PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 7 : A45D 26/00 — A1

(11) International Publication Number: WO 00/51460

(43) International Publication Date: 8 September 2000 (08.09.00)

(21) International Application Number: PCT/IL00/00124

(22) International Filing Date: 1 March 2000 (01.03.00)

(30) Priority Data:
128795 2 March 1999 (02.03.99) IL

(71) Applicant *(for all designated States except US)*: ZERO TECH TECHNOLOGY LTD. [IL/IL]; HaBarzel Street 2A, Ramat Hachayal, 69710 Tel Aviv (IL).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: WILDER, Chaim [IL/IL]; Yehuda Halevi 7, 43555 Raanana (IL).

(74) Agent: REINHOLD COHN AND PARTNERS; P.O. Box 4060, 61040 Tel Aviv (IL).

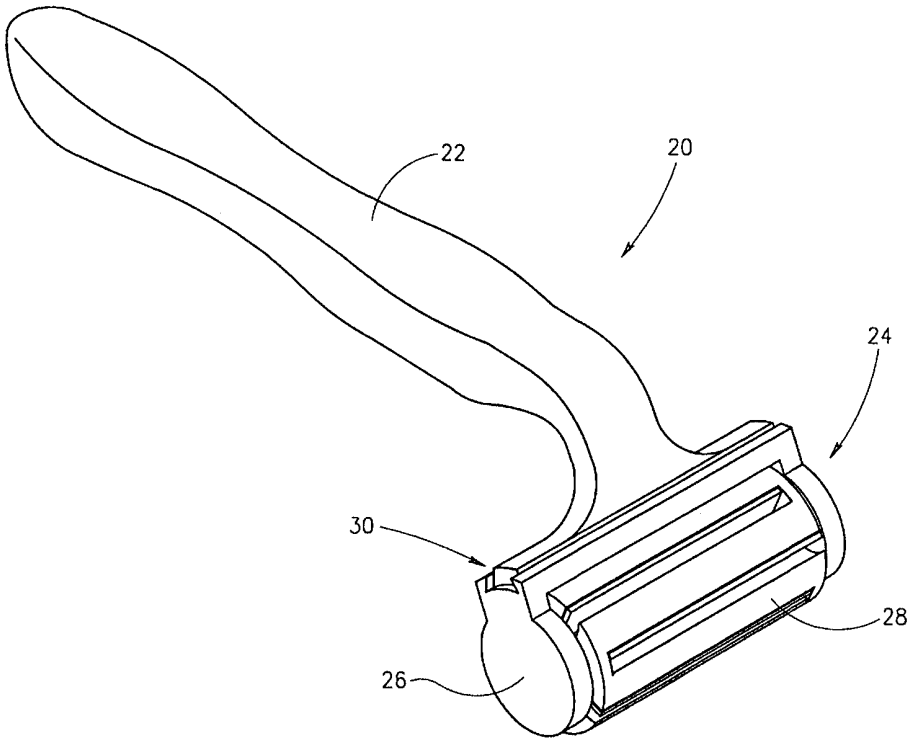
(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.
Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.

(54) Title: DEPILATOR

(57) Abstract

A depilator comprising a cylindrical depilating head (28) revolving about its longitudinal axis (50) and having a circumferential skin-engaging surface (40) extending between two side walls (42, 44) thereof. The head is formed with at least one axial recess (46, 48) extending between the two sides (42, 44), each at least one recess (46, 48) accommodating an elongated hair-plucking member (54) having a peripheral hair clamping portion (58). The plucking member (54) is capable of angular reciprocation about an axial axis (56) parallel to the longitudinal axis (50) and has a duty cycle involving a clamping state in which the clamping portion (58) tightly bears against a peripheral wall portion (64) of a wall of the recess (46, 48), and an open state in which there is a clearance between the clamping portion and the peripheral wall portion. During revolution of the depilating head (28), the plucking member (54) performs at least one reciprocation for each revolution, and it is in an open state while approaching a hair-engaging state where during use it will bear against the skin, and closes to a clamping position prior to moving towards a position where it disengages the skin, and remains close during or portion of the revolution to allow plucking of hair clamped thereby.



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	**ES**	Spain	**LS**	Lesotho	**SI**	Slovenia
AM	Armenia	**FI**	Finland	**LT**	Lithuania	**SK**	Slovakia
AT	Austria	**FR**	France	**LU**	Luxembourg	**SN**	Senegal
AU	Australia	**GA**	Gabon	**LV**	Latvia	**SZ**	Swaziland
AZ	Azerbaijan	**GB**	United Kingdom	**MC**	Monaco	**TD**	Chad
BA	Bosnia and Herzegovina	**GE**	Georgia	**MD**	Republic of Moldova	**TG**	Togo
BB	Barbados	**GH**	Ghana	**MG**	Madagascar	**TJ**	Tajikistan
BE	Belgium	**GN**	Guinea	**MK**	The former Yugoslav Republic of Macedonia	**TM**	Turkmenistan
BF	Burkina Faso	**GR**	Greece			**TR**	Turkey
BG	Bulgaria	**HU**	Hungary	**ML**	Mali	**TT**	Trinidad and Tobago
BJ	Benin	**IE**	Ireland	**MN**	Mongolia	**UA**	Ukraine
BR	Brazil	**IL**	Israel	**MR**	Mauritania	**UG**	Uganda
BY	Belarus	**IS**	Iceland	**MW**	Malawi	**US**	United States of America
CA	Canada	**IT**	Italy	**MX**	Mexico	**UZ**	Uzbekistan
CF	Central African Republic	**JP**	Japan	**NE**	Niger	**VN**	Viet Nam
CG	Congo	**KE**	Kenya	**NL**	Netherlands	**YU**	Yugoslavia
CH	Switzerland	**KG**	Kyrgyzstan	**NO**	Norway	**ZW**	Zimbabwe
CI	Côte d'Ivoire	**KP**	Democratic People's Republic of Korea	**NZ**	New Zealand		
CM	Cameroon			**PL**	Poland		
CN	China	**KR**	Republic of Korea	**PT**	Portugal		
CU	Cuba	**KZ**	Kazakstan	**RO**	Romania		
CZ	Czech Republic	**LC**	Saint Lucia	**RU**	Russian Federation		
DE	Germany	**LI**	Liechtenstein	**SD**	Sudan		
DK	Denmark	**LK**	Sri Lanka	**SE**	Sweden		
EE	Estonia	**LR**	Liberia	**SG**	Singapore		

DEPILATOR

FIELD OF THE INVENTION

The present invention is generally in the field of depilators and provides a depilator with a depilating head of a novel design.

BACKGROUND OF THE INVENTION

A wide variety of depilatory devices in which hair is removed by clamping between plucking members displaceable between open and closed positions whereby the hair is removed by plucking, are known. Such devices are disclosed, for example, in the following U.S. Patents: 2,220,811, 2,900,661, 4,079,741, 4,279,253, 4,726,375, 5,032,126, 5,057,116, 5,116,348 and 5,234,441. Among these patents, U.S. Patent 5,116,348 (Patent now removed) is considered to be of some particular relevance.

This patent discloses a depilating apparatus including a motor rotated disk which includes a plurality of circumferentially spaced entrance slots which open both into an end face and into a cylindrical outer jacket of the depilating member. Each entrance slot includes a clamping element displaceable between an open position and a closed position whereby in the open position hair enters into an entrance slot and in the closed hair becomes clamped against a wall of the slot such that upon rotation of the disk, the clamped hair is plucked and releases as the clamping element displaces again into its open position.

GENERAL DESCRIPTION OF THE INVENTION

The present invention provides a depilator comprising:

a cylindrical depilating head revolving about its longitudinal axis and having a circumferential skin-engaging surface extending between two side walls thereof; the depilating head being formed with at least one axial recess substantially extending between the two sides, each at least one recess accommodating an elongated hair-plucking member having a peripheral hair clamping portion; the plucking member is capable of angular reciprocation about an axial axis parallel to said longitudinal axis and has a duty cycle involving a clamping state in which clamping portion tightly bears against a peripheral wall portion of a wall of the recess, and an open state in which there is a clearance between the clamping portion and said peripheral wall portion; during revolution of the depilating head, the plucking member performs at least one reciprocation for each revolution, and it is in an open state while approaching a hair-engaging state where during use it will bear against the skin, and closes to a clamping position prior to moving towards a position where it disengages the skin, and remains close during a portion of the revolution to allow plucking of hair clamped thereby.

The plucking member has an edge being substantially flush with the skin-engaging surface of the depilating head.

It has been realized that the extent of pain is significantly reduced during a hair plucking procedure if simultaneously while plucking the hair the skin is depressed in an opposite direction and is restrained from being pulled in the direction of the hair plucked. Therefore, in accordance with the present invention, while the plucking head revolves over a portion of the skin the skin remains depressed while the respective hair is being plucked in an opposite direction, eliminating or significantly reducing pain caused to the user thereof.

In accordance with one embodiment of the invention, the revolution of the cylindrical head is manually driven by driving the head over the skin.

In accordance with another embodiment of the invention, the revolution of the head is motor-driven.

In accordance with an embodiment of the invention, particularly where the head's rotation is manually driven, the head forms part of a head assembly which may be disposable and which has an attachment arrangement for attachment to a handle, e.g. a handle of a standard heretofore known manual razor device. In accordance with another embodiment, the plucking head assembly is integrally formed with or is permanently connected to a handle.

The recess in the cylindrical head, has typically generally a V-shaped cross-section, allowing for the angular reciprocation of the plucking member between the clamping phase in which it bears against the wall of the recess, and a fully open phase.

In accordance with an embodiment of the invention, the plucking member has an axle portion situated at an innermost portion of the recess and has a radial portion extending therefrom to its edge. By one particular embodiment, said radial portion is planar. In accordance with this embodiment, the walls of the recesses are typically formed with trough-like indentation extending longitudinally-therealong. In this manner, when said plucking member bears against the peripheral portion, there is defined between it and said trough-like indention a confined space. In use, the hair is clamped, typically at a portion adjacent the skin, between the clamping portion of the plucking member and the peripheral portion of the respective wall, with the free end of the hair extending into said confined space.

In accordance with another embodiment of the invention, the angular reciprocation of the plucking member is by means of a cam-follower mechanism. In accordance with this embodiment, the clamping member is integrally formed with or is connected to a follower assembly comprising a lateral projection, fitted into a cam groove formed in an opposite support wall of the head assembly. During rotation of the cylindrical head, by following a path defined by the groove, the projection induces the angular reciprocation of the plucking member.

Typically, each recess has an opening in at least one side wall through which the follower assembly projects. The other end may have an opening at the

opposite side wall or may be closed. In accordance with a specific embodiment, the follower assembly of consecutive plucking members, projects from opposite side walls into a cam recess formed in corresponding walls of the support assembly.

In accordance with a different embodiment of the present invention, the depilating head may revolve in two directions (or in one direction) whereby it may be displaced up and down along a body surface of an individual, each time changing the direction of revolution, respectively. According to this embodiment, one or more of the at least one recess is formed with two peripheral wall portions, with a clearance formed between the clamping portions of the plucking member and each of said two peripheral wall portions; and wherein the depilating head is adapted for revolving in two directions and the plucking member is reciprocally displaceable between closed position in which it bears against one or another of said two peripheral wall portions, and open positions, respectively, depending on the direction of revolution of the depilating head.

According to one design, the plucking member has an axle portion situated at an innermost portion of the recess and has a radial portion symmetrically extending therefrom.

The recesses of the two peripheral wall portions may be formed either with trough-like indentations extending longitudinally-therealong or, may be formed by inwardly extending tangent extensions extending from a radial most portion of the peripheral wall portions.

Typically, but not exclusively, the plucking head comprises eight recesses, with corresponding eight plucking members.

The invention will now be described with reference to specific, non-limiting embodiments, shown in the annexed drawings:

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a depilator in accordance with a first embodiment of the invention.

Fig. 2A is a perspective view of the cylindrical plucking head of the depilator.

Fig. 2B is a partial cross-section through the plucking member showing a portion with a recess and a plucking member in two different operational states.

Fig. 3 is an exploded view of the depilator of Fig. 1.

Figs. 4A-4C show three different embodiments of plucking members.

Figs. 5-8 show four consecutive operational phases of the plucking head. In each of this figure, Fig. A shows a side elevation of a single recess, a plucking member and its associate follower, together with the cam groove; and Fig B is a cross-section through the plucking head at corresponding operational phases.

Fig. 9 shows another embodiment of a cam-follower arrangement, in an elevational view showing a single recess, a plucking member, its associated follower and the cam groove, illustrating different consecutive operational states, corresponding to the states shown in Figs. 5, 6, 7 and 8, respectively.

Figs. 10A-10F illustrate six consecutive operational phases of the plucking head, in accordance with another embodiment of the invention wherein the depilating head is revolvable in two directions.

Figs. 11A and **11B** illustrate a depilating head in accordance with a preferred embodiment, fitted with friction inserts, wherein **Fig. 11A** is an isometric view and **Fig. 11B** is a section along line XI-XI.

DETAILED DESCRIPTION OF THE INVENTION

Reference is first being made to Fig. 1, showing a depilator generally designated **20** with a handle **22**, a depilating head assembly **24** with a support frame **26** and a revolving depilating head **28**. The handle **22** and the head assembly **24** are removably connected to one another at **30**, by means of a dove-tail engagement. As will be appreciated, this type of engagement is an example only, and a myriad of other engagement means may be used, e.g. all those known in the art of connecting razor blades to handles of standard manual

razors. Alternatively, the support frame **26** and handle **22** may also be integrally formed.

As can better be seen in Fig. 2A, the depilating head **28** is cylindrical with a circumferential skin engaging surface **40** defined between two side walls **42** and **44** and formed with a plurality of longitudinal recesses (8 in this embodiment), which comprises alternating recesses of a first type **46** which have an opening at side wall **42** and of a second set **48** which have an opening at the other side wall **44**. The depilating head **28** has an axle **50**.

Each recess **46** or **48** accommodates a plucking member generally designated **54**, with an axle portion **56** and a radial portion **58** terminating at an edge **60** flush with the outer face **40** of the cylindrical head **28**. As can specifically be seen, for example in Fig. 2A, the axle portion **56** is accommodated within an innermost portion **64** of the recesses **46** and **48**.

However, by a preferred embodiment, in order to eliminate or reduce the risk of tweezing skin, the radii of the plucking member is slightly less (in an order of about 0.1-0.2 mm) than the radii of the skin-engaging surface.

As can further be seen in Fig. 2B, the plucking member **54** can angularly rotate between an open phase, shown by a solid line, and a closed, hair clamping phase, shown by means of dashed lines.

Each of the recesses **46** and **48** has generally a V-like cross-sectional shape with a first wall **64** and a second wall **66** opposite thereto. As can further be seen, wall **64** is formed with a trough-like indention **68** extending longitudinally throughout the lengths of the first wall **64**. Against this, the second wall **66** is essentially radial.

As can best be seen in Fig. 3, each plucking member has a terminal follower assembly **70** with a lateral projecting cylindrical follower **72**, which engages with a cam groove **74** as will be explained below. It should be noted that in Fig. 2, the plucking members of recesses **46** have been removed for sake of illustration.

Fig. 3 shows the depilating head **28**, with the plucking members of recesses **48** being partially slidably removed out of place, in order to illustrate their structure. When assembling, these are fully received within the recess. Fig. 3 further illustrates the structure of support frame **26** and as can be seen, it has two wall portions **78,** each one formed at its inner face with the circumferential cam groove **74** and a bore **80** which rotatably receives axle **50** of the depilating head **28**. The circumferential cam groove **74** receives lateral follower projections **72** of all the plucking members.

Some alternative embodiments of the plucking members are shown in Fig. 4. The plucking member **54** shown in Fig. 4A, which is that in the embodiment of Figs. 2 and 3, is integrally formed with a follower assembly **70** and has a simple, stationary following projections **72**. The plucking member **54′** shown in Fig. 4B, is also integral with the follower assembly **70′**, which has a slightly different structure, and which is formed with a follower roller **84**. Plucking member **54″** shown in Fig. 4C is formed with an independent blade portion **59** and a follower assembly **70″**, which are assembled together.

Figs. 5-8 show different operational phases of the plucking head. The operational phases will be described with reference to a single plucking assembly **100** which comprises a plucking member **102**, accommodated within a recess **104** having a first side wall **106** which has a trough-like indention, and a second, opposite wall **108** which is essentially radial. The plucking member **102** is angularly rotational about an axle portion **110**, as described above, and is integrally formed or connected to the follower assembly with a follower projection **112** which is received within cam groove **114**. In the operational state shown in Figs. 5A and 5B, plucking member **102** is in its fully opened position bearing against wall **108**. The cylindrical depilating head **40** bears against skin **116** and by displacing it in direction of arrow **118**, a rotational movement in the direction of arrow **120** is induced.

In the state shown in Fig. 5A, the plucking assembly **100** is in its fully opened position, whereby hair **122**, projecting from the skin, protrudes into the space formed between the plucking member **102** and wall **106**.

Fig 5B, as well as Figs. 6B, 7B and 8B, show the concurrent state of each of the other plucking members in the depilator head. These views are included for the purpose of illustration and will not be specifically elaborated herein.

While the plucking assembly approaches a position where it comes to lie over the skin, as a result of rotational movement dictated by the structure of the cam groove, the plucking assembly closes with plucking member **102** which has a clamping portion **126** approaches the opposite peripheral wall portion **128**. At the next state, which can be seen in Fig. 7A, the plucking assembly **100** is in a fully closed position, with the peripheral portion **126** of plucking member **102** bearing tightly against the peripheral wall portion **128** thus clamping hair **122** therebetween. In this state, the plucking member **102** and wall **106** defining a confined space **130** accommodating the free end of the hair. The rotational movement causes plucking of the clamped hair as can be seen in Fig. 7A, and after further rotation, the angular displacement guided by follower groove **114** causes the opening of the plucking assembly **100** and release of the plucked hair.

It is noted that during the plucking phase, as the hair is clamped between peripheral portion **126** of plucking member **102** and the peripheral wall portion **128** of the respective recess, the skin portion is depressed by the skin-engaging surface of the depilating head whereby the plucking pain is substantially reduced since the skin is not deformed as in many other depilating arrangements, which deformation is the cause of pain.

Another embodiment of a cam-follower arrangement for angular displacement of a plucking member can be seen in Figs. 9A-9D, in states corresponding to Figs. 5-8, respectively.

Further attention is now directed to Figs. 10A through 10F illustrating a depilating head in accordance with another embodiment. In accordance with this embodiment, the depilating head generally designated **150** is essentially similar to

the depilating head illustrated in previous figures. However, as it can be seen, the depilating head **150** comprises a plurality of longitudinal recesses **154** and **155** which in the present case are radially oriented and symmetrically about a radial axis.

As in the previous embodiment, depilating head **150** is formed with a circumferential skin engaging surface **156** and the recesses are alternating between a first type **154** and a second type **155**, as in the previous embodiment, wherein the first type have an opening at a first side wall and the second type have an opening at the other side wall.

Each of the recesses **154** and **155** has a generally V-like cross-sectional shape symmetrical about the radial axis extending from the longitudinal axis of the depilating head **150**. Each of the recesses **154** and **155** is formed with a first wall **160** and a second wall **162**, each wall being formed with a cut-out portion **164** and **166**, respectively. A plucking member **170** (only one seen for the sake of clarity of illustration) has an axle portion **172** received within a corresponding axle housing **174** of the recess **154** and **155**, and a radial portion **176** terminating at an edge **178**. Axle portion **172** of the plucking member is associated with a follower **177** engaged within a cam groove **180** (see below).

The plucking member **170** is angularly displaceable between a closed, plucking position in which it bears against one of the side walls **160** and **162** and an open state in which it is disengaged from the respective wall.

The arrangement of Fig. 10 is principally similar to the previous embodiments, the significant difference residing in that the plucking head **150** may be rotated in both directions, whereby the plucking member **170** is adapted for bearing against a respective wall **160** or **162**, respectively, depending on the direction of rotation of the plucking head **150**.

The cam portion **180** formed on the side walls of the plucking head may be formed as mirror images of one another whereby rotation of the plucking head in either direction entails displacing all plucking members (those received within grooves **154** and those received within grooves **155**, respectively) against the same

corresponding peripheral wall of the recess. However, in accordance with a different embodiment, rotation of the plucking head in either direction may entail displacement of alternating plucking members against first peripheral walls **160** of the recesses and intermediately alternating plucking members against second peripheral walls **162** of the recesses. This arrangement is possible by forming the cam patches on the side walls of the plucking head in identical position.

In Fig. 10C plucking member **170** is illustrated in a position in which it bears against a first peripheral wall **160**, whilst in Fig. 10F the plucking member **170** pluckingly bears against a second peripheral wall portion **162** of a recess.

Figs. 11A and 11B illustrate a depilating head **200** which is essentially similar to the embodiment illustrated hereinabove with the addition of a plurality of friction inserts **204**, typically made of a rubber material, inserted into the head and slightly extending from the skin-engaging surface **206**. This arrangement increases the friction contact of the depilating head **200** with the skin surface, thus giving rise to a friction based mechanism for imparting the depilating head with rotary motion.

The extent at which the inserts **204** project from the skin-engaging surface **206** is designed so as to prevent tweezing of skin by the plucking member and the walls of the recesses of the depilating head.

In order to increase such an engagement of the depilating head in order to facilitate easier rotation by friction over the skin, at least portions of the skin-engaging portions may be coated or provided with a friction element such as different types of rubber. Such friction elements may be embedded in the skin-engaging portion or may be inserts applied to by any other way as known, *per se*.

It will be obvious to a person versed in the art that rotation of the depilating head in accordance with this embodiment will typically be carried out by friction displacement over the skin of an individual. However, the plucking head may also be rotated by an electric motor as known *per se*.

CLAIMS:

1. A depilator comprising:

a cylindrical depilating head **28** revolving about its longitudinal axis **50** and having a circumferential skin-engaging surface **40** extending between two side walls **42:44** thereof; the head being formed with at least one axial recess **46:48** extending between the two sides **42:44**, each at least one recess **46:48** accommodating an elongated hair-plucking member **54** having a peripheral hair clamping portion **58**; the plucking member **54** is capable of angular reciprocation about an axial axis parallel **56** to said longitudinal axis **50** and has a duty cycle involving a clamping state in which the clamping portion **58** tightly bears against a peripheral wall portion **64** of a wall of the recess **46:48**, and an open state in which there is a clearance between the clamping portion **58** and said peripheral wall portion **64**; during revolution of the depilating head **28**, the plucking member **54** performs at least one reciprocation for each revolution, and it is in an open state while approaching a hair-engaging state where during use it will bear against the skin, and closes to a clamping position prior to moving towards a position where it disengages the skin, and remains close during a portion of the revolution to allow plucking of hair clamped thereby.

2. A depilator according to Claim 1, wherein the plucking member **54** has an edge **60** having a radii slightly shorter than the radii of the skin-engaging surface **40** of the depilating head **28**.

3. A depilator according to Claim 1, wherein the plucking member **54** has an edge **60** being essentially flush with the skin-engaging surface **40** of the depilating head **28**.

4. A depilator according to Claim 1, wherein the revolution of the cylindrical head **28** is manually driven by driving the head over the skin.

5. A depilator according to Claim 1, wherein the revolution of the head is motor-driven.

6. A depilator according to Claim 1, wherein the plucking member **54** has an axle portion **56** situated at an innermost portion **64** of the recess **46:48** and has a radial portion **28** extending therefrom to its edge.

7. A depilator according to Claim 6, wherein said radial portion **58** is planar.

8. A depilator according to Claim 1, wherein at least one wall **66** of said at least one recess **46:48** is typically formed with trought-like indentation extending longitudinally-therealong.

9. A depilator according to Claim 8, wherein the hair is clamped at a portion adjacent the skin, between the clamping portion **58** of the plucking member **54** and the peripheral portion of the wall **42:44**. with the free end of the hair extending into a space defined by said trough-like indention.

10. A depilator according to Claim 1, wherein angular reciprocation of the plucking member **54** is induced by means of a cam-follower mechanism **72:74**.

11. A depilator according to Claim 10, wherein the clamping member **54** is integrally formed with, or is connected to a follower assembly **70** comprising a lateral projection **72**, fitted into a cam groove **74** formed in an opposite support wall **78** of the head assembly **24**.

12. A depilator according to Claim 11, wherein the follower assembly **70** of consecutive plucking members **54**, projects from opposite side walls **42:44** into a cam recess **74** formed in corresponding walls **78** of the head assembly **24**.

13. A depilator according to Claim 1, wherein one or more of the at least one recess **154:155** is formed with two peripheral wall portions **160:162**, with a clearance **164:166** formed between the clamping portions of the plucking member **170** and each of said two peripheral wall portions; and wherein the depilating head is adapted for revolving in two directions and the plucking member is reciprocally displaceable between closed position in which it bears against one or another of said two peripheral wall portions **160;162**, and open positions, respectively, depending on the direction of revolution of the depilating head.

14. A depilator according to Claim 13, wherein the plucking member has essentially a T-like shape thus constituting the clearance between the clamping portions of the clamping member and each of said two peripheral wall portions.

15. A depilator according to Claim 13, wherein the clearance between the clamping portions of the plucking member and each of said two peripheral wall portions is established by grooves or indentions **164:166** formed in the walls of the recesses.

16. A depilator according to Claim 13, wherein the plucking member **170** has an axle portion **172** situated at an innermost portion of the recess **154:155** and has a radial portion **176** symmetrically extending therefrom.

17. A depilator according to Claim 1, wherein at least portions of the skin-engaging surface **40** comprises friction inducing portions for inducing friction with the skin as the depilating head revolves over the skin.

18. A depilator according to Claim 17, wherein the friction inducing portions are internal with or attached to the skin-engaging surface **40**.

19. A depilator according to Claim 1, wherein during the plucking position the skin is depressed by respective skin-engaging surface **40** of the depilating head **28**.

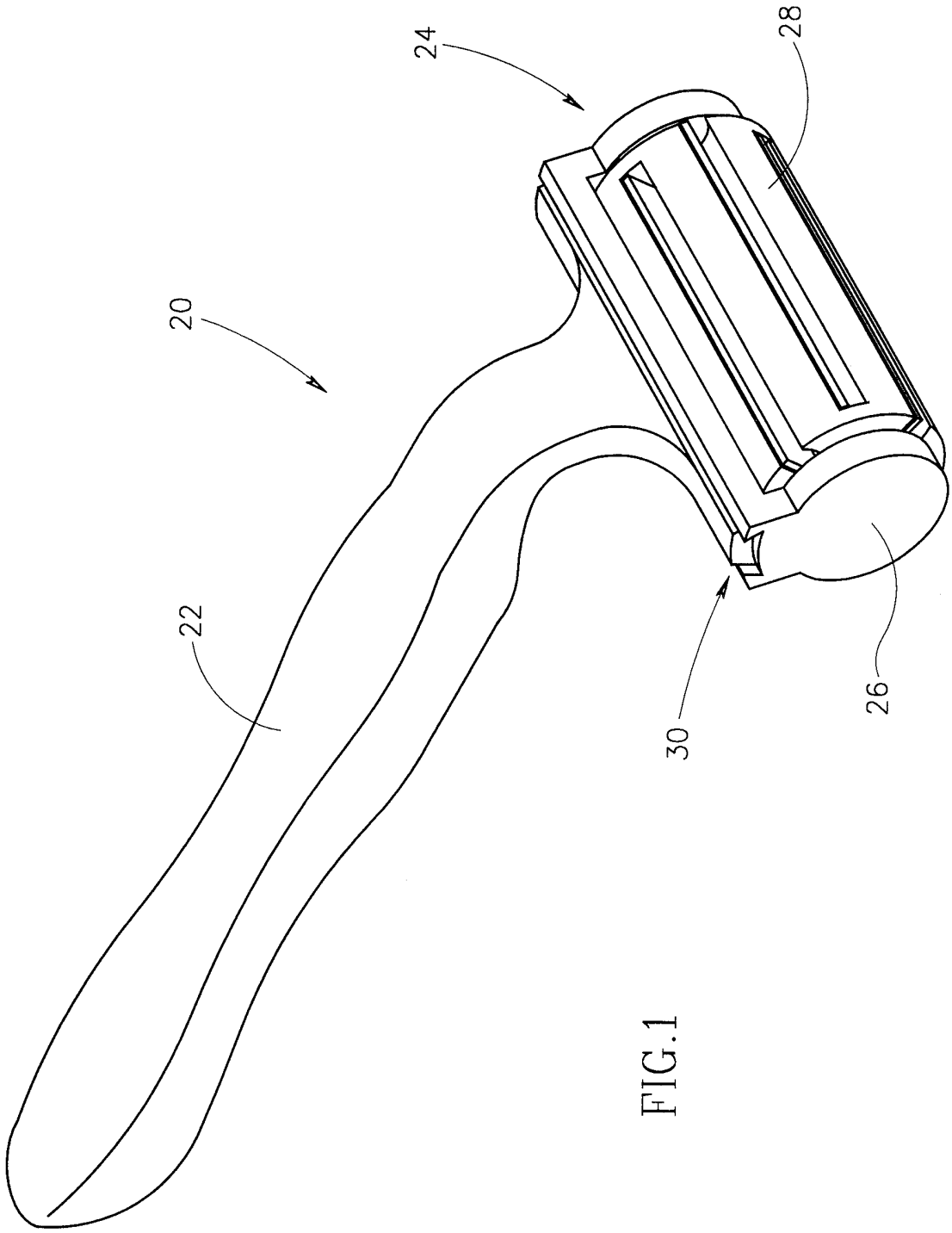


FIG.1

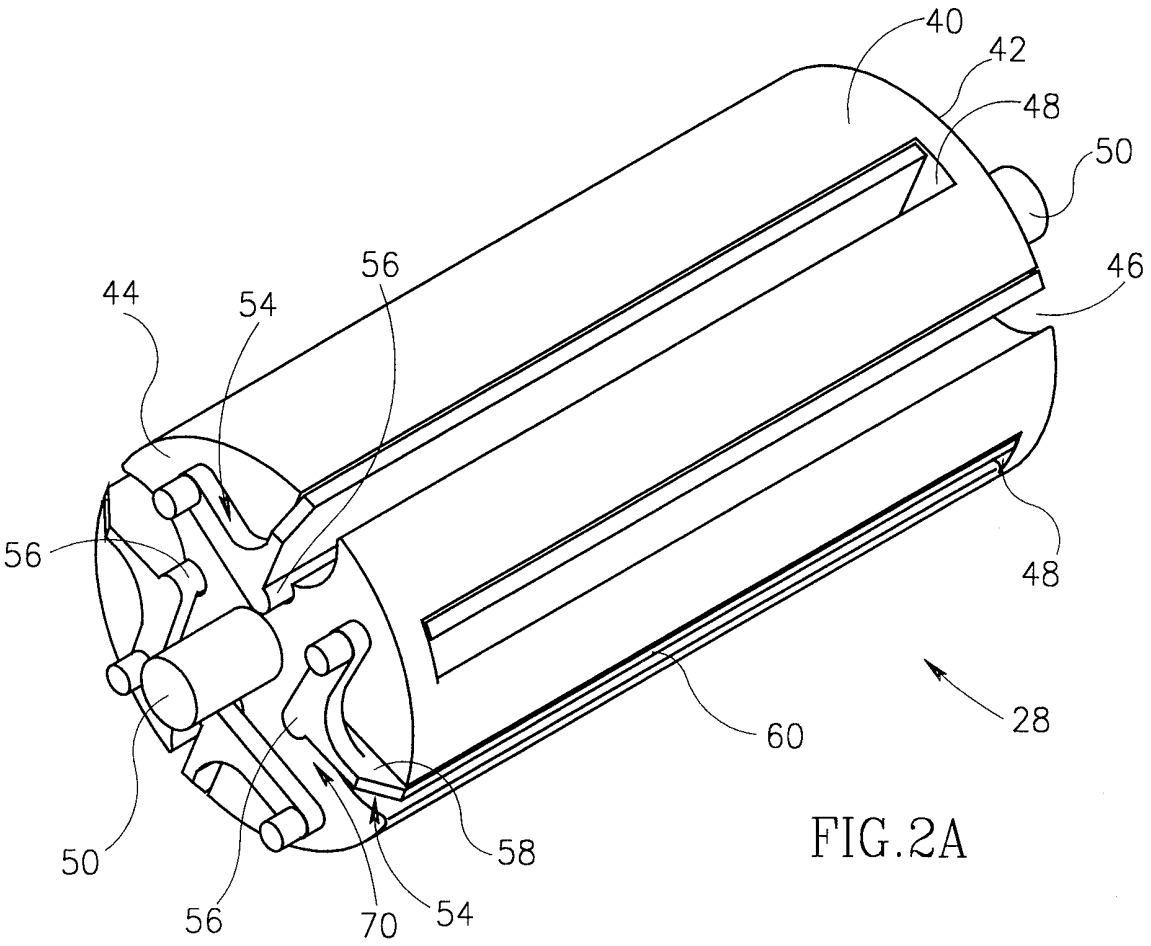

40
42
48
50
46
44
54
56
56
48
28
60
50
58
56
70
54

FIG.2A

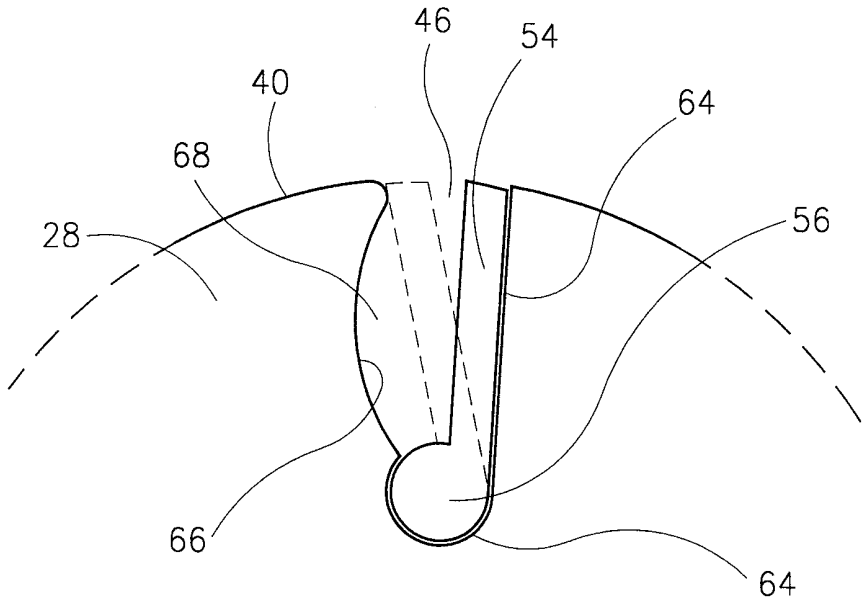

46
54
40
64
68
28
56
66
64

FIG.2B

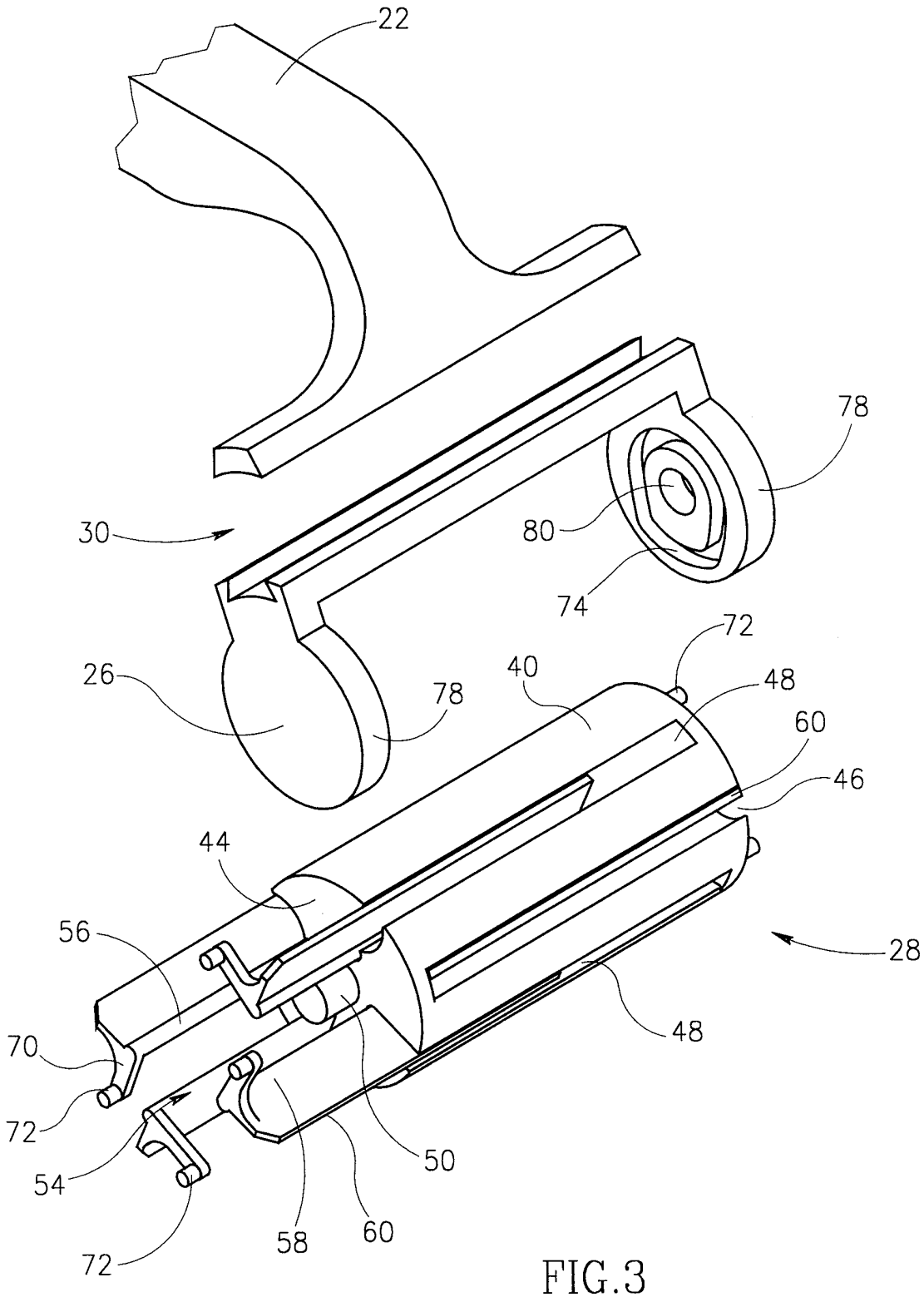


FIG.3

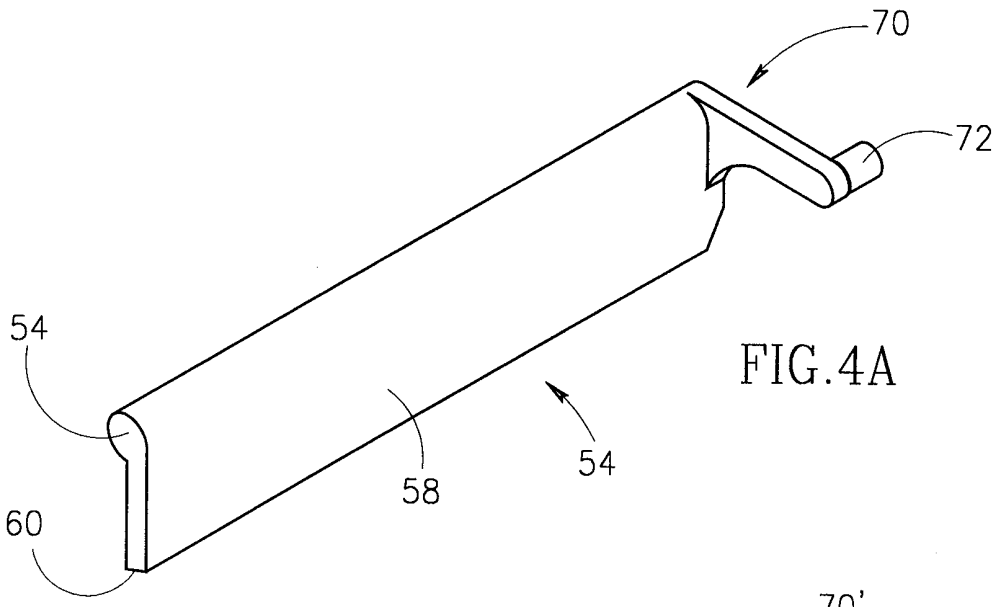


FIG.4A

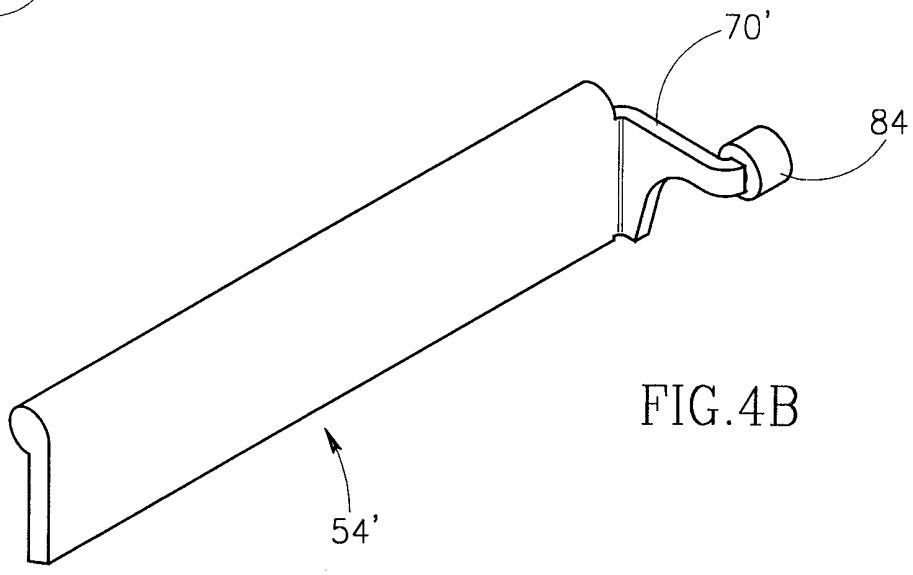


FIG.4B

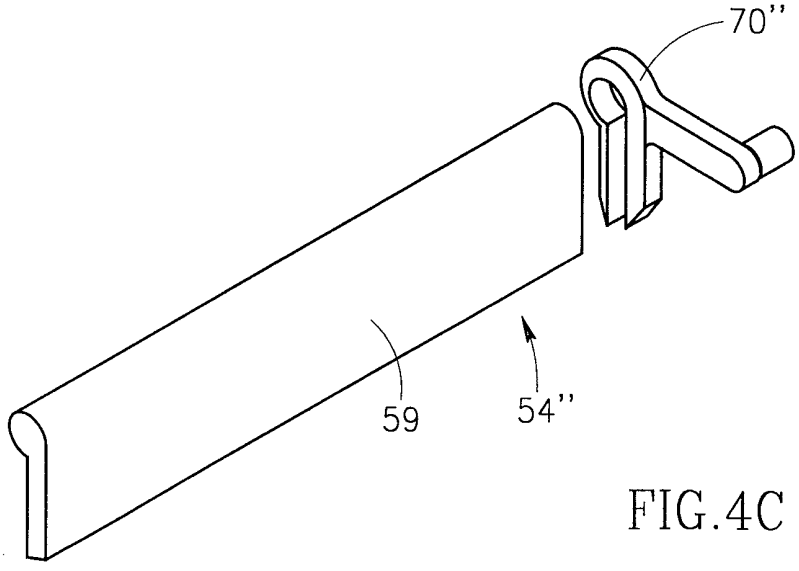


FIG.4C

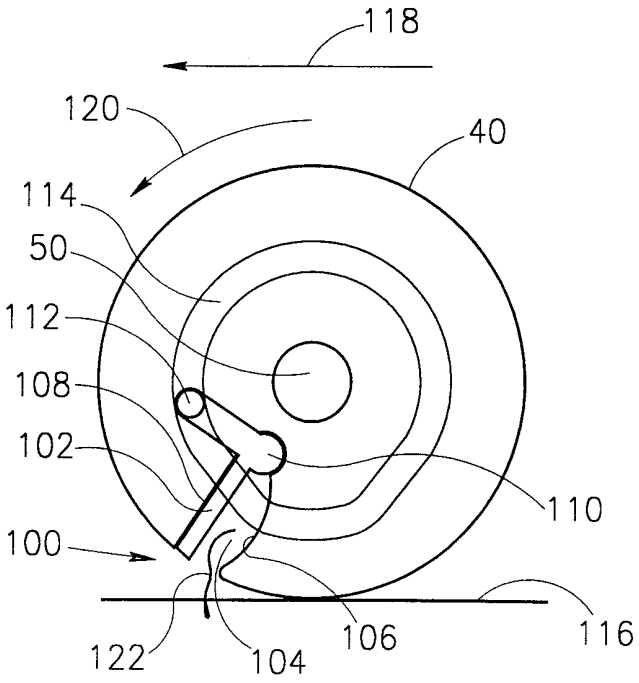


FIG.5A

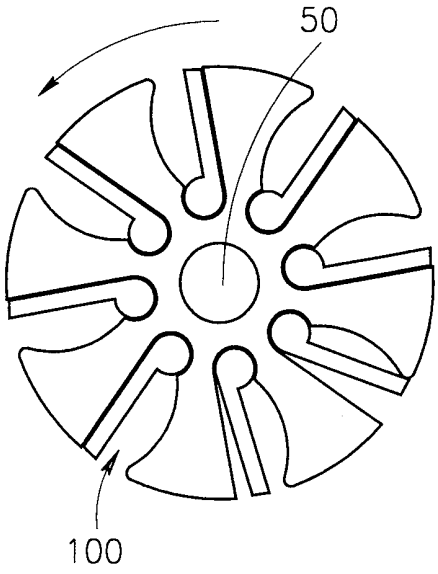


FIG.5B

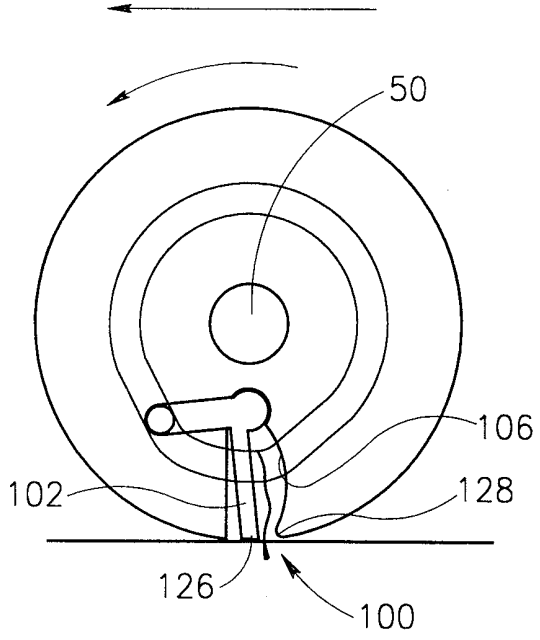


FIG.6A

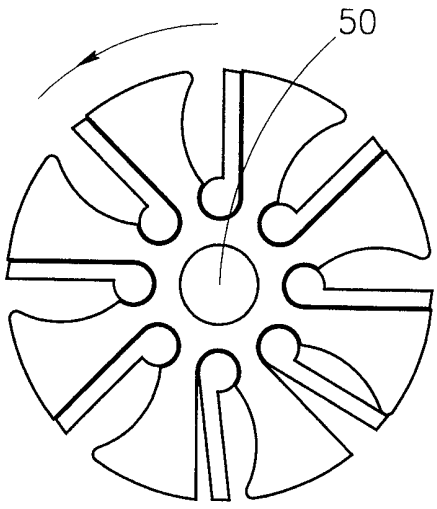


FIG.6B

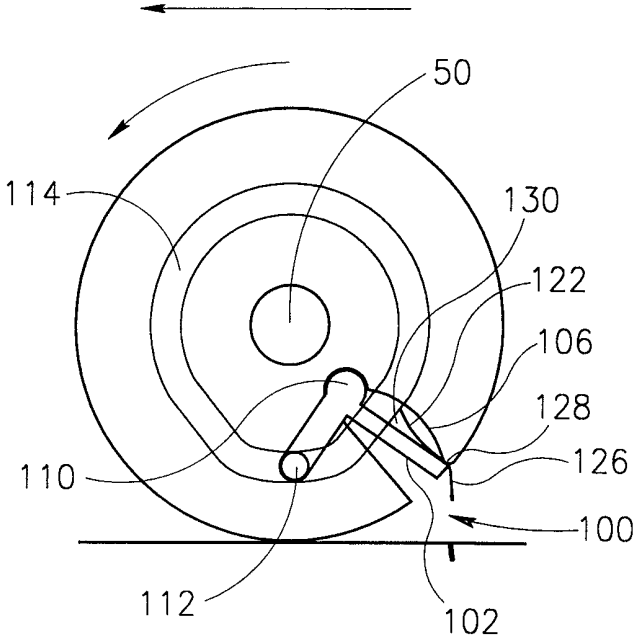


FIG.7A

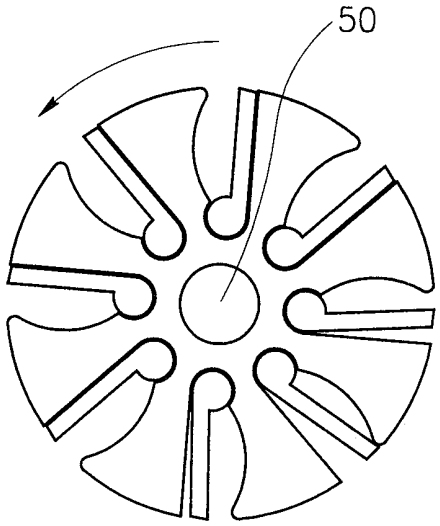


FIG.7B

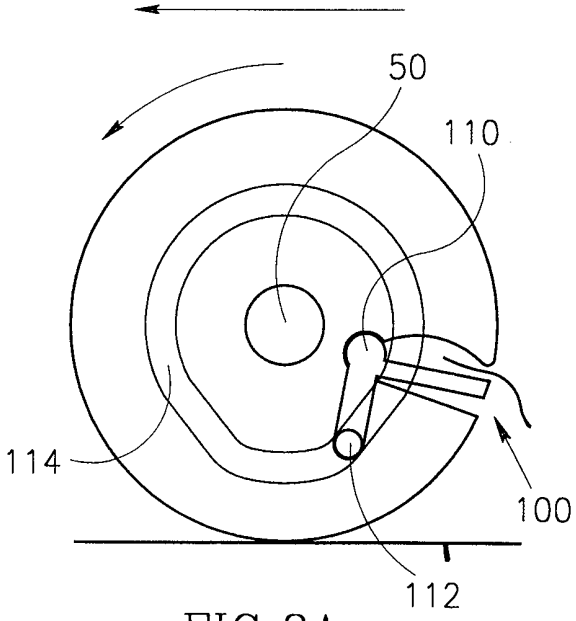


FIG.8A

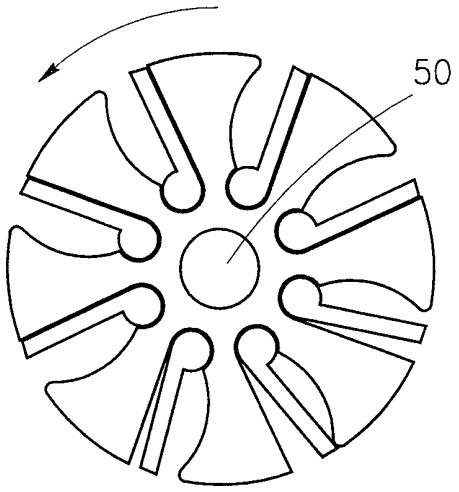


FIG.8B

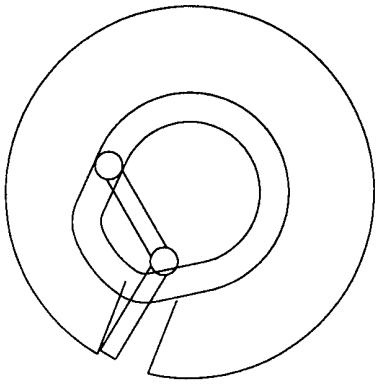


FIG.9A

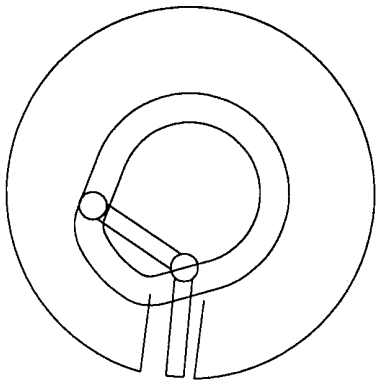


FIG.9B

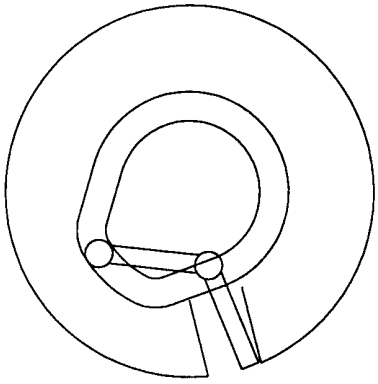


FIG.9C

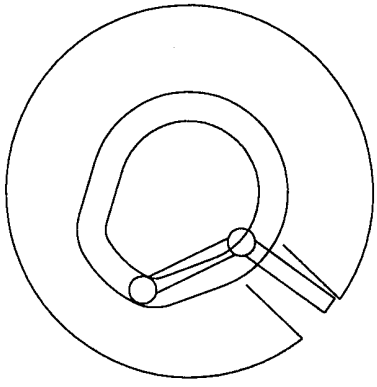


FIG.9D

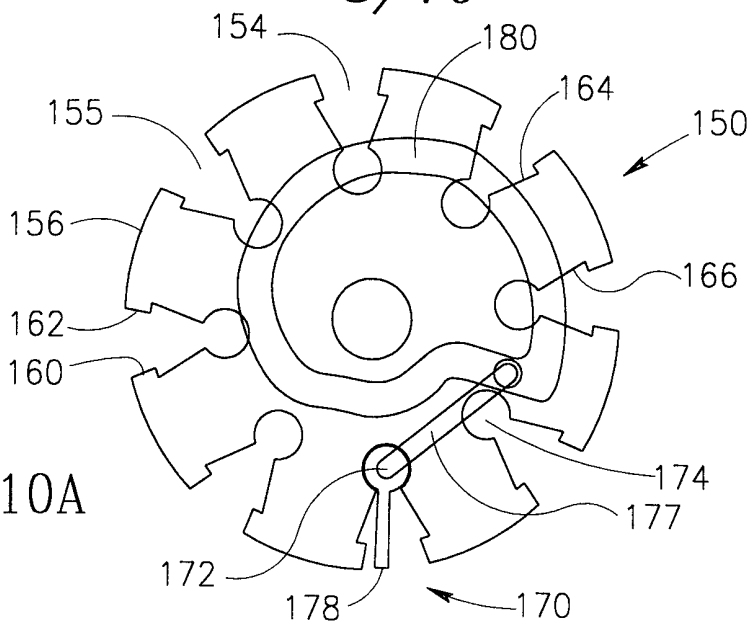


FIG.10A

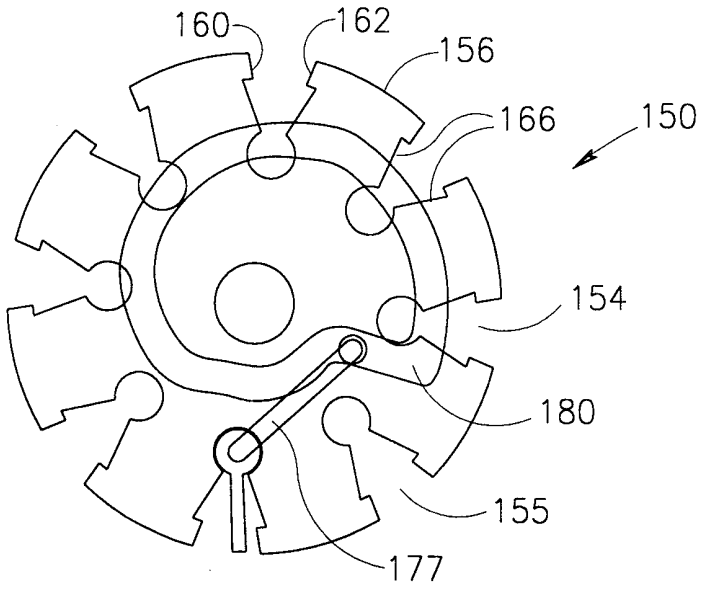


FIG.10B

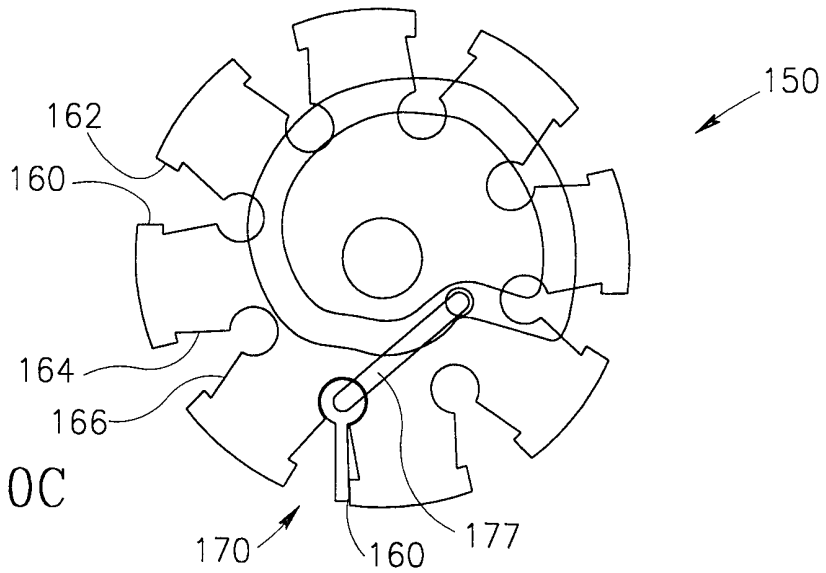


FIG.10C

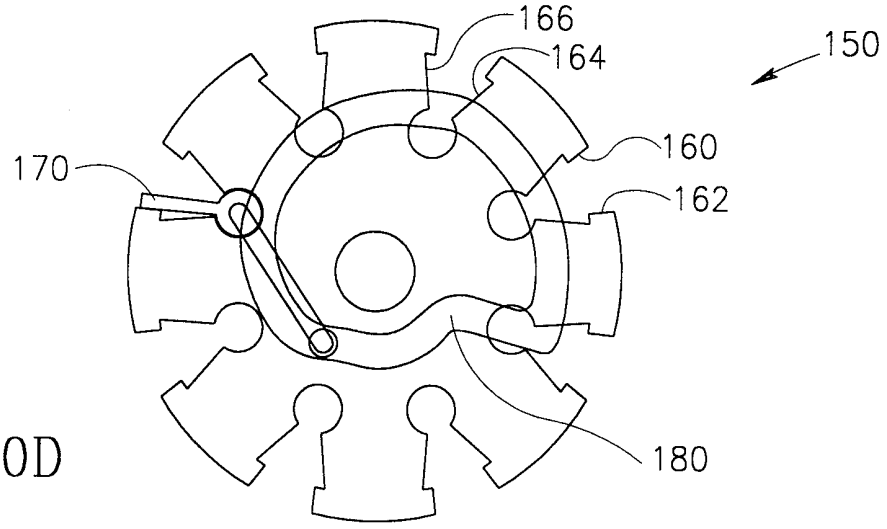


FIG.10D

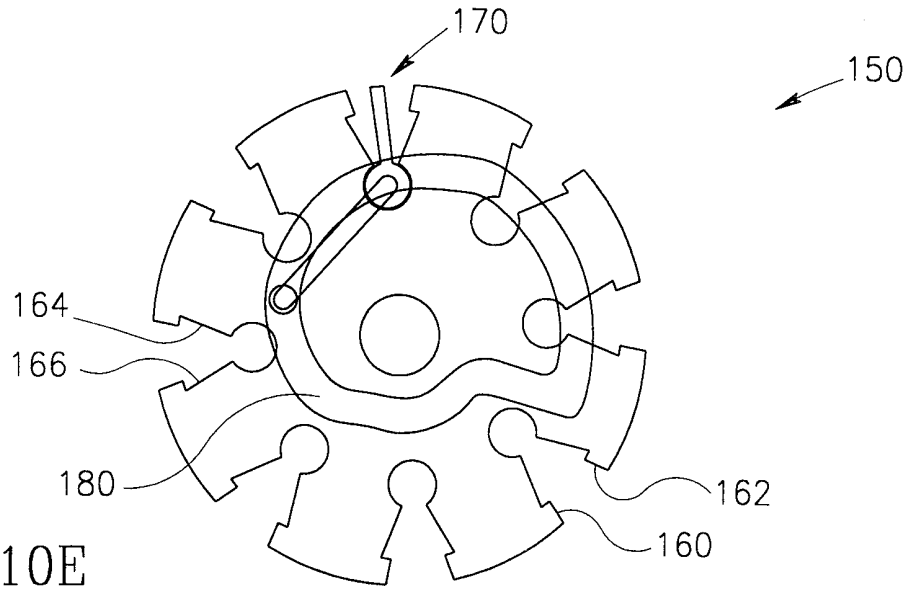


FIG.10E

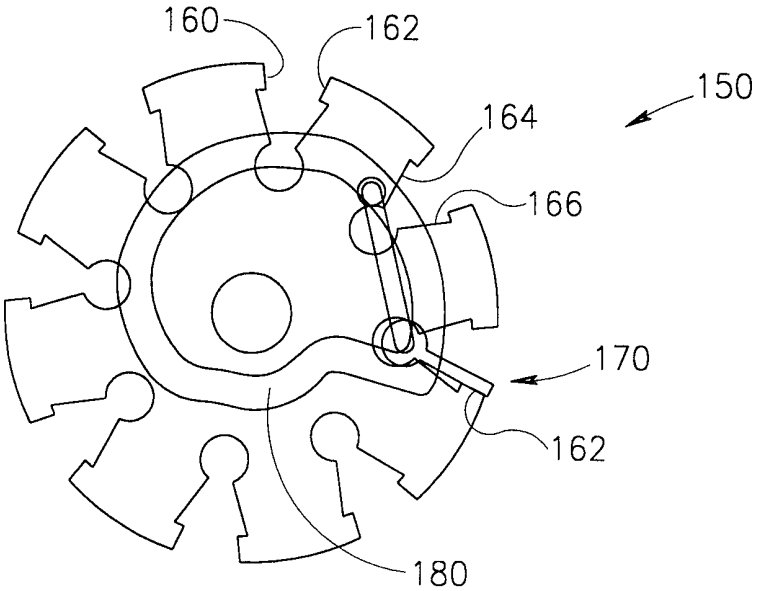


FIG.10F

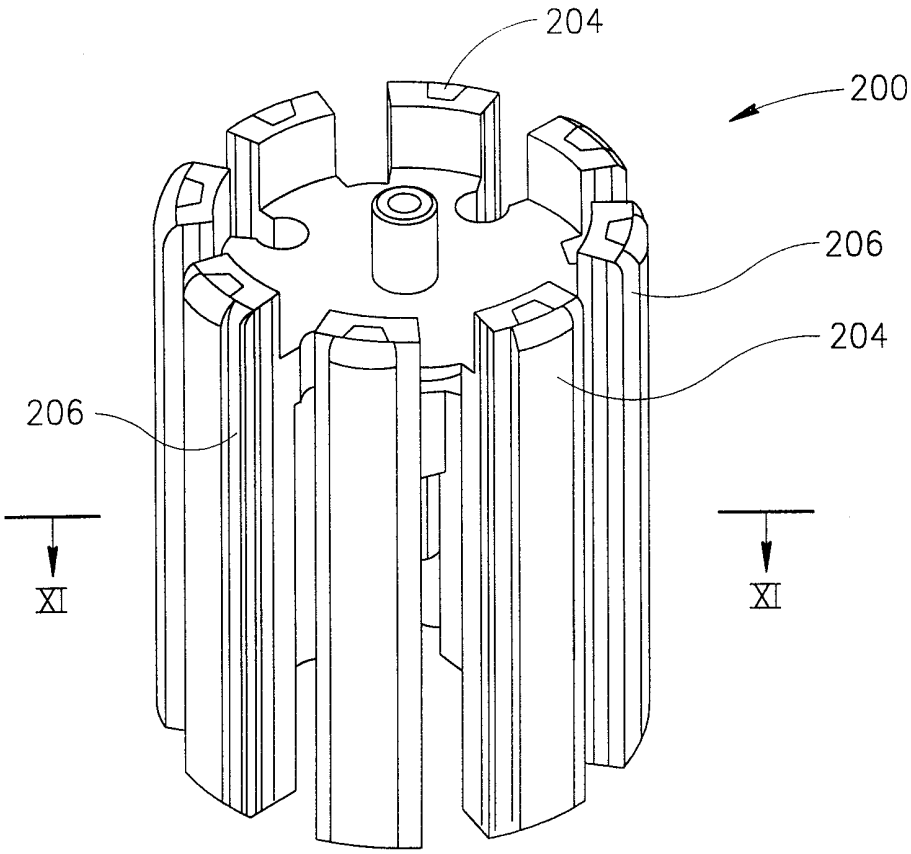


FIG.11A

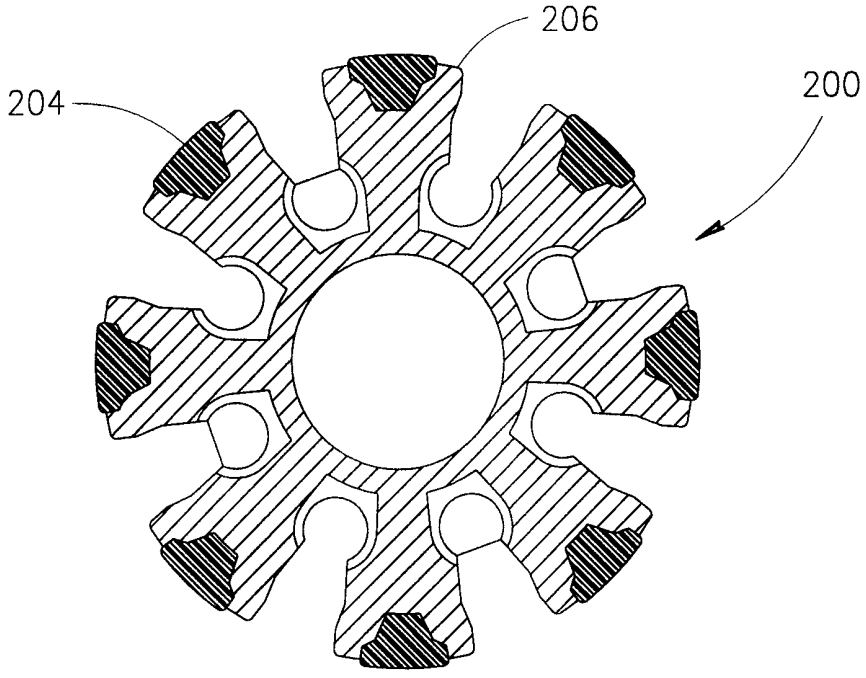


FIG.11B

INTERNATIONAL SEARCH REPORT

Inter ·onal Application No
PCT/IL 00/00124

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A45D26/00

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 7 A45D A22C

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)
WPI Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 169 773 A (GUILLON ROBERT HENRI ;GUILLON ALINE SONIA (FR)) 29 January 1986 (1986-01-29) page 2, line 24 -page 3, line 22; figures 1-8	1
A	DE 196 02 559 A (BRAUN AG) 13 March 1997 (1997-03-13) the whole document	1
A	US 4 279 253 A (HAES FREDDY ET AL) 21 July 1981 (1981-07-21) cited in the application the whole document	1

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 June 2000	30/06/2000
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Authorized officer Herijgers, J

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter ɔnal Application No
PCT/IL 00/00124

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0169773 A	29-01-1986	FR 2568110 A	31-01-1986
DE 19602559 A	13-03-1997	NONE	
US 4279253 A	21-07-1981	NL 7805230 A	20-11-1979
		DE 2918972 A	22-11-1979
		ES 480534 A	16-12-1979
		FR 2425822 A	14-12-1979
		GB 2020548 A	21-11-1979
		IT 1112519 B	20-01-1986
		JP 54150256 A	26-11-1979
		SE 7904179 A	17-11-1979