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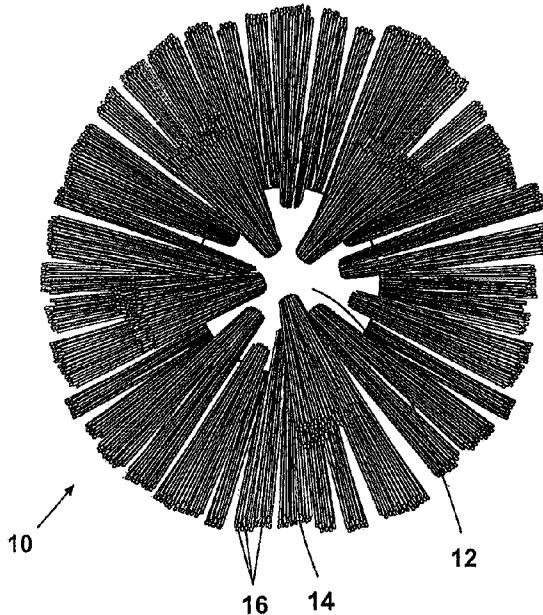
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(54) Title: FOOD WASTE DISPOSER SCOURING SCRUB DEVICE



(57) Abstract: A scrub device having a central core and multiple flexible strands of a polymeric material can be placed into a food waste disposer, which is then turned on, and the low mass and low inertia of the scrub device permits a spinning motion to promote frictional cleaning by the flexible strands. Multiple geometries of the scrub devices provide for different cleaning motions. The material of both the central core and flexible strands can be ground or can be retained during operation of the disposer while preventing disposer damage permitting the scrub device to be permanently left in the disposer. Holding and extraction tools are provided for manual cleaning motion or removal of the scrub devices.

Fig. 1



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FOOD WASTE DISPOSER SCOURING SCRUB DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Application No. 61/023,199, filed on January 24, 2008. The disclosure of the above application is incorporated herein by reference.

FIELD

[0002] The present disclosure relates to devices and methods for cleaning a food waste disposer.

BACKGROUND

[0003] The statements in this section merely provide background information related to the present disclosure and may not constitute prior art.

[0004] Food waste disposers commonly have a grind chamber which receives multiple types of waste products. Following repeated use, some portions of the waste products may not flush through the disposer after each operation. This can lead over time to waste build-up which can create an odor problem from the remnants of the waste products remaining in the disposer.

20 Cleaning systems have therefore been developed to clean food waste disposers.

[0005] Known cleaning systems have several drawbacks. Some systems use food materials themselves, such as citrus rinds, bones, or ice cubes to clean the waste disposer. Food products used for this purpose also generally leave behind portions of the food products themselves or are ineffective at 25 cleaning the food waste disposer. Products such as detergent packets have been developed which are introduced into the disposer while the disposer is operating. Citrus rinds and detergent packets can mask the odor of the waste build-up, but because they may not effectively clean the disposer do not eliminate odors. Products such as brushes have therefore been developed 30 which rely on manual scrubbing when the disposer is not operating and commonly provide a handle which reaches outside of the disposer for grasping. Brushes can also miss portions of the waste products due to the inability to

reach every portion of the disposer, including the discharge passages from the grind chamber.

SUMMARY

5 [0006] According to several embodiment of the present disclosure, a low mass and inertia, spherical-shaped brush pod includes a plurality of points or brush elements attached to a central hub. The central hub is created from a material which can slowly be ground up by the disposer over time without damaging the grind elements. The brush pod can be left in the food waste 10 disposer while grinding, or can be removed after cleaning.

15 [0007] According to additional embodiments, an elastomeric material is used for the bristles or brush elements. The elastomeric material is preselected to promote chemical resistance, and to minimize weight and therefore reduce mass and inertia of the brush pod. An elastomeric material can also be used for the central hub.

20 [0008] According to additional embodiments a non-geometrically shaped scrub device having a central core and multiple flexible strands of a polymeric material is placed into a food waste disposer where the low mass and low inertia of the scrub device permits a random spinning motion to promote frictional cleaning by the flexible strands.

[0009] Further areas of applicability will become apparent from the description provided herein. It should be understood that the description and specific examples are intended for purposes of illustration only and are not intended to limit the scope of the present disclosure.

25

DRAWINGS

[0010] The drawings described herein are for illustration purposes only and are not intended to limit the scope of the present disclosure in any way.

30 [0011] Figure 1 is a front perspective view of a scrub device of the present disclosure;

[0012] Figure 2 is a front perspective view another embodiment of a scrub device of the present disclosure;

[0013] Figure 3 is a partial cross sectional front perspective view of another embodiment of a scrub device of the present disclosure;

[0014] Figure 4 is a front perspective view another embodiment of a scrub device having tubular shaped core members;

5 [0015] Figure 5 is a front perspective view another embodiment of a pyramidal-shaped scrub device of the present disclosure;

[0016] Figure 6 is a front perspective view another embodiment of a non-geometrically-shaped scrub device of the present disclosure;

[0017] Figure 7 is a front elevational view of a scrub device holding member;

[0018] Figure 8 is a front elevational view of a scrub device extraction tool;

[0019] Figure 9 is a partial cross sectional, front elevational view of a scrub device extraction tool;

15 [0020] Figure 10 is a partial cross sectional, front elevational view of another embodiment of a scrub device extraction tool; and

[0021] Figure 11 is a cross sectional front elevational view of a food waste disposer having a scrub device of the present disclosure shown therein.

20 DETAILED DESCRIPTION

[0022] The following description is merely exemplary in nature and is not intended to limit the present disclosure, application, or uses. It should be understood that throughout the drawings, corresponding reference numerals indicate like or corresponding parts and features.

25 [0023] Referring to Figure 1, according to several embodiments of the present disclosure for a food waste disposer scouring scrub device, a scrub device 10 includes a central core 12 having a plurality of bundles 14 extending outwardly from central core 12. Each of the bundles 14 includes a plurality of flexible strands 16 which can be of equal or different lengths with respect to each 30 other. Central core 12 can be substantially circular in shape as shown or can have any geometric shape. A material for central core 12 can be a polymeric material which is adapted to be received in a food waste disposer (shown and

described in reference to Figure 11). Each of the flexible strands 16 are also made from a polymeric material and are flexible to allow the individual flexible strands 16 to individually flex and contact the inner surfaces of the food waste disposer. The food waste disposer is turned on with the scrub device 10 in the 5 disposer to clean the disposer.

[0024] Referring to Figure 2, in another embodiment a scrub device 18 is modified from the scrub device 10 of Figure 1 to eliminate the bundles 14 and to include a plurality of random flexible strands 22, a portion of which are centrally grouped or wound to form a central core 20. Central core 20 is not an 10 independent entity with respect to the flexible strands 22, having flexible strands 22 extending outwardly therefrom, but is formed of a portion of each of the flexible strands 22. Central core 20 of scrub device 18 therefore does not have a standard geometric form and can vary in both size and geometry based on a 15 quantity of random flexible strands 22 which are grouped together to form central core 20.

[0025] Referring to Figure 3, according to additional embodiments a scrub device 24 has a body 26 including each of a first and second body portion 28, 30 which are homogenously joined, bonded together such as by thermal bonding, adhesively joined, or otherwise formed as a fixed unit to define body 20 26. The first and second body portions 28, 30 define an interior cavity 32 which can be adapted to receive a liquid or powder material such as a cleaning solution, a fragrance solution, or the like. Interior cavity 32 is accessible for fill and subsequent discharge of the material via an aperture 34. Body 26 also 25 includes a plurality of faces 36 each having a bundle 38 similar to bundles 14 extending outwardly from the faces. Exemplary ones of bundle 38 are oriented at an angle α with respect to a longitudinal axis 39 of body 26. Proximate ones of the bundles 38 identified for example as bundles 38, 38' can be oriented with respect to each other by a bundle-to-bundle included angle β . Angles α and β can vary at the manufacturers discretion to provide for different quantities of 30 bundles 38, to promote random rotation of scrub device 24, or to provide improved access to aperture 34.

[0026] Referring to Figure 4, according to additional embodiments a scrub device 40 includes a grouping of multiple tubular shaped barrels 42 which can be oriented at substantially right angles to each other. A bundle 44 extends from a free end of each of the tubular barrels 42, including from each of the 5 opposed ends of the tubular barrels 42. The plurality of tubular barrels 42 are homogenously or fixedly connected to one another and can be commonly created during a molding process. A plurality of flexible strands 45 similar to flexible strands 16, are provided with each of the bundles 44. The core 20 (not visible in this view) of the flexible strands 45 can be centrally located at an 10 interior end of the tubular shaped barrels 42, or the core 20 can be eliminated and each bundle 44 be independently created in each tubular shaped barrel 42.

[0027] Referring to Figure 5, according to additional embodiments a scrub device 46 includes a plurality of triangular-shaped faces 48 which together define a pyramid-shaped structure or core. A bundle 50 of flexible strands, 15 similar to bundles 44 extends from each of the triangular shaped faces 48.

[0028] Referring to Figure 6, according to additional embodiments a scrub device 52 includes a non-uniformly shaped body 54 having a plurality of body faces 56 which are oriented randomly with respect to other ones of the body faces 56. Each of the body faces 56 provides a bundle 58 extending 20 outwardly therefrom, each similar to bundles 44. The non-geometric body shape of body 54 is advantageous in providing for a greater random motion of scrub device 52 so that individual ones of the bundles 58 are also randomly oriented to provide for enhanced cleaning motion of the scrub device 52.

[0029] Referring now to Figure 7, any of the scrub devices previously 25 described herein can be inserted into a food waste disposer when not running and manually held for manual scrubbing operation using a scrub device holding tool 60. Scrub device holding tool 60 includes a handle 62 having a slidable lever 64 disposed thereon. Lever 64 is in turn operable to displace an actuation arm 66 which can grasp one of the scrub devices (for example scrub device 18 30 shown) between actuation arm 66 and a retention end 68. Holding tool 60 can be oriented to receive a scrub device by sliding lever 64 in a first lever direction "A" to provide clearance space to receive the scrub device. By subsequently

sliding lever 64 in a second or opposite lever direction "B" actuation arm 66 contacts the scrub device to capture the scrub device between the actuation arm 66 and retention end 68.

[0030] Referring to Figure 8, an extraction tool 70 can be provided for 5 removal of a scrub device of the present disclosure such as scrub device 18 shown. Extraction tool 70 includes a handle 72 having a lever 74 slidable in either of a first lever direction "C" or in an opposite second lever direction "D". Extraction tool 70 has a claw 76 which includes each of a first and second claw 10 arm 78, 80 which are deflectable toward or away from each other by motion of lever 74. For example, displacement of lever 74 in the second lever direction "D" allows first claw arm 78 to deflect away from second claw arm 80 in a release direction "E" while second claw arm 80 displaces in a release direction "F". Operation of lever 74 in the first lever direction "C" provides an opposite action 15 causing first and second claw arms 78, 80 to displace toward each other to grasp the scrub device 18.

[0031] Referring now to Figure 9, according to other embodiments, an extraction tool 82 includes an engagement member 84 which is slidably received within a chamber 86 of a receiving member 88. Engagement member 84 includes a first and second engagement arm 90, 92. First and second 20 engagement arms 90, 92 are movable with respect to each other as they are separated by a partial longitudinal slot 94. First engagement arm 90 includes a first raised surface 96 and second engagement arm 92 includes a second opposed raised surface 98. First and second raised surfaces 96, 98 are adapted to be frictionally received within a comparably sized aperture (shown in phantom) 25 created in a body or central core of one of the various scrub devices previously described herein.

[0032] A first cavity 100 is defined between first and second engagement arms 90, 92 proximate and between first and second raised surfaces 96, 98. A sliding member 102 having an engagement end 104 adapted 30 to be received in first cavity 100 is positioned as shown in Figure 9 to force first and second engagement arms 90, 92 apart from each other which temporarily locks or engages engagement member 84 with the scrub device. By pulling

sliding member 102 in an extraction/release direction "H" engagement member 84 slides within chamber 86 until a first and second flange 106, 108 of the first and second engagement arms 90, 92 respectively contact each of a first and second stop wall 110, 112 of receiving member 88. Once contact between first 5 and second flanges 106, 108 and the first and second stop walls 110, 112 occurs, further force applied to sliding member 102 in the extraction/release direction "H" releases engagement end 104 from first cavity 100 allowing engagement end 104 to displace into a second cavity 114. Second cavity 114 is 10 larger than first cavity 100 allowing first and second engagement arms 90, 92 to displace toward each other about partial longitudinal slot 94 thereby allowing release of engagement member 84 as first and second raised surfaces 96, 98 elastically spring toward each other to thereafter reduce the frictional engagement of the scrub device.

15 **[0033]** When temporarily connecting engagement member 84 with the scrub device, an opposite motion of the sliding member 102 is used. For example, sliding member 102 moved in an engagement direction "G" displaces engagement end 104 from second cavity 114 into first cavity 100 thereby forcing first and second raised surfaces 96, 98 away from each other to provide a frictional engagement with the scrub device.

20 **[0034]** Referring to Figure 10, another extraction tool 116 according to several embodiments of the present disclosure includes an arm 118 having a sliding member 120 slidably disposed therein. Sliding member 120 includes opposed first and second claw arms 122, 124. Extraction tool 116 can be used by pulling sliding member 120 to the right as viewed in Figure 10 which forces 25 first and second claw arms 122, 124 into contact with arm 118 and thereby forces first and second claw arms 122, 124 toward each other to grasp the scrub device (not shown). A contact member 126 can also be provided on one or opposed sides of the first and second claw arms 122, 124 to assist in retaining the scrub device.

30 **[0035]** Referring generally to Figure 11, a food waste disposer 128 includes an upper food conveying section 130, a lower motor section 131, and an intermediate grinding section 132 disposed between the food conveying

section 130 and the motor section 131. The food conveying section 130 includes a housing 133 that forms an inlet 134 at its upper end for receiving food waste, water, and a scrub device of the present disclosure in a direction "J". The housing 133 also includes a second inlet 135 for receiving water and food waste 5 in a direction "K" discharged for example from a dishwashing machine (not shown). Food conveying section 130 conveys food waste and water to the grinding section 132.

[0036] The motor section 131 includes a motor 136, which may illustratively be an induction motor imparting rotational movement to a motor 10 shaft 138. The grinding section 132 can include a support plate 140 connected for rotation to motor shaft 138. Support plate 140 can be connected to a grinding or rotating plate 142. Water and ground food waste which are combined in a slurry are collected below support plate 140 and rotating plate 142 in a waste receiving cavity 144 for discharge in a discharge direction "L" through a 15 discharge port 146.

[0037] Grinding section 132 has a grinding cavity 148 disposed above rotating plate 142 to receive the food waste and a volume of water. Food waste and the water volume can be received through inlet 134, through second inlet 135, or both. At least one and in several embodiments a plurality of fixed lugs or 20 elements 150 extend upwardly from and co-rotate with rotating plate 142. Food waste is forced outwardly by centrifugal force toward elements 150 which force the food waste into contact with cutting edges or teeth defined by a plurality of apertures 152 in a stationary shredder ring 154. The food waste is ground between an outer edge of elements 150 and the cutting edges of apertures 152 25 and the ground food waste particles with the water in the form of a slurry moves outwardly as viewed in Figure 11 through apertures 152 and then downwardly into waste receiving cavity 144.

[0038] To help transfer the food waste toward elements 150, at least one and in several embodiments a plurality of rotatable lugs 156 are provided 30 (both a first lug 156 and a second lug 156' are shown), each rotatably connected to rotating plate 142 and/or support plate 140. Lugs 156 function to keep the food waste moving outwardly and therefore to reduce accumulation of food

waste in a stationary position with respect to rotating plate 142 and out of reach of elements 150.

[0039] As shown in Figure 11, an exemplary one of the scrub devices of the present disclosure, scrub device 10 is positioned within housing 133 and grinding cavity 148. The central core 12 of scrub device 10 is sized smaller than inlet 134 to be received through inlet 134. Insertion can also be aided by deflection of the flexible strands 16. The flexibility of the plurality of flexible strands 16 allows individual ones of the flexible strands to contact the inner wall of the housing 133 and the inner wall of the stationary shredder ring 154 so that all areas within housing 133 and grinding cavity 148, including an outward area "Z" can be contacted for cleaning. Thereafter, operation of motor 136 rotates rotating plate 142 to displace scrub device 10 about the housing 133 and the grinding cavity 148. Portions of the flexible strands 16 or the central core 12 which are fractured or removed by contact with the elements 150, rotatable lugs 156, and/or the cutting edges defined by apertures 152 will be displaced through apertures 152 for discharge through receiving cavity 144 and discharge port 146.

[0040] The flexible element scrub devices of the present disclosure can be made from a molded or extruded polymeric material for the flexible strands or bundles, and each of the central cores can also be made of a polymeric material to prevent damage to the elements 150 and cutting edges of the apertures 152. According to several embodiments each of the flexible strands (16, 22, 45) are either homogenously connected to a corresponding core, are wound or grouped into a tight configuration defining a core, or the flexible strands are grouped into the bundles, such as bundles 14 which are fixedly or homogenously connected to the core.

[0041] Scrub and scour devices, and holding or extraction tools for the scrub and scour devices of the present disclosure provide several advantages. The ability to dispose a scrub or scour device into a food waste disposer and leave the device in the disposer allows for a continuing ability to clean the disposer without further operator action. The flexibility of the flexible strands and the geometry of the scrub devices provides for a low mass, low inertia device which can freely rotate during operation of the food waste disposer to promote

cleaning. The low mass makes the presence of the scrub device in the food waste disposer nearly unperceivable in terms of noise and vibration. The center core or hub can be made of a material which itself can be slowly ground by the disposer, or which does not grind during operation but can be retained in the 5 disposer without damaging the operating elements, which allows the devices to be left in the disposer. The flexible strands also provide a self-cleaning action to prevent food waste deposits from building up on the flexible strands themselves.

[0042] Provision of a cavity in various embodiments of the scrub devices can also allow use of an additional cleaning/disinfecting solution which 10 can automatically discharge from the scrub device. The central core also provides a portion which can be grasped for removal or manual cleaning motion of the scrub devices. An interior cavity similar to interior cavity 32 can be provided in most of the scrub devices of the present disclosure, and can be provided by inclusion of a hollow member in the wound core 20 of scrub device 15 18. By eliminating the flexible strands and using a water soluble material for a body to replace the core, a scouring device can be created which can deliver a cleaning agent into the disposer, physically scour the disposer, and be retained in the disposer until it dissolves over time.

CLAIMS

What is claimed is:

1. A scrub device for insertion into a food waste disposer having a
5 rotatable inner surface, comprising:

a central core created from a portion of multiple flexible fiber
strands of a polymeric material connected together, having individual ones of the
fiber strands of at least one length extending outwardly from the central core,
each of the fiber strands adapted to flex and when randomly contacting the inner
10 surface during rotation of the inner surface adapted to abrade to clean the inner
surface.

2. The scrub device of Claim 1, wherein the fiber strands are grouped
into multiple bundles of the fiber strands each bundle extending outwardly from
15 the central core.

3. The scrub device of Claim 2, wherein the central core is contained
within a grouping of tubular shaped barrels having the flexible fiber strands of
each bundle directly extending from an end of individual ones of the tubular
20 shaped barrels, the tubular shaped barrels oriented at an angle to each other.

4. The scrub device of Claim 3, wherein the plurality of tubular
shaped barrels are fixedly connected to one another and commonly created
during a molding process.

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5. The scrub device of Claim 1, wherein the multiple flexible fiber
strands are grouped in a plurality of fiber bundles extending outwardly from the
central core, wherein the at least one length of the fiber strands of each bundle
defines a substantially single length.

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6. The scrub device of Claim 1, wherein the central core defines a
circular shape.

7. The scrub device of Claim 1, wherein the central core defines a non-circular geometric shape.

5 8. The scrub device of Claim 1, wherein the central core is defined by a portion of the multiple flexible fiber strands being centrally grouped, the central core lacking a standard geometric form and variable in both size and geometry based on a random quantity of the flexible strands grouped together to form the central core.

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9. The scrub device of Claim 1, wherein the at least one length of the multiple flexible fiber strands comprises multiple random lengths.

15 10. A scrub device for insertion into a food waste disposer having a rotatable inner surface, comprising:

20 a central core of a polymeric material; and multiple flexible fiber strands of the polymeric material having individual ones of the fiber strands of at least one length extending outwardly from the central core, each of the fiber strands adapted to flex and when randomly contacting the inner surface during rotation of the inner surface adapted to clean the inner surface.

25 11. The scrub device of Claim 10, wherein the core is a body including first and second body portions joined together.

12. The scrub device of Claim 11, wherein the body includes an interior cavity created within the both first and second body portions adapted to receive a cleaning material.

30 13. The scrub device of Claim 12, wherein the body includes an aperture created through the body opening into the interior cavity and adapted for fill and subsequent discharge of the cleaning material.

14. The scrub device of Claim 11, wherein the fiber strands are grouped into multiple bundles of the fiber strands each bundle extending outwardly from the central core.

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15. The scrub device of Claim 14, wherein the body includes a plurality of faces each having one of the bundles extending outwardly from the face.

16. The scrub device of Claim 15, wherein individual ones of the
10 bundles are oriented at a first angle with respect to a longitudinal axis of the body.

17. The scrub device of Claim 16, wherein proximate ones of the
bundles are oriented with respect to each other by a bundle-to-bundle included
15 angle different from the first angle.

18. A scrub device for insertion into a food waste disposer, comprising:
a body of a polymeric material having a non-uniform shape and a
plurality of body faces oriented randomly with respect to each other;

20 each of the body faces including an outwardly extending
bundle;

each bundle including multiple outwardly extending flexible fiber
strands of a polymeric material; and

25 individual ones of the bundles being randomly oriented with respect
to each other to promote random motion of the scrub device in the food waste
disposer.

19. The scrub device of Claim 18, wherein the flexible fiber strands of
each bundle have an equal length.

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20. The scrub device of Claim 18, wherein the flexible fiber strands of
each bundle have random lengths.

21. A scrub device for insertion into a food waste disposer, comprising:
 - a body including first and second body portions joined together;
 - an interior cavity created within the first and second body portions adapted to receive a cleaning material; and
- 5 an aperture created through the body to the interior cavity adapted for fill and subsequent discharge of the cleaning material.
22. The scrub device of Claim 12, wherein the body includes a plurality of faces each having a bundle of flexible fibers extending outwardly therefrom.
- 10 23. The scrub device of Claim 22, wherein the bundle of each of the faces is oriented at an angle with respect to a longitudinal axis of the body.
24. The scrub device of Claim 22, wherein proximate ones of the bundles are oriented with respect to each other by a bundle-to-bundle included angle.
- 15 25. A scrub device system for a food waste disposer, comprising:
 - a cleaning device including:
 - 20 a central core of a polymeric material; and
 - multiple flexible fiber strands of at least one length extending outwardly from the central core, each adapted to individually flex and randomly contact an inner surface of the food waste disposer to clean the inner surface; and
 - 25 an extraction tool adapted for removal of the scrub device from the food waste disposer, the extraction tool including:
 - a handle having a lever slidable in each of a first lever direction and an opposite second lever direction; and
 - 30 a claw including each of a first and second claw arm deflectable toward or away from each other by motion of the lever.

26. The scrub device system of Claim 25, wherein displacement of the lever in the second lever direction directs the first claw arm to deflect away from the second claw arm in a first release direction and the second claw arm to displace in an opposite second release direction.

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27. The scrub device system of Claim 25, wherein displacement of the lever in the first lever direction directs the first and second claw arms to displace toward each other to grasp the scrub device.

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28. A food waste disposer and scrub brush system, comprising:

a food waste disposer including a food conveying section and a rotating grinding section adapted to receive food from the food conveying section; and

15

a cleaning device adapted to be inserted through the food conveying section into the food grinding section, including:

a central core of a polymeric material; and

multiple flexible fiber strands of at least one length extending outwardly from the central core, each adapted to individually flex and randomly contact at least the food grinding section of the food waste disposer to clean the

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food grinding section.

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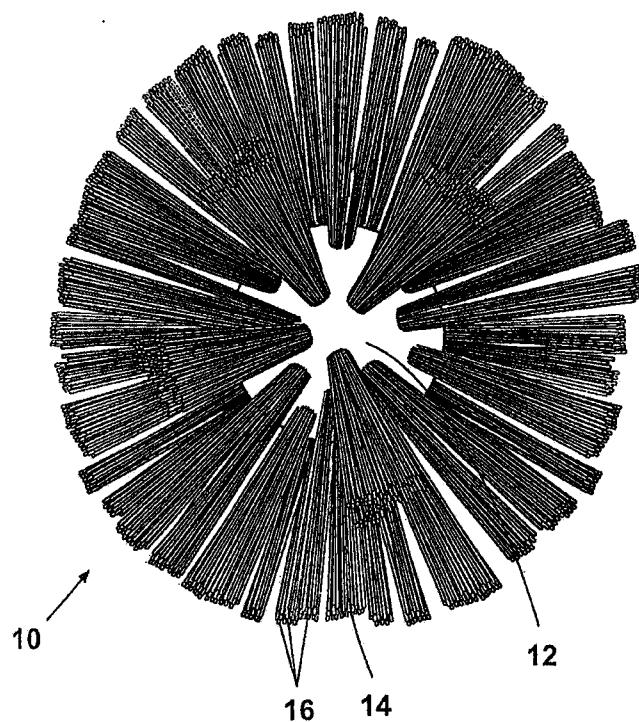


Fig. 1

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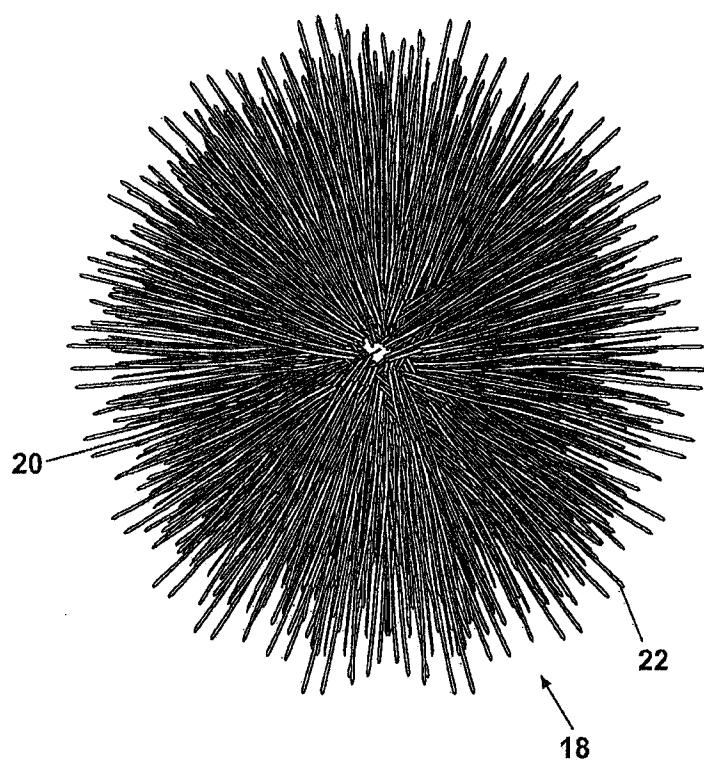
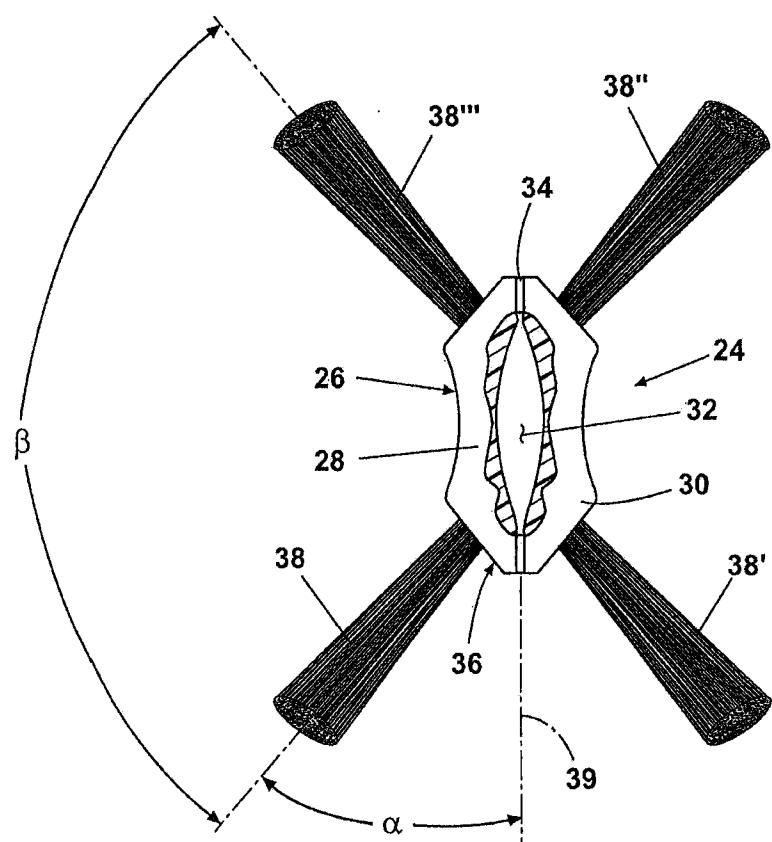
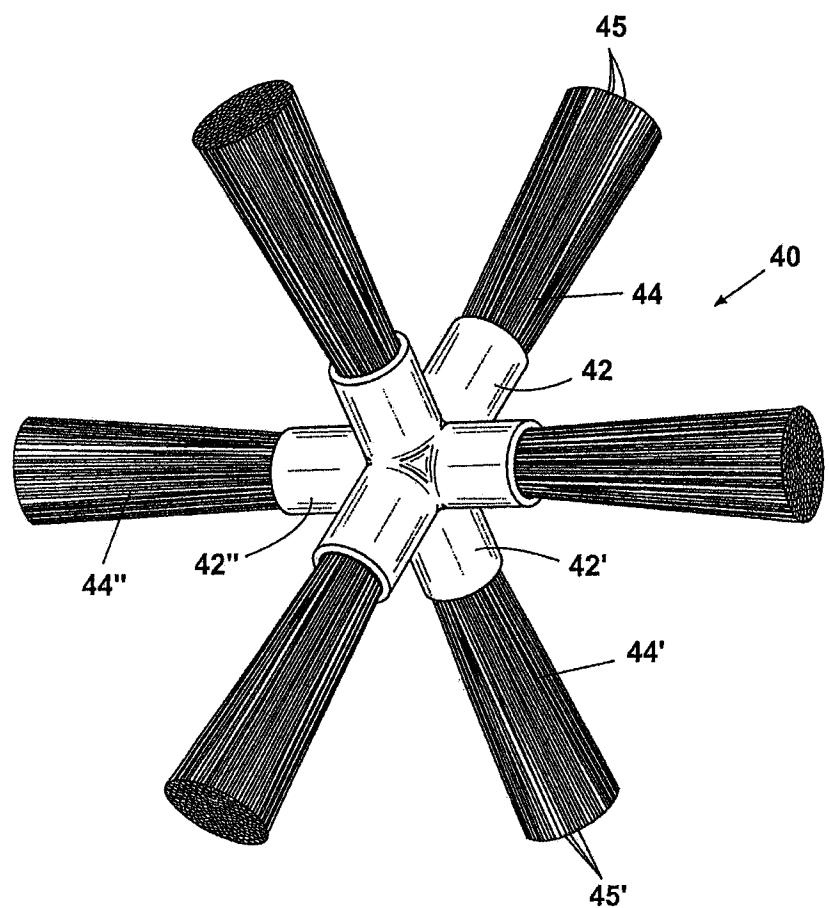


Fig. 2

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**Fig. 3**

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**Fig. 4**

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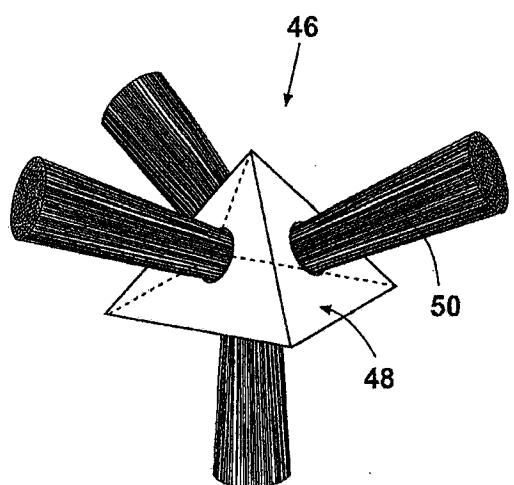


Fig. 5

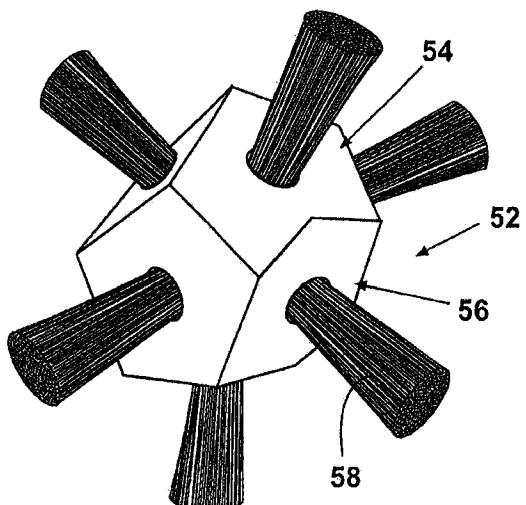


Fig. 6

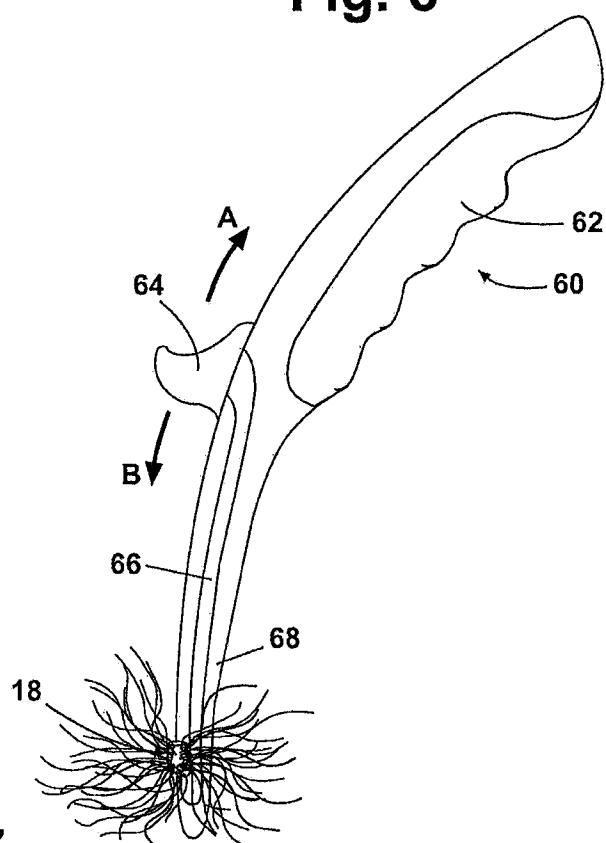


Fig. 7

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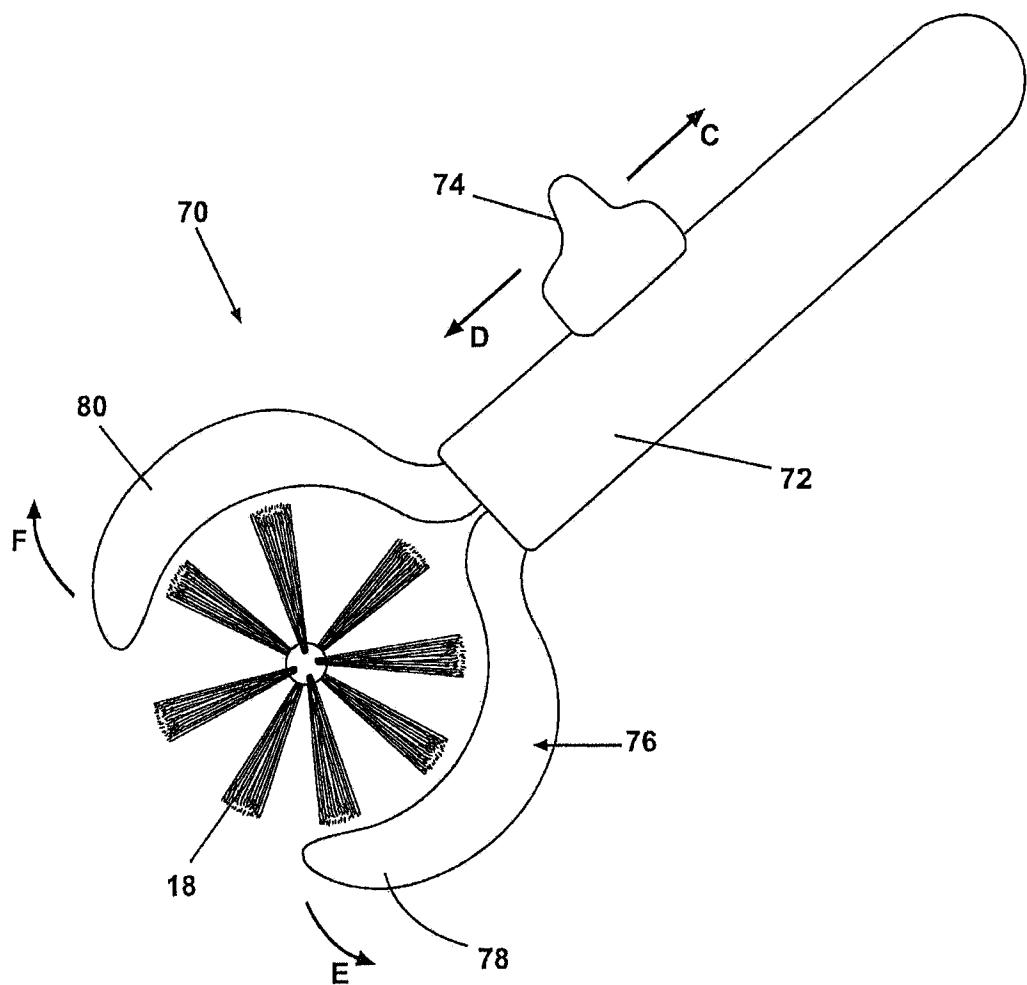


Fig. 8

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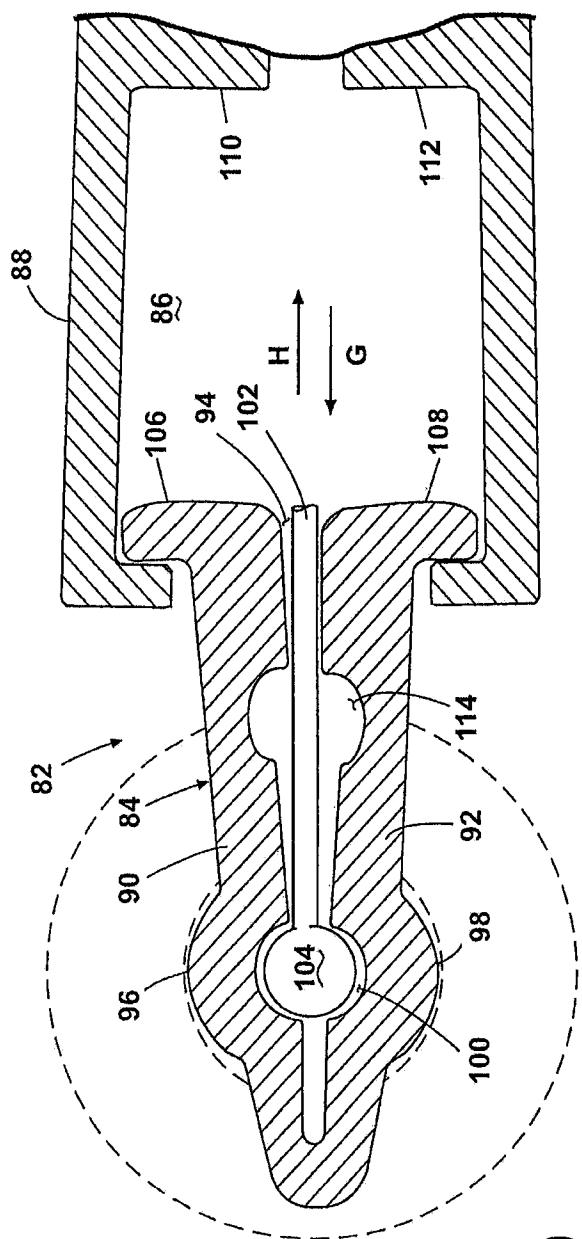


Fig. 9

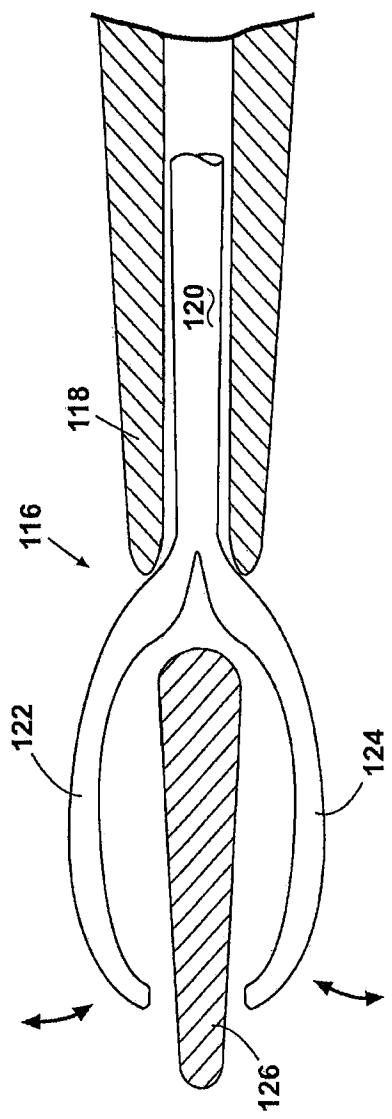


Fig. 10

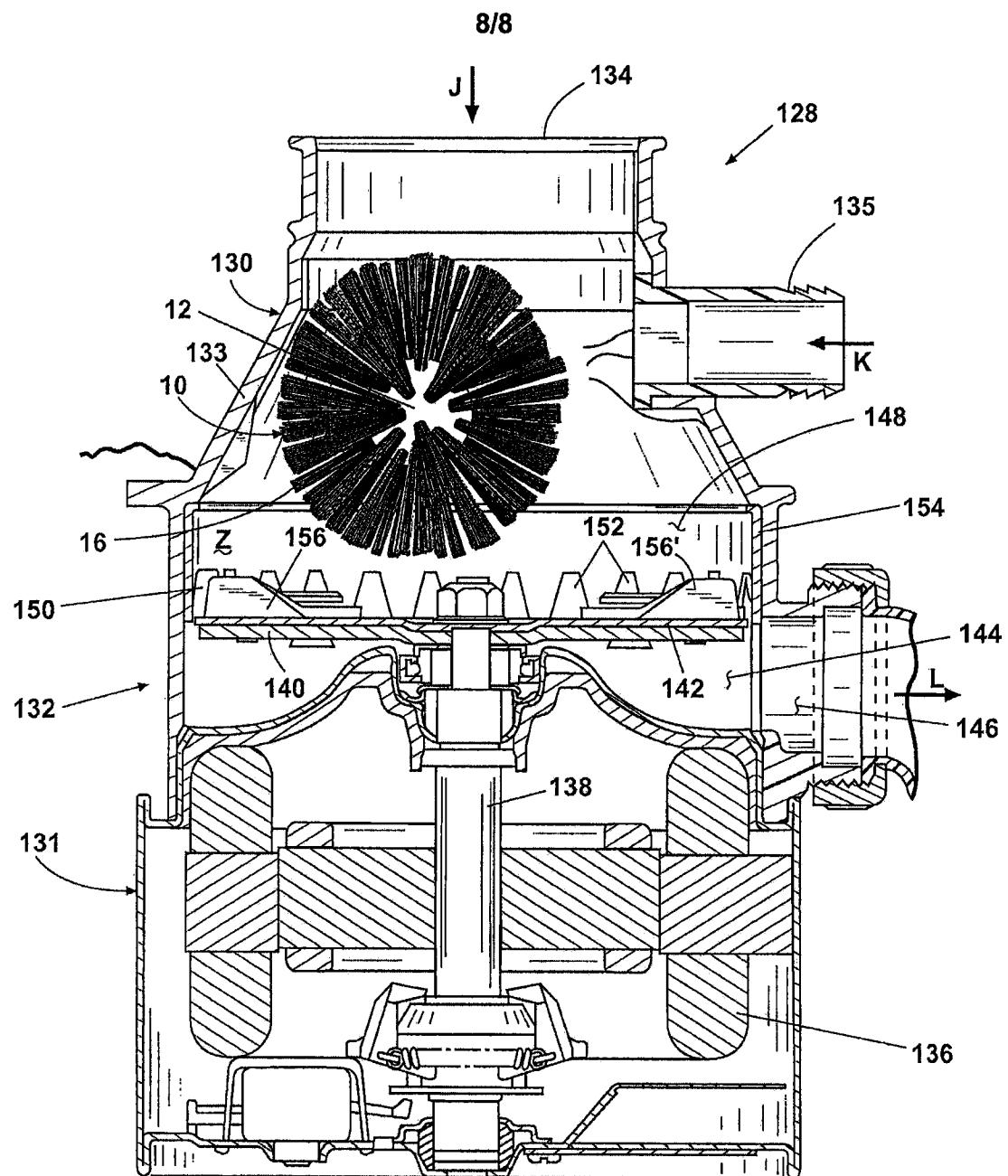


Fig. 11

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2009/031844

A. CLASSIFICATION OF SUBJECT MATTER

A46B 7/06(2006.01)i, A46B 7/10(2006.01)i, A46B 9/02(2006.01)i

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 A46B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models since 1975
Japanese Utility models and application for Utility models since 1975Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
eKIPASS(KIPO internal)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	KR 20-0171270 Y1 (JUNG, G. J.) 15 March 2000 See the whole document.	1,2,5,6,
X	KR 20-0330083 Y1 (KANG, B. G.) 11 October 2003 See figures 1-3 and claim 1.	7,8,10,11,18,19
A	KR 20-0433678 Y1 (PARK, Y.J.) 13 December 2006 See abstract and figures 1-7	1-28
A	JP 2005-253935 A (ISHIDA, KAZUO) 22 September 2005 See the whole document.	1-28
A	US 6,026,534 A (GONDA, Frank et al.) 22 February 2000 See abstract and figures 1-3.	1-28

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search

07 MAY 2009 (07.05.2009)

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2009/031844

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 20-0171270 Y1	15.03.2000	NONE	
KR 20-0330083 Y1	11.10.2003	NONE	
KR 20-0433678 Y1	13.12.2006	NONE	
JP 2005-253935 A	22.09.2005	NONE	
US 6026534 A	22.02.2000	AU 1998-97458 A1 US 6026534 A W0 99-15062 A1	12.04.1999 22.02.2000 01.04.1999