retenir lesdits éléments (30) de lame dans une relation décalée verticalement dans lesdites rainures (68) desdits côtés latéraux (66).
14. Une tête de rasoir (10) selon la revendication 1 dans laquelle ledit support (20) de lame comprend une assistance au rasage (80).
15. Une tête de rasoir (10) selon la revendication 14 dans laquelle ladite assistance (80) au rasage comprend au moins une matière choisie parmi le groupe consistant en un agent lubrifiant, un agent médicamenteux, une vitamine, un agent cosmétique, un coagulant, un astringent, un agent nettoyant, une lotion de conditionnement de la peau, et des combinaisons de ces matières.

FIG-1

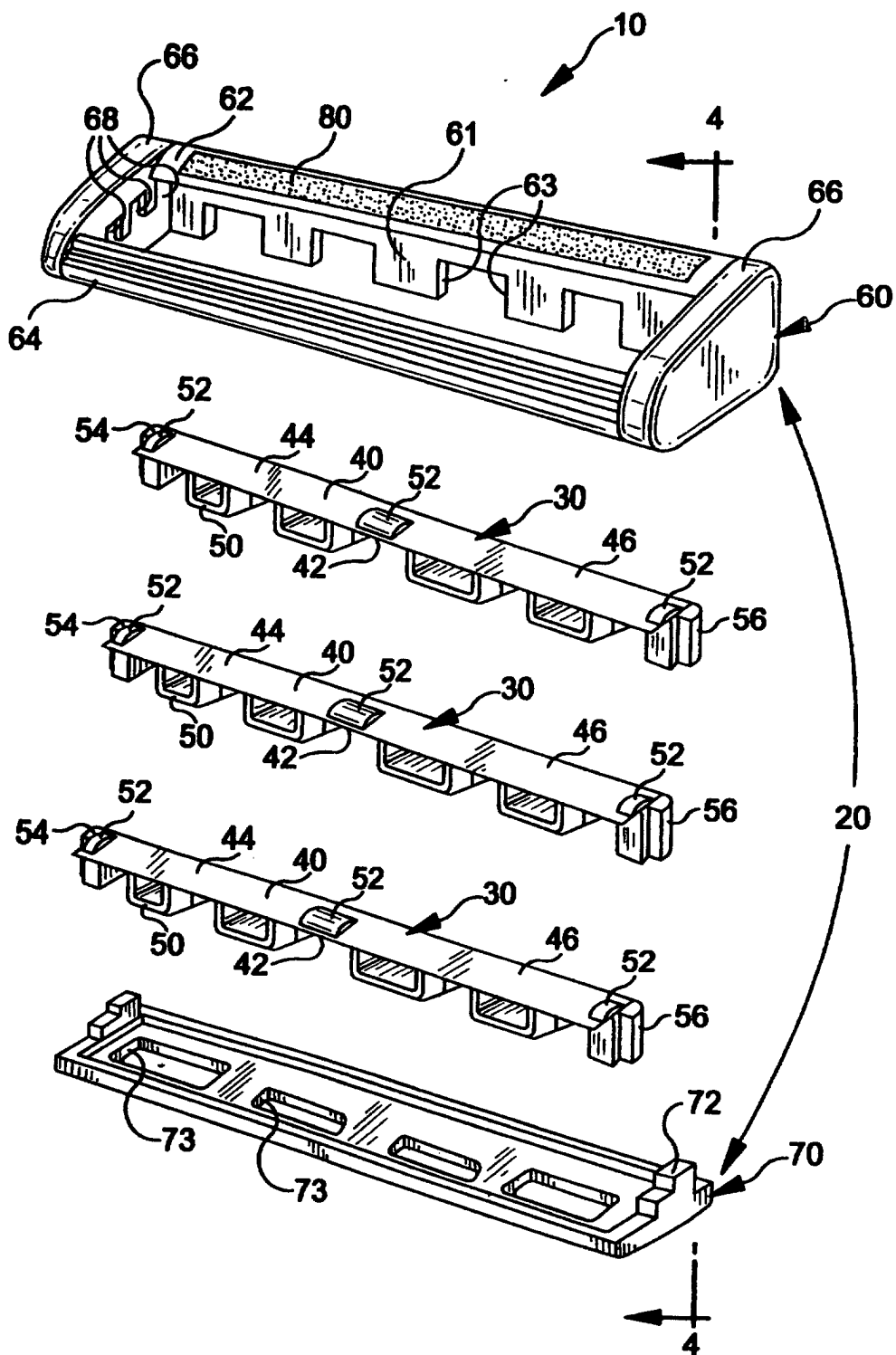


FIG-2

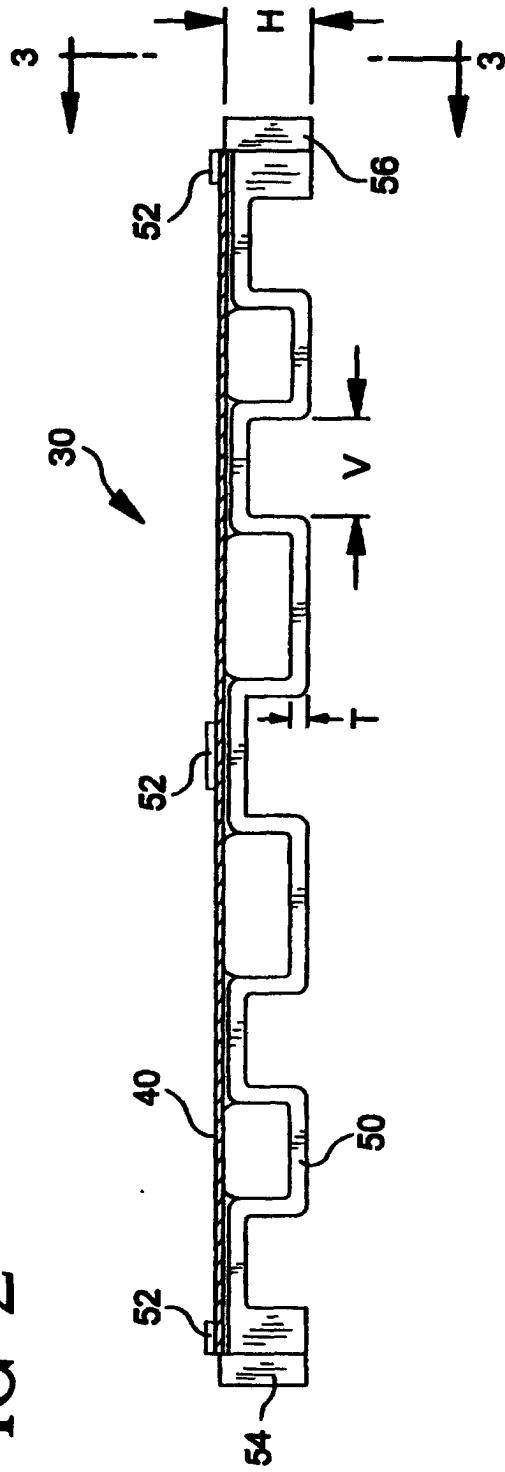


FIG-3

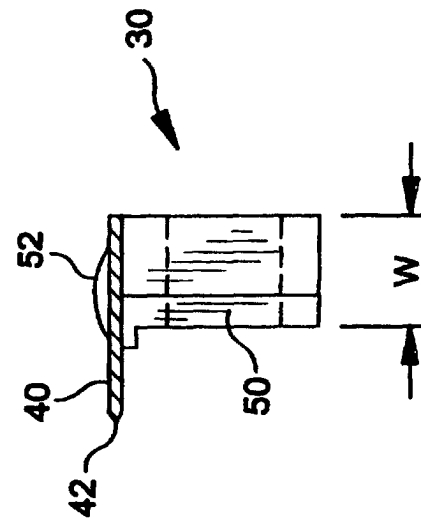


FIG-4

