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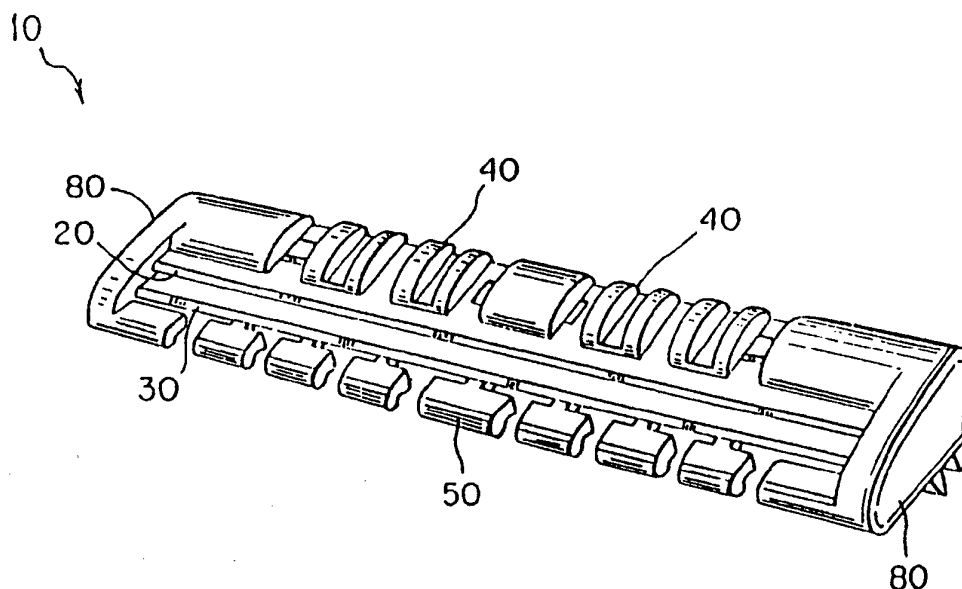
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(54) Title: FLEXIBLE RAZOR HEAD WITH INCREASED RINSEABILITY



(57) Abstract

An integrally formed flexible razor head (10) having a plurality of blade platforms (70) separated by a corrugation (60), at least one blade (20, 30) having a cutting edge, and a plurality of blade retainers (40) which are integrally formed with the blade platforms (70) and extend to positions above and adjacent to the top surface of the blade. While the blade retainers (40) are integrally formed with the other pieces of the flexible razor head (10), each blade retainer (40) is discrete with respect to other blade retainers.

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FLEXIBLE RAZOR HEAD WITH INCREASED RINSEABILITY

The present invention is directed to a flexible razor head and, more particularly, to a one-piece, integrally formed, flexible razor head.

5 BACKGROUND OF THE INVENTION

Razor heads which are flexible along their longitudinal axes have been disclosed in the art. Many of these razor heads require the assembly of several separate pieces such as a cap, a spacer, one or more blades and a
10 blade platform. This assembly process is time consuming and costly. Furthermore, the requirement that these pieces are manipulated, either manually or automatically, is generally considered to place restrictions on the type of materials which may be used in their manufacture. The
15 materials used must be substantially rigid to withstand the assembly process while meeting the specification tolerances necessary to properly join with the other pieces. It would, therefore, be desirable to provide a flexible razor head having integrally formed elements
20 which would therefore eliminate the need for the assembly of a number of elements.

SUMMARY OF THE INVENTION

The present invention overcomes disadvantages of previously disclosed razor heads by providing an
25 integrally formed flexible razor head having a plurality of blade platforms separated by corrugations, at least one blade having a cutting edge, and a plurality of blade retainers which are integrally formed with the blade platforms and extend to positions above and adjacent to
30 the top surface of the upper blade. While the blade retainers are integrally formed with the other pieces of

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the flexible razor head, each blade retainer is discrete with respect to other blade retainers. The integrally formed flexible razor head of the present invention, therefore, does not have a continuous cap member commonly
5 found in commercially available razor heads.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of one embodiment of a flexible razor head of the present invention.

10 Figure 2 is a side view of the razor head shown in Figure 1.

Figure 3 is a top, perspective view of the razor head shown in Figure 1.

Figure 4 is a front view of the razor head shown in Figure 1.

15 Figure 5 is a rear view of the razor head shown in Figure 1.

Figure 6 is a bottom, perspective view of the razor head shown in Figure 1.

20 Figure 7 is a top view of a bottom blade of the razor head illustrated in Figure 1.

Figure 8 is a top view of an upper blade of the razor head shown in Figure 1.

Figure 9 is a sectional view taken along lines 9-9 of Figure 3.

25 Figure 10 is a cross-sectional view taken along lines 10-10 of Figure 3.

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Figure 11 is a cross-sectional view along line 11-11 of Figure 4.

Figure 12 is a cross-sectional view of the upper portion of one embodiment of the razor head of the present invention illustrating a shaving aid receptacle.

Figure 13 is a cross-sectional view illustrating the positioning of a shaving aid according to one embodiment of the present invention.

Figure 14 is a sectional view with portions removed illustrating the positioning of a shaving aid on a blade retainer according the one embodiment of the present invention.

Figure 15 is a perspective view of another embodiment of a flexible razor head of the present invention in which a shaving aid has been incorporated on the cap surface.

Figure 16 is a top plan view of the embodiment shown in Figure 15.

Figure 17 is a front elevation view of the embodiment shown in Figure 15.

Figure 18 is a rear elevation view of the embodiment shown in Figure 15.

Figure 19 is a perspective view of yet another embodiment of a flexible razor head in accordance with the present invention.

Figure 20 is a cross-section taken along lines 20-20 of the embodiment shown in Figure 19.

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Figure 21 is an enlarged detail of the cross-sectional view shown in Figure 20.

DETAILED DESCRIPTION

The present invention comprises an integrally-molded, flexible razor head wherein all elements, except the blade or blades, are formed as a single piece. The integral formation of the present flexible razor head eliminates the time consuming and costly assembly steps necessary in the manufacture of flexible razor heads formed of separate pieces. As described in further detail below, the flexible razor head of the present invention also provides controlled shaving geometry without the use of a continuous cap found in most commercially available razor heads. As used herein, the term "razor head" is meant to include cartridges which are manufactured and typically marketed separate from razors, as well as disposable razors which are formed with a handle and do not require the attachment of separate pieces by the consumer.

Figure 1 illustrates one preferred embodiment of the present invention wherein the flexible razor head 10 comprises an upper blade 20, a lower blade 30, a plurality of discrete retaining members 40, guard members 50, and side supports 80. Figure 2 is a side view of the flexible razor head illustrated in Figure 1 showing the side portion of side supports 80, as well as a side view of attachment neck 90.

The spacing between the discrete retaining members 40 is shown in Figure 3, which is a top view of the embodiment of the present invention illustrated in Figure 1. This top view also provides a clearer view of the relative positioning of cutting edges 21, 31 of upper blade 20 and lower blade 30, respectively. Blade retainers 40 overlap upper blade 20, preferably extending

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at least about 50% and most preferably about 70% to about 90% of the distance from the rear edge of upper blade 20 to cutting edge 21. The retainer members 40 which are integrally formed with blade platform 70 and spacer 100 (Fig. 10) thereby maintain the vertical positioning of the blades.

According to one preferred embodiment illustrated in Figures 1 to 10, blade retainers 40 are discretely formed without connections and therefore do not form a single, unitary cap member found in many commercially available razor heads. As illustrated in Figure 3, the two end blade retainers 40 are connected to respective side supports 80 via molded connecting member 83. Connecting members 83 are designed to minimize the risk of exposure of either or both of the blades if the razor head 10 is misused by a person applying an outward, lateral force to side supports 80.

As shown in the illustrated embodiment, side supports 80 comprise upper side retainers 81 and lower guard portions 82. Upper side portions 81 are located above and adjacent to the upper blade 20 to retain the upper blade against the spacers 100 and also to control the blade geometry along the side portions of the flexible razor head 10. Those skilled in the art will also appreciate that lower guard portions 82 cover the forward corners of lower blade 30 while also serving as a guard member to control the blade geometry. Referring to Fig. 10, the bottom of lower blade 30 can be seen supported by a plurality of blade platforms 70 which are integrally formed with corrugations 60. Each platform 70 preferably has a substantially planar upper portion 76 adjacent to lower blade 30.

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As shown in Figures 9 and 10, a spacer 100 is preferably provided between upper blade 20 and lower blade 30 proximate each retaining member 40. The spacer 100 is preferably positioned substantially centrally with respect to the width of the corresponding blade retainer 40 and blade platform 70. Those skilled in the art will appreciate that the ability to flush shaving debris from the space between the blades is enhanced by designing each spacer 100 to have a width less than the corresponding widths of blade spacer 40 and blade platform 70. Spacer 100 maintains a predetermined space, for example about .02 inches, between lower blade 30 and upper blade 20. As shown more clearly in Figure 11, spacer 100 is integrally formed with blade retainer 40.

In order to increase the flexibility of the blade support, flexible razor head 10 is provided with corrugations 60 between adjoining blade platforms 70. The corrugations are integrally formed with retainer members 40. The positioning of corrugations 60 on both sides of a blade platform 70 is shown in Figure 10 which is a cross-sectional view along lines 10-10 of Figure 3. Corrugations 60 may be formed in a generally U-shape with a rounded lower portion or may be formed with two vertical side portions and a lower horizontal segment connecting the vertical side walls. Other shapes are possible without departing from the scope of the present invention. Corrugations 60 allow relative movement between neighboring blade platforms 70 during the flexing of flexible razor head 10. The use of discrete blade platforms 70 connected by a corrugation 60 minimize the potential for separation between the upper supporting surface of blade platform 70 and the bottom of lower blade 30. In this manner, the correct blade geometry is maintained at each point along the flexible razor head 10 even during flexing which occurs during shaving.

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As used herein, the term "corrugation" is meant to include a resilient connector disposed between adjoining blade platforms and having a length greater than the "normal" distance between those adjoining blade platforms, i.e. the gap existing when the flexible razor head is in a substantially linear configuration and is not subject to external forces such as those encountered during shaving. The corrugations of the present invention are longer than the "normal" distance and are preferably at least about 20% longer than the normal distance. Furthermore, the corrugations may be formed with sidewalls having sections with different thicknesses in order to further increase the flexibility of the blade support.

A guard support 55 depends downwardly and forwardly from each blade platform 70 in the illustrated preferred embodiment. As illustrated more clearly in the bottom view of Figure 6, each guard support 55 extends from a rearward position between corrugations 60 to a position forward of cutting edge 31 to support guard members 50. Those skilled in the art will appreciate that discrete guard members 50 provide a function similar to a continuous guard bar in providing a suitable blade geometry to the flexible shaving head 10 of the present invention, while providing greater flexibility than a conventional continuous guard bar formed of the same materials.

Figures 7 and 8 illustrate an upper blade 20 and a lower blade 30, respectively, used in the illustrated embodiment of the present invention. Both upper blade 20 and lower blade 30 comprise a forward cutting edge 21, 31 and side positioning slots 23, 33 and 24, 34. As illustrated, left side slots 23, 33 may be formed with a shape different from right side slots 24, 34 in order to ensure proper positioning within a mold cavity. Each blade is also preferably provided with a generally

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centrally located hole 25, 35. As illustrated in Figure 3, a securing member 105, which is integrally formed with central blade retainer 40 and central blade platform 70, passes through both of these centrally located holes 25, 35. In the illustrated preferred embodiment of the present invention, these central holes 25, 35 are the only positions where a securing member passes entirely through both blades.

Those skilled in the art will appreciate that the flexibility of the razor head of the present invention would be impeded if upper blade 20 was affixed to lower blade 30 along its entire longitudinal length. This is due to the fact that as the razor head 10 flexes, points on upper blade 20 will have a tendency to move laterally relative to points on lower blade 30. If lateral shifting is not permitted, flexing is impeded and the blades will not flex evenly thereby distorting the blade geometry. Therefore, in accordance with the illustrated embodiment of the present invention, lower blade 30 is secured at mid-holes 36, 37 to a number of discrete blade platforms 70 which are movable relative to each other as explained above. The mid-holes 36, 37 of lower blade 30 receive securing members during the formation of the flexible razor head 10. Since upper blade 20 has no holes at these positions, the upper blade 20 does not receive these securing members. Consequently, the shifting of upper blade 20 relative to lower blade 30 is not impeded at these positions. Additionally, in a manner described in further detail below, left position hole 38 also receives some thermoplastic material which also may tend to fasten lower blade 30 to a corresponding blade platform 70. In contrast, upper blade 20 receives thermoplastic material through oblong, right positioning hole 29 but not at left positioning hole 28.

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Razor head 10 is preferably formed by injection molding by first placing lower blade 30 into a mold with locating pins extending from the bottom of the mold cavity through positioning holes 38 and 39. A mold cavity spacer
5 is then positioned on top of bottom blade 30 and upper blade 20 is then positioned on the same positioning pins which extend through positioning holes 28, 29. The placement of the blades 20, 30 on the pins is facilitated by providing each blade with one oblong positioning hole
10 as illustrated. Those skilled in the art will appreciate that the mold member positioned between the blades is designed to prevent the flow of thermoplastic material where such material is not ultimately desired.

The mold is then closed and a thermoplastic material,
15 such as polypropylene, is injected into the mold cavity to form flexible razor head 10. Those skilled in the art will appreciate that other material may be used in the preferred molding process of the present invention such as polyethylene. Polypropylene has been found to be
20 desirable since it allows the desired amount of flexibility and cost effective manufacturing while providing adequate support for the blades and sufficient rigidity to maintain the desired blade geometry. Polypropylene also provides a low mold temperature
25 relative to other materials known in the art for the formation of razor heads. This low mold temperature is desirable if a shaving aid is to be added to the flexible razor head in a sequential molding process.

A flexible razor head of the present invention is
30 adapted to be supported by a razor mechanism (illustrated partially in phantom in Fig. 9) having outwardly biased attachment members. The illustrated flexible razor head 10 is shown in Figure 6 as having an attachment slot 110 defined by outer sidewalls 115 and 120, inner wall 135,
35 outer wall 140, and slot cover plates 150 and 160 having

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inner edges 151 and 161, respectively. Inner wall 135 has an inner wall slot 180 defined by inner side walls 125 and 130. The slot cover plates 150 and 160 cover the outer ends of the slot 110 but, as shown in Figure 6, leave a
5 portion of the inner end of slot 110 and the entire central region of slot 110 uncovered for the passage of an attachment member of a razor. The outwardly biased arms are advantageously designed to maintain the razor cartridge in a substantially linear configuration in the
10 absence of shaving forces.

As best illustrated in Figure 9, inner side walls 125 and 130 may be extended downwardly together forming an attachment neck 90. Attachment neck 90 is designed to provide a greater bearing surface for a razor attachment
15 member (shown in phantom) thereby reducing the potential for flexible razor head to rock when attached to a razor mechanism.

A flexible razor head of the present invention may also be designed to receive one or more additional
20 elements such as a shaving aid in a subsequent molding or assembly step. For example, during the molding of a flexible razor head according to the present invention, a blade retainer may be formed with depressions designed to receive a shaving aid. The completed flexible razor head
25 could then be subjected to a supplemental molding step wherein a shaving aid is sequentially molded into the recesses in the blade retainers.

In accordance with the another preferred embodiment illustrated in Figures 12 to 14, one or more of the blade
30 retainers 140 is initially molded with a receptacle 142 having flexible sidewalls 143. The initially molded flexible razor head is then subjected to a subsequent molding step wherein side walls 143 are first bent downwardly into receptacle 142 and then a shaving aid is

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injected into receptacle 142. Figures 13 and 14 illustrate the final positioning of the shaving aid 145 on blade retainers 140. The cut away view of Figure 14 illustrates the positioning of sidewall 143 below the shaving aid 145 in the final flexible razor head of this embodiment.

Exemplary materials constituting the shaving aid may comprise one or various combinations of the following:

a. A lubricating agent for reducing the frictional forces between the razor head 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 of about 100,000 to about 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 whiskers and skin debris to be washed more easily from the razor parts during shaving, e.g., a silicone 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.

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

As has been mentioned hereinabove, the configuration of the shaving aid, its place of application to the razor cartridge, the manner of attachment and/or other means and method of incorporation may vary widely to fit particular requirements.

An alternative embodiment of the present invention, i.e., razor head 10,' is illustrated in Figs. 15-18. Like razor head 10, razor head 10' is a one piece continuous thermoplastic body in which the blades are secured substantially rigidly against movement and vibration during shaving. As is known in the shaving industry, the design and positioning of the cap portion and guard bar of the razor head with respect to the cap and seat blades create what is commonly referred to as a "shave geometry." A proper shave geometry is an important factor in ensuring a comfortable and a smooth shave.

The embodiment depicted in Figure 15 shows the addition of a skin flow control rail 200 and a shaving aid 210 which includes corrugations 211 to permit flexing during shaving. Razor head 10' has also been insert molded so that the guard members 50' are interconnected and continuous with skin flow control rail 200.

As shown in Fig. 18, razor head 10' is also provided with flow-through rinse slots 220. Shaving debris tends to accumulate between the cap and seat blades during shaving. This debris, which can detract from the effectiveness of the razor unit, is often difficult to remove by rinsing alone. This difficulty in removing the shaving debris which becomes lodged between the blades often forces the user to have to "tap" the razor head against the sink, counter, etc. to clear the blades.

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Razor head 10' addresses this concern by incorporating rinse slots 220 in the back surface of the head. The slots are positioned between the blades such that a flow of water directed into the slots from the rear of the razor unit will dislodge any shaving debris trapped between the blades.

Another embodiment of the present invention is illustrated in Figs. 19-21. Referring to Figs. 20 and 21, razor unit 10" is molded so that both the cap blade and the seat blade are supported equally by plastic. In particular, the amount of unsupported seat blade (i.e., length X_1) is substantially equal to the amount of unsupported cap blade (i.e., length X_2). Phantom lines A, B, and C depict the additional continuous body sections a, b, and c which distinguish this preferred embodiment.

These minute body modifications provide unique cooperative support characteristics over the basic invention illustrated best for comparison in Figures 9 and 11. The additional body segments a, b and c are also continuous with the remainder of the shaving head.

Body segments a, b and c perform basically two functions. First, the additional body segments equalize length X_1 and length X_2 so that the vibration cycle of the blades will begin substantially simultaneously when an impact force is exerted on the blades. In other words, the blades are synchronized and will vibrate together, thereby ensuring that the span between the blades remains substantially constant during shaving. Second, the additional plastic increases the rigidity of the blades, which, in turn, decrease the amplitude of any vibration in the blade. Ideally, the amplitude of any vibration in the blades should be maintained as low as possible to ensure that the razor head is providing the user with a comfortable and close shave. Both of these features

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enhance the ability to maintain shave geometry over the entire length of the shaving unit during shaving.

Though the present invention has been illustrated utilizing two blades, those skilled in the art will
5 appreciate that the advantages of the present invention may also be achieved using a single blade razor head.

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WHAT IS CLAIMED IS:

1. A razor head comprising:
 - a) at least one flexible blade having a forward cutting edge, a rear edge, two side edges, and an upper, and a lower surface; and
 - 5 b) a flexible blade support with a continuous single piece thermoplastic body having formed therein
 - i) at least one blade platform formed integrally and continuously with said single piece thermoplastic body, said platform supporting said lower
 - 10 surface of said at least one blade,
 - ii) at least one blade retainer integrally formed and continuous with said single piece thermoplastic body for securing said blade cooperatively between said platform and said retainer, and
 - 15 iii) edge guards integrally formed and continuous with said single piece thermoplastic body, said guard substantially covering corners formed at the intersections of said edges whereby a user of said razor head is protected from said corners during shaving.
2. The razor head of Claim 1 wherein said at least one platform and said at least one retainer are substantially aligned.
3. The razor head of Claim 1 wherein there are at least two blade platforms and a corrugation adjoining said platforms, said corrugation integrally formed and continuous with said single piece thermoplastic body.
4. The razor head of Claim 3 wherein there are seven said blade platforms with said corrugations adjoining them.

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5. The razor head of Claim 4 wherein there are seven discrete blade retainers for cooperative securement of said at least one blade.

6. The razor head of Claim 1 which further comprises a plurality of guard members disposed forwardly of said cutting edge, said guard members integrally formed and continuous with said single piece thermoplastic body
5 and disposed forwardly of said cutting edge to provide a desired shave geometry.

7. The razor head of Claim 6 which further comprises a skin flow control rail which extends across and between said guard members, said control rail integrally formed and continuous with said single piece
5 thermoplastic body.

8. The razor head of Claim 1 which further comprises means for attaching said razor head to a razor handle, said attaching means integrally formed and continuous with said single piece thermoplastic body.

9. The razor head of Claim 8 wherein said attaching means comprises two slots integrally formed in the bottom of said blade support and adapted to receive an outwardly biased attachment member of a razor handle.

10. The razor head of Claim 9 wherein said attaching means comprises an attachment neck which extends lower than said guard supports, and is integrally formed and continuous with said single piece thermoplastic body.

11. The razor head of Claim 1 wherein said thermoplastic body comprises polypropylene.

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12. A twin blade razor head comprising:

a) a flexible cap blade having a forward cutting edge, a rear edge, two side edges, an upper, and a lower surface;

5 b) a flexible seat blade having a forward cutting edge, a rear edge, two side edges, an upper, and a lower surface; and

 c) a flexible blade support with a continuous single piece thermoplastic body having a front and a rear
10 and having formed therein

 i) at least one blade platform supporting said lower surface of said seat blade,

 ii) at least one spacer integrally formed and continuous with said single piece thermoplastic body
15 securing said seat blade therebetween and for supporting said cap blade thereon,

 iii) at least one blade retainer integrally formed and continuous with said single piece thermoplastic body for securing said cap blade between said retainer and
20 said spacer at a distance and spatial location to form a desired shaving geometry, and

 iv) edge guards integrally formed and continuous with said single piece thermoplastic body, said
25 guards substantially covering corners formed at the intersections of said edges whereby a user of said razor head is protected from said corners during shaving.

13. The razor head of Claim 12 wherein said at least one platform, said at least one spacer, and said at least one retainer are substantially aligned to secure said blades in said desired shave geometry.

14. The razor head of Claim 12 wherein there are at least two blade platforms and a corrugation adjoining said platforms, said corrugation integrally formed and continuous with said single piece thermoplastic body.

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15. The razor head of Claim 14 wherein there are three said blade platforms with said corrugations adjoining them.

16. The razor head of Claim 15 wherein there are three discrete blade retainers and three discrete spacers which are substantially aligned for cooperative securement of said blades in a blade geometry.

17. The razor head of Claim 12 which further comprises a plurality of guard members disposed forwardly of said cutting edge, said guard members integrally formed and continuous with said single piece thermoplastic body.

18. The razor head of Claim 17 which further comprises a skin flow control rail which extends across and between said guard members, said control rail integrally formed and continuous with said single piece thermoplastic body.

19. The razor head of Claim 12 wherein said seat blade comprises a seat blade securing opening, said cap blade comprises a cap blade securing opening substantially aligned with and above said seat securing opening, and said razor head further comprising a securing member extending through said seat blade securing opening and said cap blade securing opening and integrally formed and continuous with said single piece thermoplastic body.

20. The razor head of Claim 19 wherein said seat blade securing opening is substantially centrally located in said seat blade.

21. The razor head of Claim 12 wherein said seat blade is directly affixed to a plurality of said blade platforms.

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22. The razor head of Claim 12 wherein said seat blade comprises a first opening and a second opening, said first opening larger than said second opening.

23. The razor head of Claim 22 wherein said seat blade is attached to one of said platform members with a securing member extending through said first opening.

24. The razor head of Claim 12 further comprising means for attaching said flexible razor head to a razor handle, said attaching means integrally formed and continuous with said single piece thermoplastic body.

25. The razor head according to Claim 23 wherein said attaching means comprises two slots integrally formed in the bottom of said blade support and adapted to receive an outwardly biased attachment member of said razor
5 handle.

26. A flexible razor head according to Claim 23 wherein said attaching means comprises an attachment neck extending below said guard supports, said attachment neck integrally formed and continuous with said one piece
5 thermoplastic body.

27. The razor head of Claim 12 wherein said one piece thermoplastic body is polypropylene.

28. The razor head of Claim 12 which further comprises body segments added to said platforms, said spacer, and said retainer in incremental amounts sufficient to provide substantially equal unsecured body
5 portions of seat blade and cap blade, said body segments integrally formed and continuous with said single piece thermoplastic body.

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29. The razor head of Claim 12 which further comprises rinse slots formed in the rear of said razor head whereby fluid can be directed through said razor head to remove shaving debris and soap.

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FIG. 1

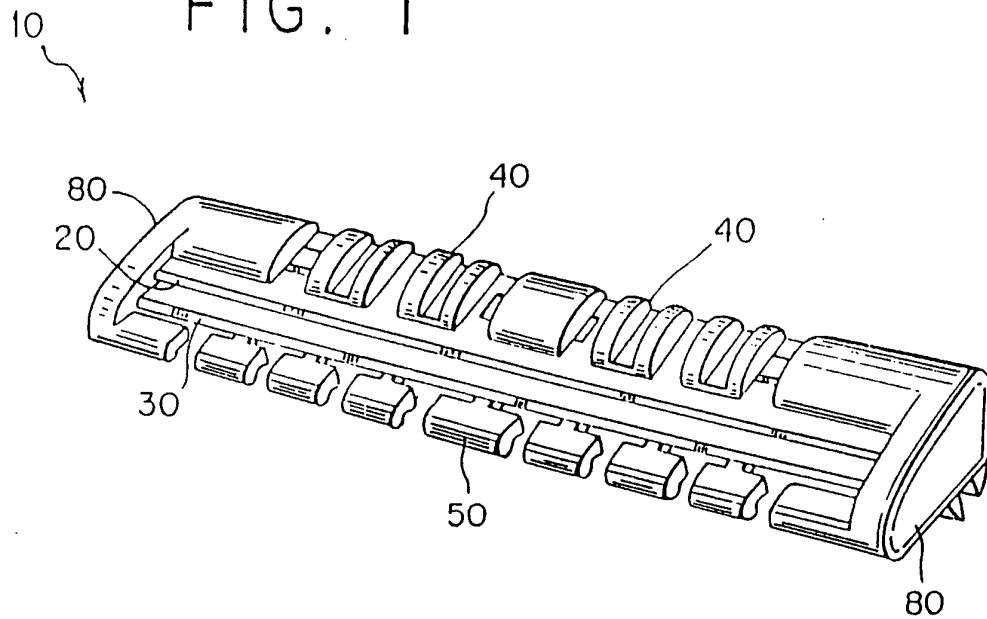
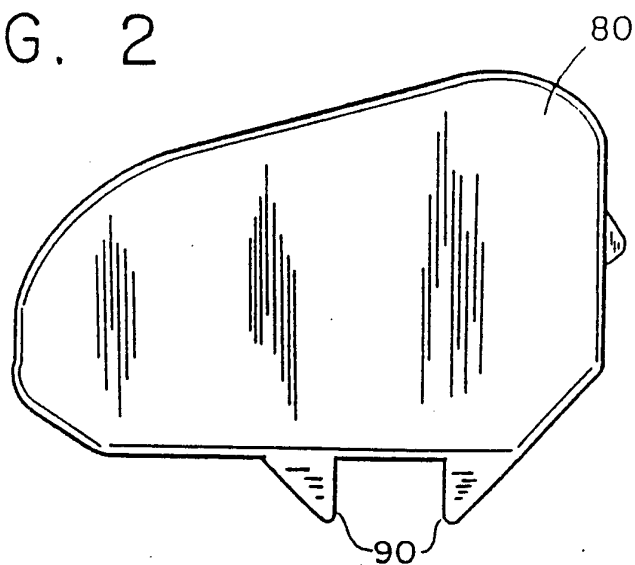
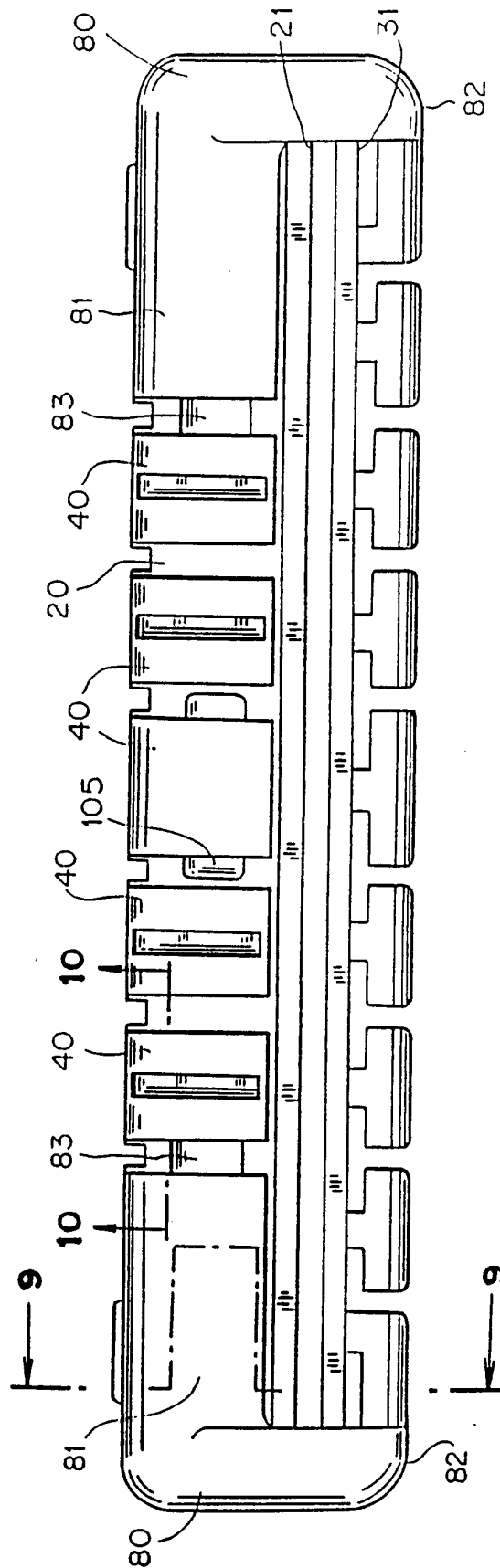


FIG. 2



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FIG. 3



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FIG. 13

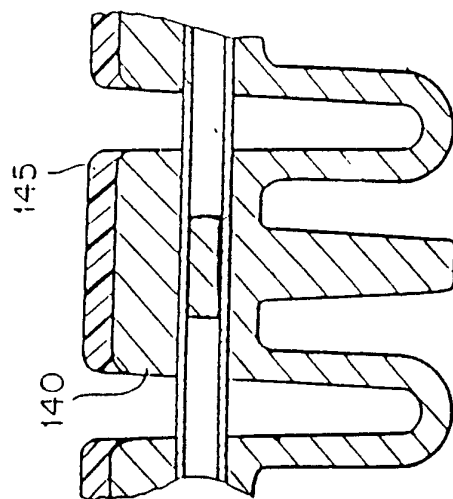


FIG. 4

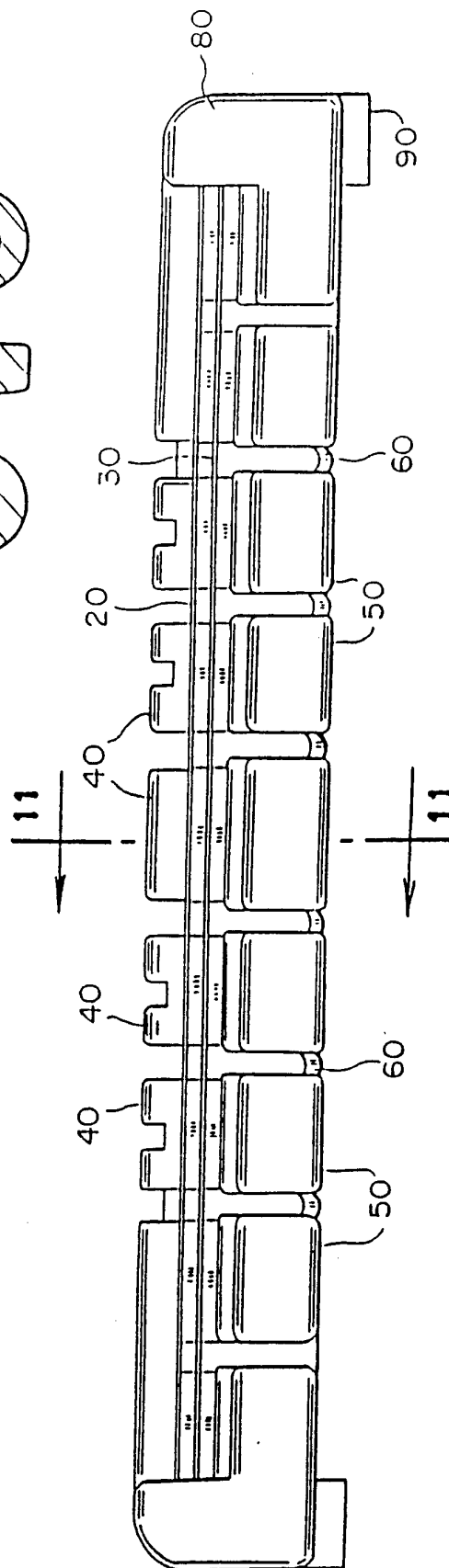


FIG. 12

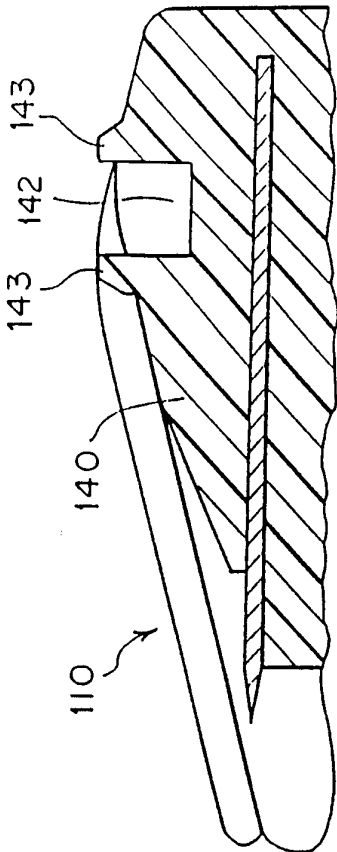
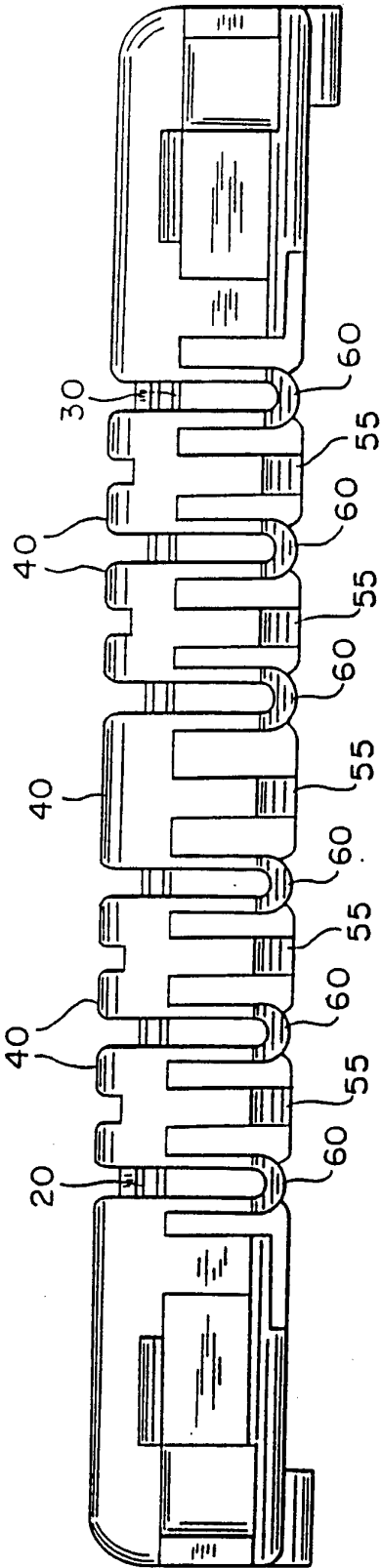
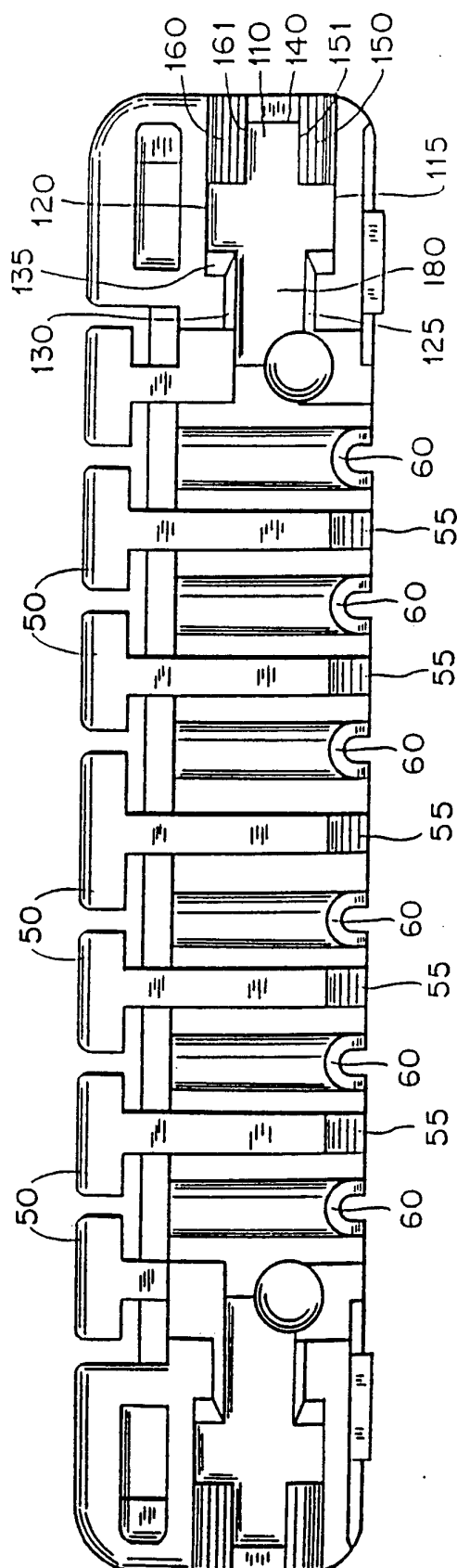


FIG. 5



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FIG. 6



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FIG. 8

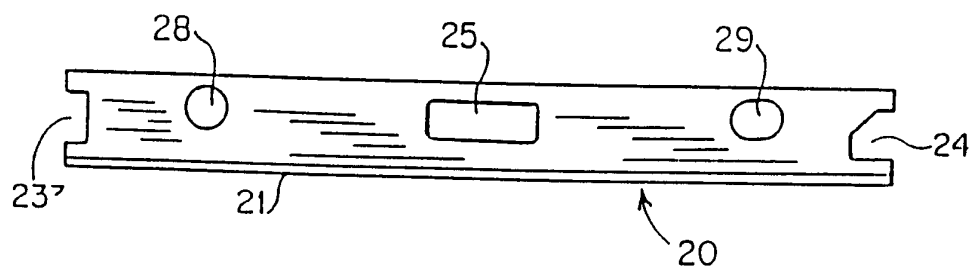


FIG. 7

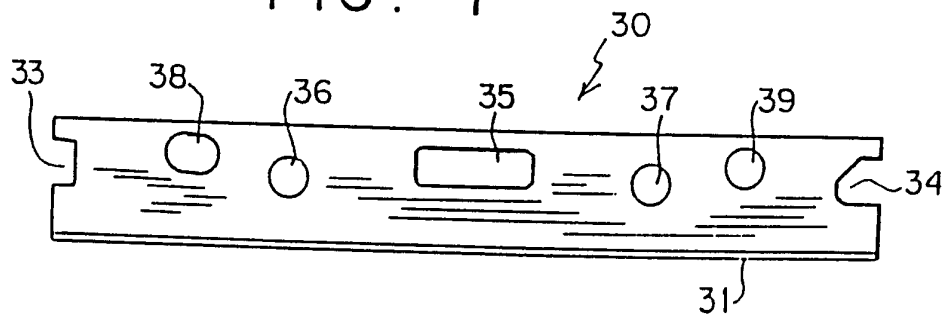
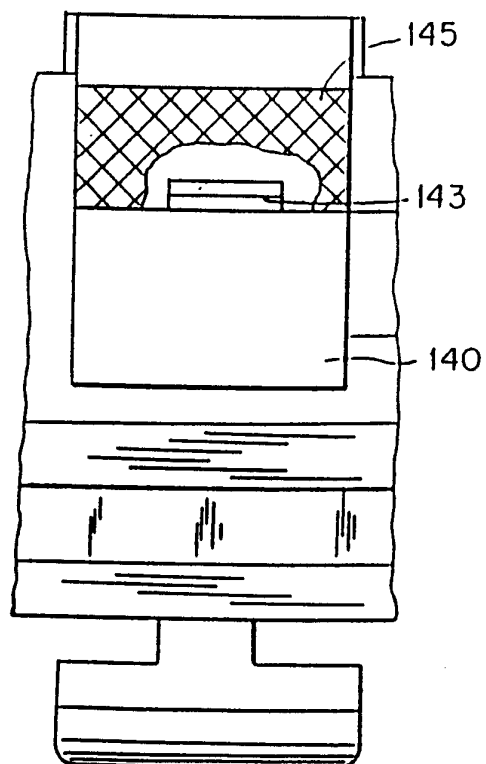


FIG. 14



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FIG. 9

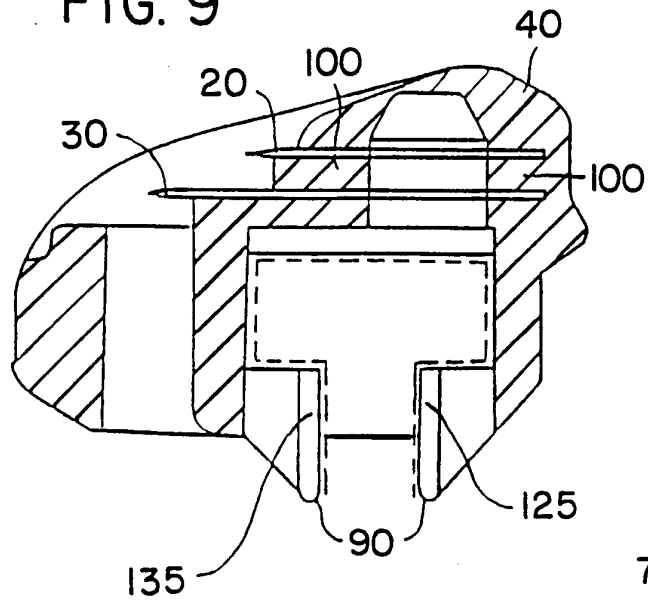


FIG. 10

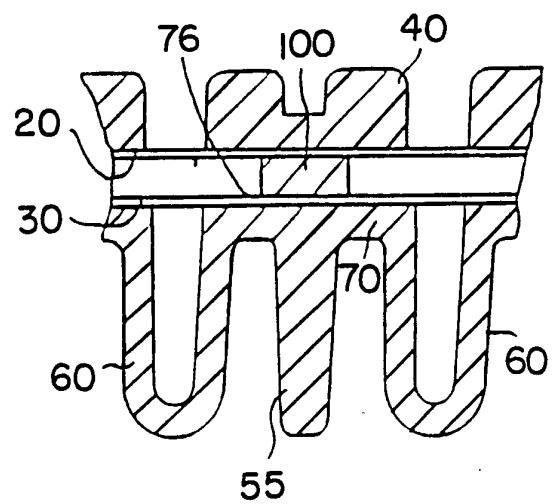
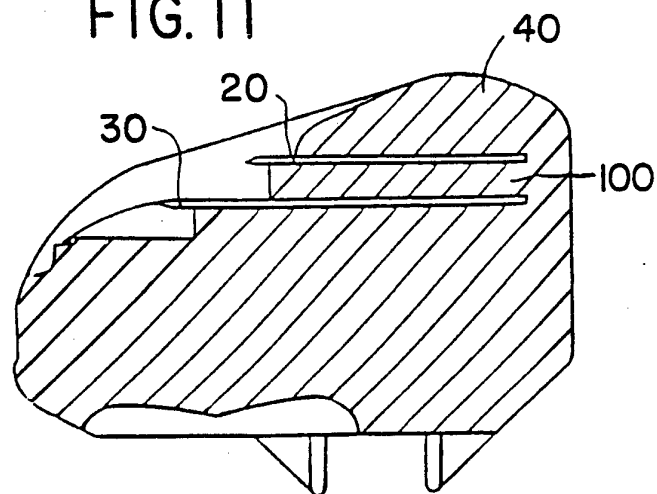


FIG. 11



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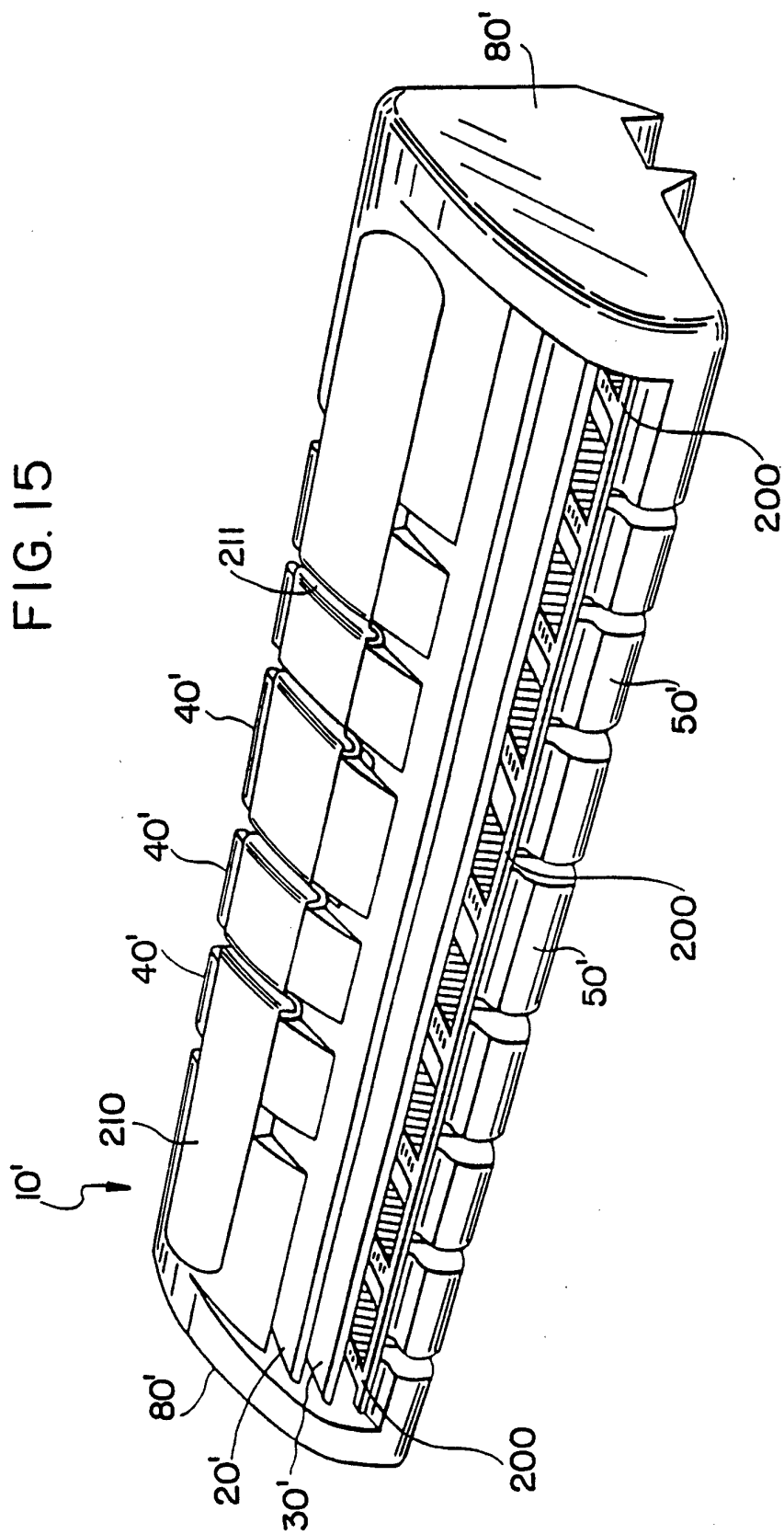


FIG. 17

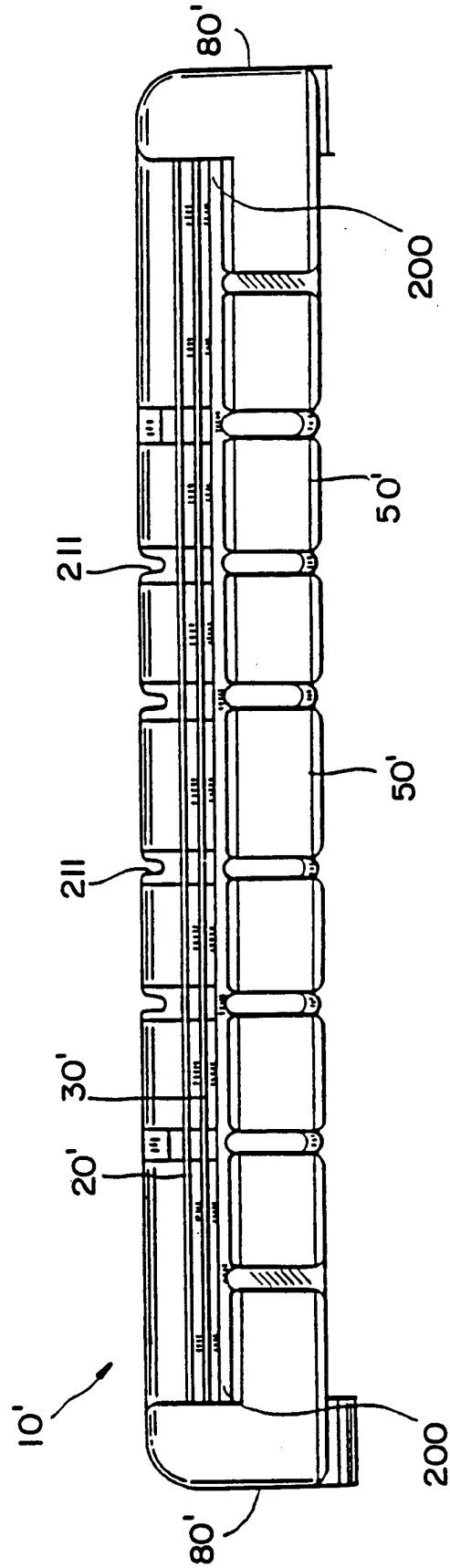
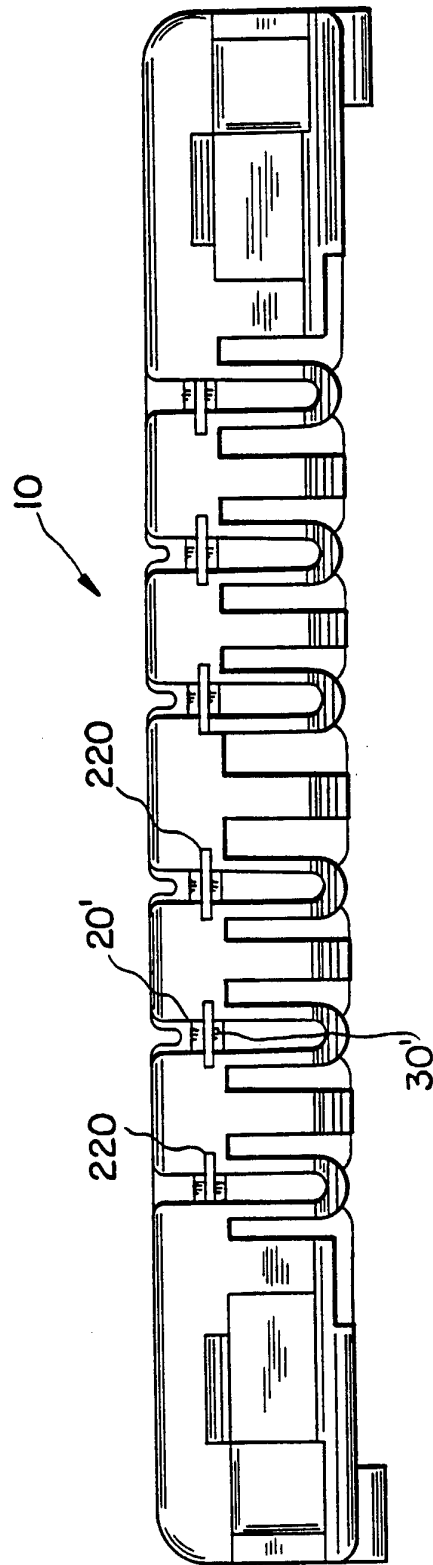


FIG. 18



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FIG. 19

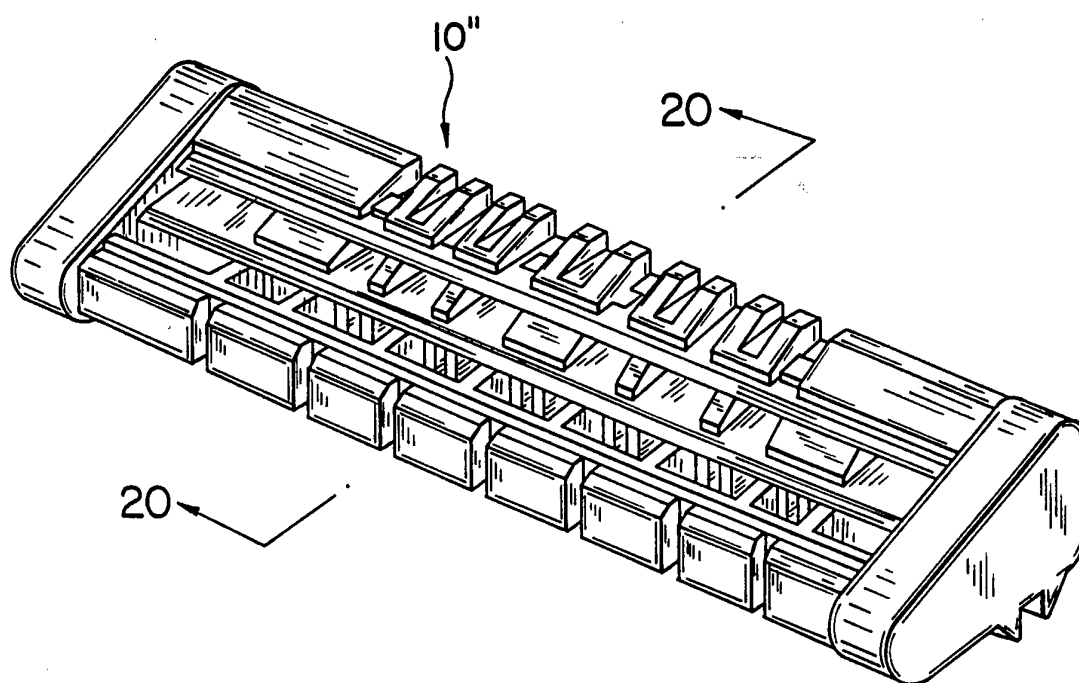


FIG. 20

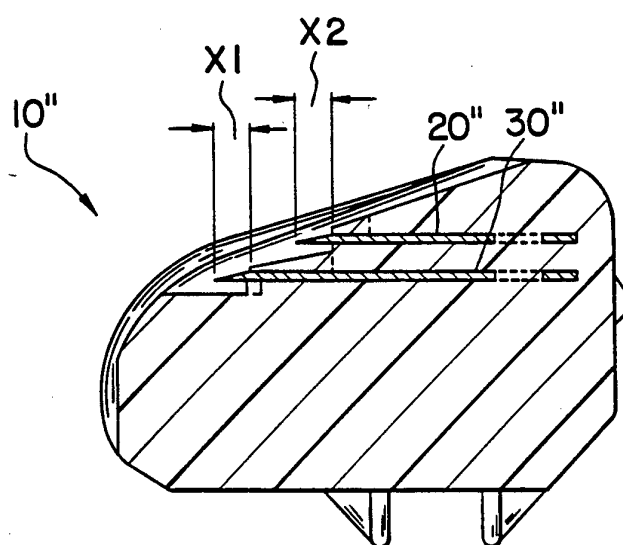
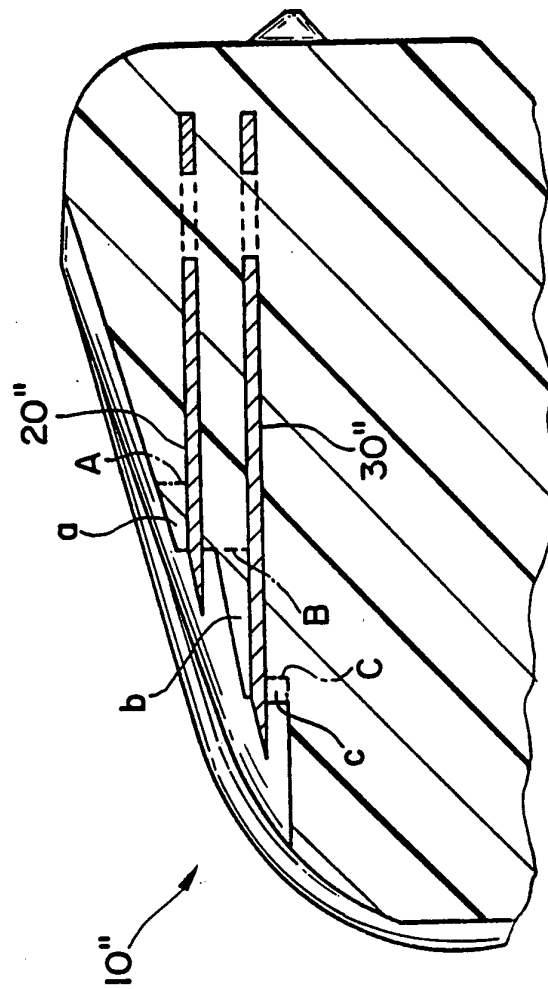


FIG. 21



INTERNATIONAL SEARCH REPORT

Int. Application No

PCT/US 93/07641

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 6 B26B21/40 B26B21/44

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B26B

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP,A,0 470 720 (WARNER-LAMBERT COMPANY) 12 February 1992	1-6, 8-17, 19-27
Y	see the whole document ---	7,18,29
Y	WO,A,92 20499 (WARNER-LAMBERT COMPANY) 26 November 1992 see page 2, line 35 - page 5; figures ---	7,18
Y	EP,A,0 462 807 (WARNER-LAMBERT COMPANY) 27 December 1991 see figures 3,8,10,11 see column 12, line 33 - line 49 see column 15, line 11 - column 16, line 9 --- -/--	29



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

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Date of the actual completion of the international search

20 April 1994

Date of mailing of the international search report

24. 05. 94

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DE,U,92 10 044 (WILKINSON SWORD GMBH) 19 November 1992 see page 6, last paragraph - page 8, paragraph 1; figures 1-4 -----	28

INTERNATIONAL SEARCH REPORT

information on patent family members

Int. Application No

PCT/US 93/07641

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		CN-A- 1058742	19-02-92
		JP-A- 4240471	27-08-92
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