(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 020 816**
**A1**

# (12) EUROPEAN PATENT APPLICATION

(21) Application number: **79105156.8**

(22) Date of filing: **13.12.79**

(51) Int. Cl.³: **B 26 B 21/52**

(30) Priority: **19.06.79 US 49919**
**19.06.79 US 49920**
**19.06.79 US 49923**

(43) Date of publication of application: **07.01.81**
**Bulletin 81/1**

(84) Designated Contracting States: **DE GB NL**

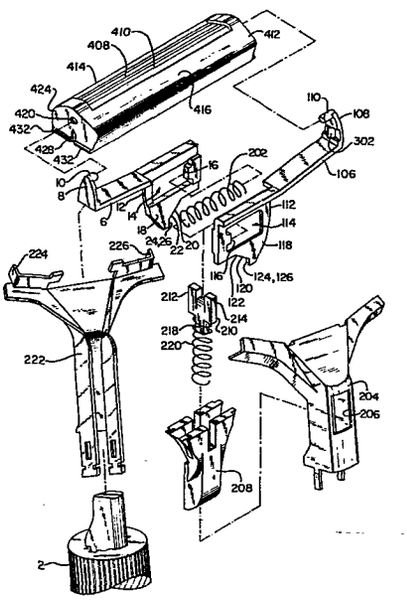
(71) Applicant: **The Gillette Company, Prudential Tower Building, Boston, Massachusetts 02199 (US)**

(72) Inventor: **Jacobson, Chester F., 10 Pinecone lane, Southboro, Massachussetts (US)**

(74) Representative: **Baillie, Iain Cameron et al, c/o Ladas, Parry, von Gehr. Goldsmith & Deschamps Blumenstrasse 48, D-8000 München 2 (DE)**

## (54) Shaving razor assembly.

(57) A razor blade unit and handle therefor, said razor blade unit being mountable on spaced arms (16,106) of the handle for pivotal movement about an axis extending parallel to the cutting edge of a blade. Cam structure (428) is provided at the ends (424, 426) of the blade unit and is engageable by cooperating cam elements (300, 302) on the arms of the handle to bias the pivotally mounted blade unit toward a neutral position.




EP 0 020 816 A1

0020816

# RAZOR BLADE ASSEMBLY

This invention relates to wet shaving systems and is directed more particularly to a razor blade assembly and a razor handle for receiving the blade assembly to facilitate movement of said blade assembly during a shaving operation.

In U.S. Patent No. 4,026,016 and U.S. Patent No. 4,083,104 there is shown and described a razor blade assembly adapted to be pivotally mounted on a razor handle which facilitates movement of the blade assembly on the handle during a shaving operation. The blade assembly is provided on its underside with a cam means including two intersecting surfaces forming a cavity for receiving a biasing force from a spring biased plunger extending from the razor handle. The interaction of the plunger and cam means yieldingly urges the blade assembly to a "neutral" position.

While the cam means and plunger arrangement are entirely satisfactory from a shaving viewpoint, the force exerted on the blade assembly by the plunger operates, upon release of the blade assembly, to urge the shaving unit outwardly from the handle, in some instances causing an outward movement of the blade assembly from the handle. It is preferable, from a safety standpoint to effect release of the blade assembly without outward projection thereof from the razor handle.

It is therefore an object of the invention to provide a razor blade unit having a housing with cam means thereon for receiving biasing means disposed on arms of a

razor handle to which the blade unit is connected, the cam means and biasing means being cooperatively operable to yieldingly urge the blade unit to a "neutral" position and being adapted to facilitate release of the blade unit from the handle without outward projection of the blade unit from the handle.

It is a further object of the invention to provide a razor handle for accommodating such blade unit and to release same without ejecting the blade unit from the handle.

According to the present invention there is provided a razor blade unit incorporating a housing, at least one blade permanently fixed to said housing, said housing having pivotal mounting means arranged to cooperate with complimentary pivotal mounting means of a razor handle and defining an axis for pivotal movement of said blade unit, characterized in that a cam structure is provided on said housing at one end thereof to engage a biasing member on the razor handle to urge said blade toward a neutral position.

According to a further aspect of the invention there is provided for use with such a razor blade unit a razor handle having first and second arms spaced to receive a blade unit therebetween, first and second pivotal mountings provided respectively on said first and second arms and arranged to engage complimentary pivotal mountings provided one at each end of said blade unit pivotally to retain said blade unit between said arms, characterized in that a cam element is provided on at least one of said arms to engage cooperating cam structure on the blade unit pivotally to urge said blade unit toward a neutral position.

The above and other features of the invention, including various novel details of construction and combinations of parts, will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular device embodying the invention is shown by way of illustration only and not as a limitation of the invention. The principles

and features of this invention may be employed in various and numerous embodiments without departing from the scope of the invention.

Reference is made to the accompanying drawings in which is shown an illustrative embodiment of the invention from which its novel features and advantages will be apparent.

In the drawings:

Fig. 1 is a perspective view of one form of razor blade assembly illustrative of an embodiment of the invention, shown in a perspective exploded view of a razor handle adapted for use in conjunction with the blade assembly;

Fig. 2 is a rear elevational view, partly broken away, the blade assembly shown mounted on the razor handle;

Fig. 3 is similar to Fig. 2, but showing the blade assembly released from the handle;

Fig. 4 is a sectional view of the handle and blade assembly taken along line IV-IV of Fig. 2;

Fig. 5 is a sectional view of the handle taken along line V-V of Fig. 3; and

Fig. 6 is a top plan view partly broken away, of the illustrative blade assembly.

Referring to the drawings, it will be seen that the razor includes a grip portion 2 and a head portion 4. The head portion 4 includes a first arm 6 having an upstanding end portion 8. A first journal 10 is fixed to the first arm end portion 8. Affixed to the first arm 6 is a first frame member 12 having an opening 14 therein. A first protrusion 16 extends inwardly of the opening 14 from a side of the first frame member 12. Extending downwardly from a bottom portion of the first frame member 12, as viewed in the drawings, is a first extension 18 having an inclined edge 20 forming a first cam surface 22, and an edge surface 24 defining a first channel wall 26, which will be further described below.

The head portion 4 further includes a second arm 106 having an upstanding end portion 108. A second journal 110 is fixed to the second arm end portion 108. Affixed to

the second arm 106 is a second frame member 112 having an opening 114 therein, the opening 114 being generally in alignment with the first opening 14. A second protrusion 116 extends inwardly of the opening 114 from a side of the second frame member 112, the second protrusion 116 being generally opposed to the first protrusion 16. Extending downwardly from a bottom portion of the second frame member 112, as viewed in the drawings, is a second extension 118 having an inclined edge 120 forming a second cam surface 122, and an edge surface 124 defining a second channel wall 126, the first and second channel walls 26, 126 defining a channel 200 therebetween, the channel 200 leading to an intersection of the opposed first and second cam surfaces 22, 122.

A coil spring 202 is disposed in the openings 14, 114, fitted over the protrusions 16, 116. The spring 202 operates to urge the frame members 12, 112 to stay in substantial alignment with each other and biases the frame members 12, 112 toward the position shown in Fig. 2.

The head portion 4 includes a first housing member 204 having an opening 206 therein. Extending through the opening 206 is a push button 208 in which is mounted a bifurcated actuator 210 having upstanding lugs 212, 214 defining a recess 216 therebetween. The actuator 210 includes a stem portion 218 about which there is disposed a coil spring 220. The actuator 210 engages the opposed first and second cam surfaces 22, 122 by way of the channel 200, the lug 212 being on one side of the extensions 18, 118 and the lug 214 being on the other. The coil spring 220 maintains the actuator 210 in engagement with the cam surfaces 22, 122.

The head portion 4 further includes a second housing member 222, which along with the first housing member 204, enclose the above described mechanism. The second housing member 222 includes a pair of upstanding detents 224, 226 which are disposed proximate to the arm end portions 8, 108, respectively. The upstanding detents 224, 226

are operative to prevent accidental endwise movement of the shaving unit which might cause separation of the journals and inadvertant release of the shaving unit. This is apparent from Figure 2 of the drawings which clearly shows the upstanding detent 226 in a position to abut a wall 426 of the shaving unit and prevent further leftwards movement of said shaving unit.

In operation, the journals 10, 110 must be moved outwardly from each other to accept a shaving unit therebetween. The shaving unit (described hereinbelow) is provided with journal bearings which accept the journals 10, 110 for pivotally mounting the shaving unit on the razor. To separate the journals 10, 110 an operator depresses the push button 208, urging the actuator forcefully against the cam surfaces 22, 122, causing the frame members 12, 112 to slide in opposite directions along the axis of the coil spring 202, compressing the spring 202. The arm end portions are then positioned to bring the journals 10, 110 into register with the aforementioned journal bearings. Upon release of the button 208, the coil spring 202 causes the frame members 12, 112 to snap back into alignment and the opposed journals 10, 110 to move along their axes toward one another to engage the shaving unit.

To release the shaving unit, the operation is repeated, the journals 10, 110 being thereby caused to move outwardly along their aligned axes to separate from the shaving unit and thereby release the shaving unit from the razor.

Referring again to the drawings, it will be seen that the first and second arm portions 6, 106 are each provided with cam means 300, 302 thereon, the cam means being engageable with complementary cam means on the blade assembly (further described below). The cam means 300, 302 cooperate with the blade assembly cam means to urge the pivotally mounted blade assembly toward a neutral position. In the illustrative example, the cam means 300, 302 each comprise an inwardly-extending protrusion on the upstanding end portion 8, 108 of either arm 6, 106. Each cam includes

a pair of cam surfaces 304, 306 (Fig. 5) intersecting at an apex 308.

Referring particularly to Fig. 4, it will be seen that the illustrative blade assembly includes a frame portion 402 including blade support portions 404, 406 to which are attached blade means 408, 410. The frame portion 402 is retained in a housing 412 having a guard portion 414 and a cap portion 416, the blade means 408, 410 being disposed in an opening 418 therebetween.

The blade assembly includes a pair of pivot mounting means preferably journal bearings 420, 422 (Figs. 2 and 3). In the illustrated embodiment, the journal bearings 420, 422 are disposed in end walls 424, 426, respectively, of the housing 412. On each of the end walls, 424, 426, proximate the pertinent journal bearings, there is disposed a recess 428. Referring particularly to Figs. 1 and 6, it will be seen that the recess 428 broadens outwardly from its inwardmost point 430, as viewed in Fig. 6. Each end wall 424, 426 of the housing is provided with a ridge 432. The recess 428 extends through the ridge 432. The edges of the recess 428 converge as the recess extends downwardly from the ridge to the base 434 of the housing end wall 424, 426. Referring to Fig. 6, it will be seen that the recess 428 comprises a cam means and is deepest in the area of the ridge 432 and tapers toward the outer surface of the end wall 424, 426. The taper of the recess toward the crest 436 of the ridge 432 defines cam surfaces 440, 442 adapted to receive the above-described cam members 300, 302 disposed on the first and second arm portions of the razor to which the blade assembly is connected. The pivot mounting means 420, 422 are adapted to accept complementary pivot mounting means on the handle, preferably the journal members 10, 110 disposed on the aforementioned first and second razor arm portions, thereby to facilitate pivotal movement of the blade assembly on the razor during a shaving operation.

The blade assembly preferably comprises a molded plastic or a formed metal and the blade assembly pivot

mounting means 420, 422 and the blade assembly cam means 428 are integrally molded or formed portions of the blade assembly.

In connection of the blade assembly to a razor, the journal bearings 420, 422 receive the journals 10, 110 on the razor and the generally V-shaped recesses 428 receive the cam members 300, 302 on the razor. Each cam member engages the deepest portion of its respective recess. During a shaving operation, pivotal movement of the blade assembly about an axis extending through the bearings 420, 422 causes movement of the recess, such as to bring one or the other of the cam surfaces 440, 442 to bear against the complemental surfaces of the cam members. The cam members seek the deepest portion of the recesses and thereby urge the return of the blade unit to its "neutral" position.

C L A I M S

1. A razor blade unit incorporating a housing, at least one blade permanently fixed to said housing, said housing having pivotal mounting means arranged to cooperate with complimentary pivotal mounting means of a razor handle and defining an axis for pivotal movement of said blade unit, characterized in that a cam structure (428) is provided on said housing (412) at one end (424) thereof to engage a biasing member on the razor handle to urge said blade toward a neutral position.

2. A razor blade unit according to claim 1, characterized in that cam structure (428) is provided at both ends (424,426) of the housing (412).

3. A razor blade unit according to claim 2, characterized in that the cam structure comprises recesses (428) disposed one in each end wall (424,426) of the housing (412).

4. A razor blade unit according to claim 3, characterized in that each recess (428) is defined by intersecting V-shaped cam surfaces (440,442).

5. A razor blade unit according to claim 4, characterized in that an elongated ridge (432) extends along an edge of each housing end wall, and in that each said ridge is interrupted by the respective V-shaped recess (428).

6. For use with a razor blade unit according to claim 1, a razor handle having first and second arms spaced to receive a blade unit therebetween, first and second pivotal mountings provided respectively on said first and second arms and arranged to engage complimentary pivotal mountings provided one at each end of said blade unit pivotally to retain said blade unit between said arms, characterized in that a cam element (300,302) is provided on at least one of said arms (6,106) to engage cooperating cam structure on the blade unit pivotally to urge said blade unit toward a neutral position.

7. A razor handle according to claim 6, characterized in that a first cam element (300) is provided on the first arm (6) and a second cam element (302) is provided on the

second arm (106).

8. A razor handle according to claim 7, characterized in that the cam elements (300,302) are integral with the respective arms (6,106).

9. A razor handle according to claim 7 or 8, characterized in that the first and second cam elements (300,302) face inwardly from the arm ends and are directed toward each other.

10. A razor handle according to any of claims 7 to 9, characterized in that each cam element (300,302) is V-shaped and comprises first and second cam surfaces (304,306) extending inwardly from the handle arm (6,106) to an apex (308).

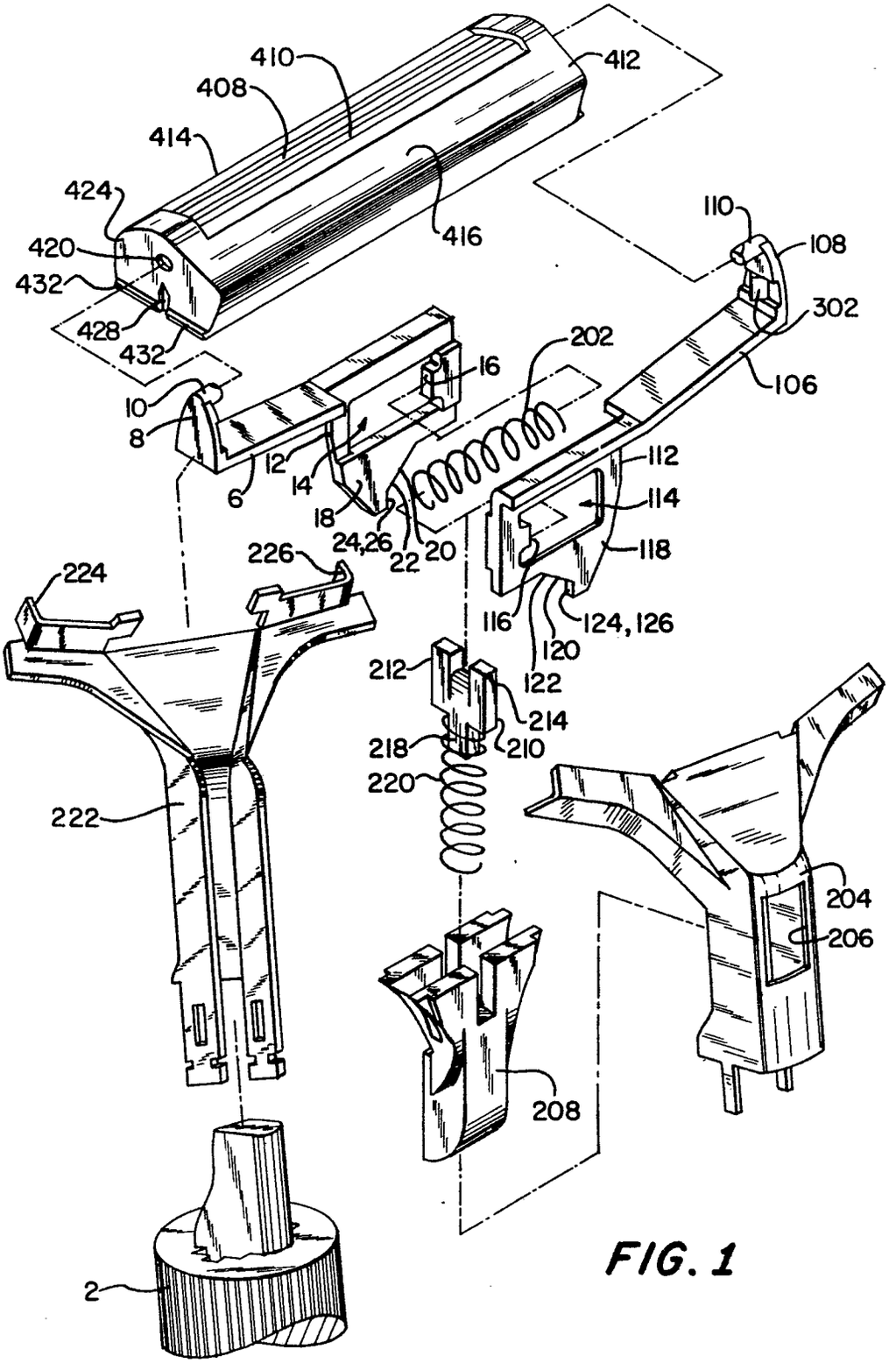

410
412
408
414
424
416
420
432
428
432
110
108
302
106
202
16
10
8
12
14
6
18
24,26
22
20
112
114
118
116
124,126
120
226
224
212
122
214
218
210
220
222
204
206
208
2

FIG. 1

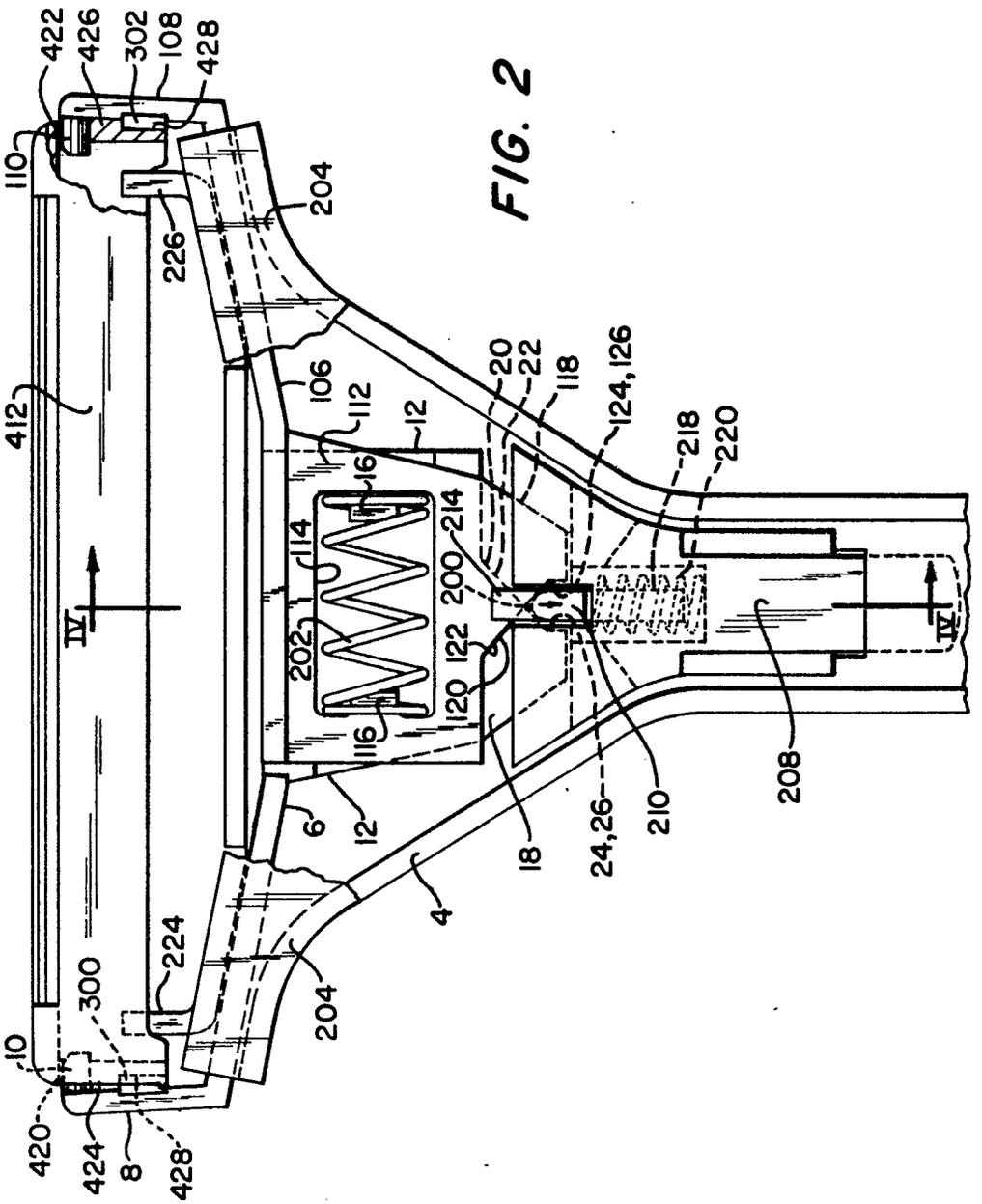

422
426
302
108
428
110
204
226
106
112
12
16
20
22
118
124,126
218
220
412
114
214
200
202
122
120
116
IV
IV
6
12
18
24,26
210
208
4
224
300
204
10
420
424
8
428

FIG. 2

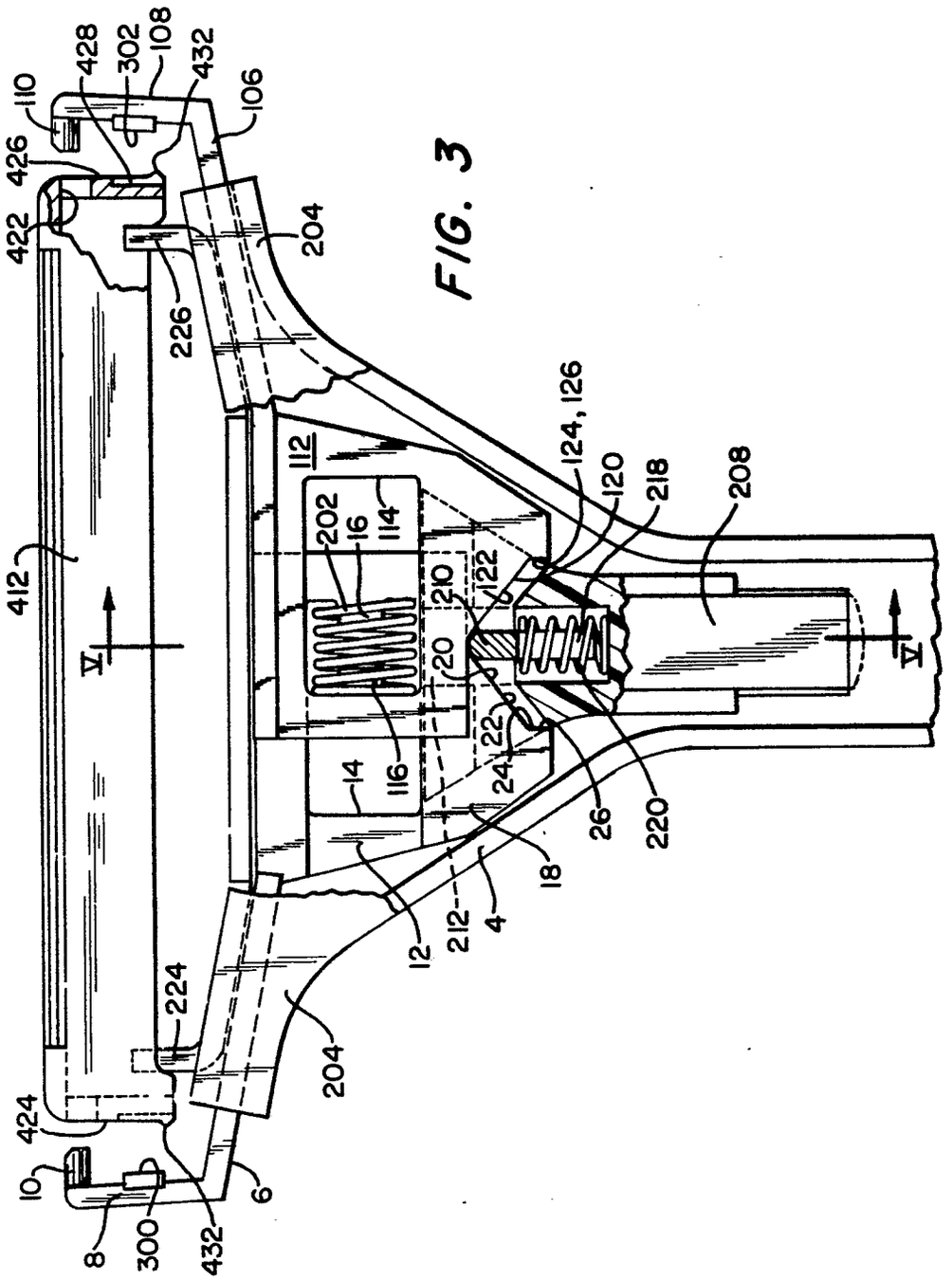

110
428
302
108
432
106
426
422
204
226
124, 126
120
218
208
112
202
16
114
412
V
210
122
20
22
24
14
116
26
220
18
12
212
4
224
204
424
10
6
8
300
432
V

FIG. 3

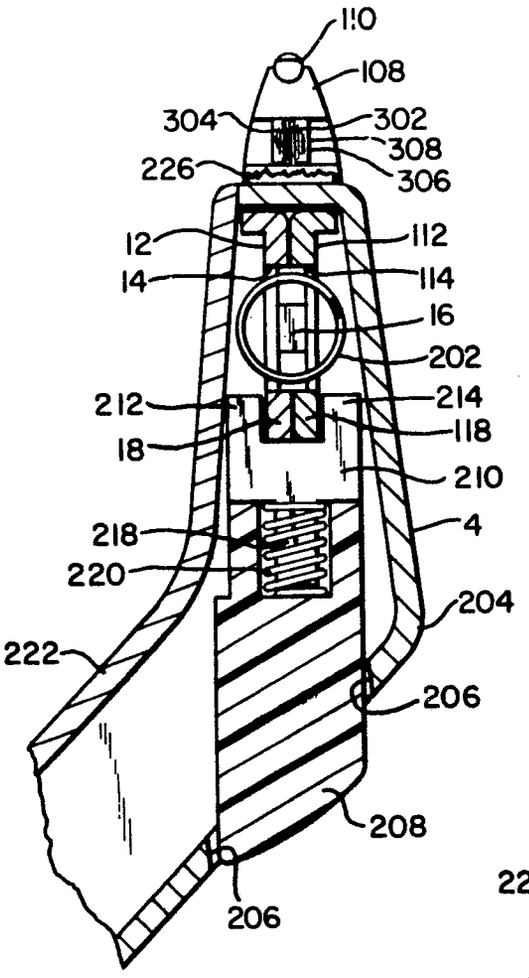



FIG. 5

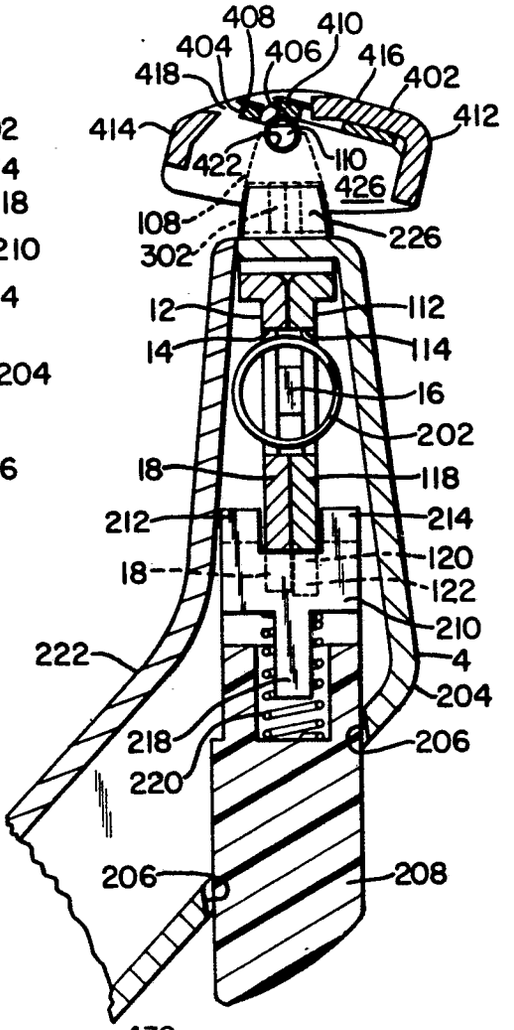



FIG. 4

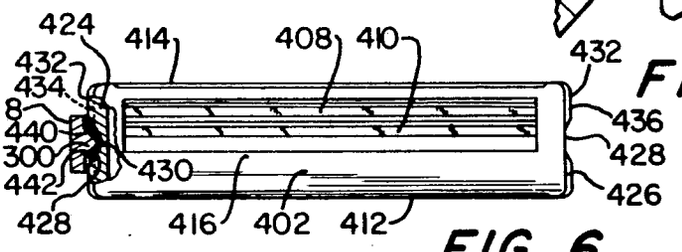



FIG. 6

European Patent Office

# EUROPEAN SEARCH REPORT

Application number
0020816
EP 79 10 5156

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim |
|---|---|---|
| X | US - A - 2 386 536 (BENSEL)<br>* Page 3, left-hand column, lines 7-50; figures 10-15 * | 1,2,4-8,10 |
| | US - A - 3 975 820 (TORANCE)<br>* Column 2; figures 1,2 * | 1,6 |
| D | US - A - 4 083 104 (NISSEN)<br>* Column 5, lines 31-56; figures 8,14 * | 1,6 |

CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)

B 26 B 21/52

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 26 B

CATEGORY OF CITED DOCUMENTS

X: particularly relevant
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: conflicting application
D: document cited in the application
L: citation for other reasons

&: member of the same patent family, corresponding document

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| The Hague | 23-09-1980 | WOHLRAPP |

EPO Form 1503.1 06.78