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(54) **FOOD WASTE DISPOSER SCOURING SCRUB DEVICE**

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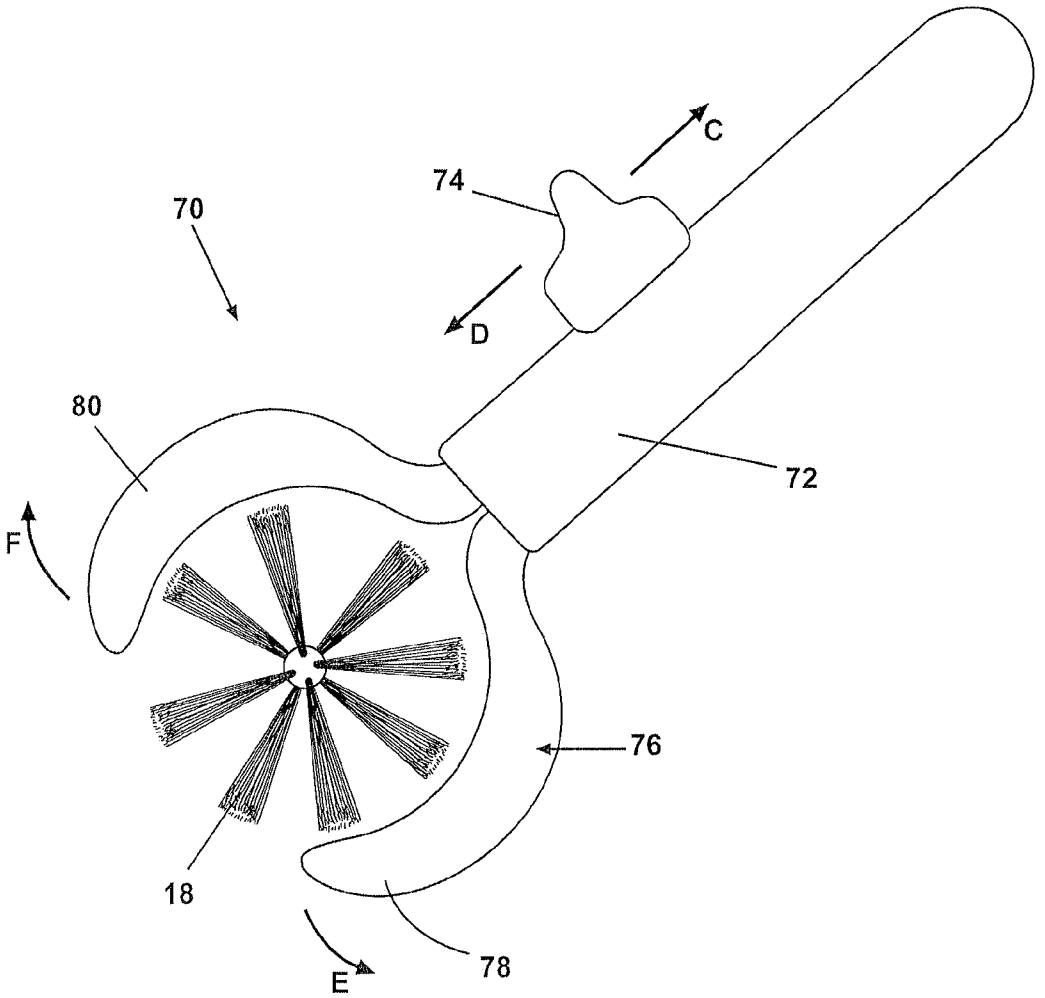
(57) **ABSTRACT**

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.



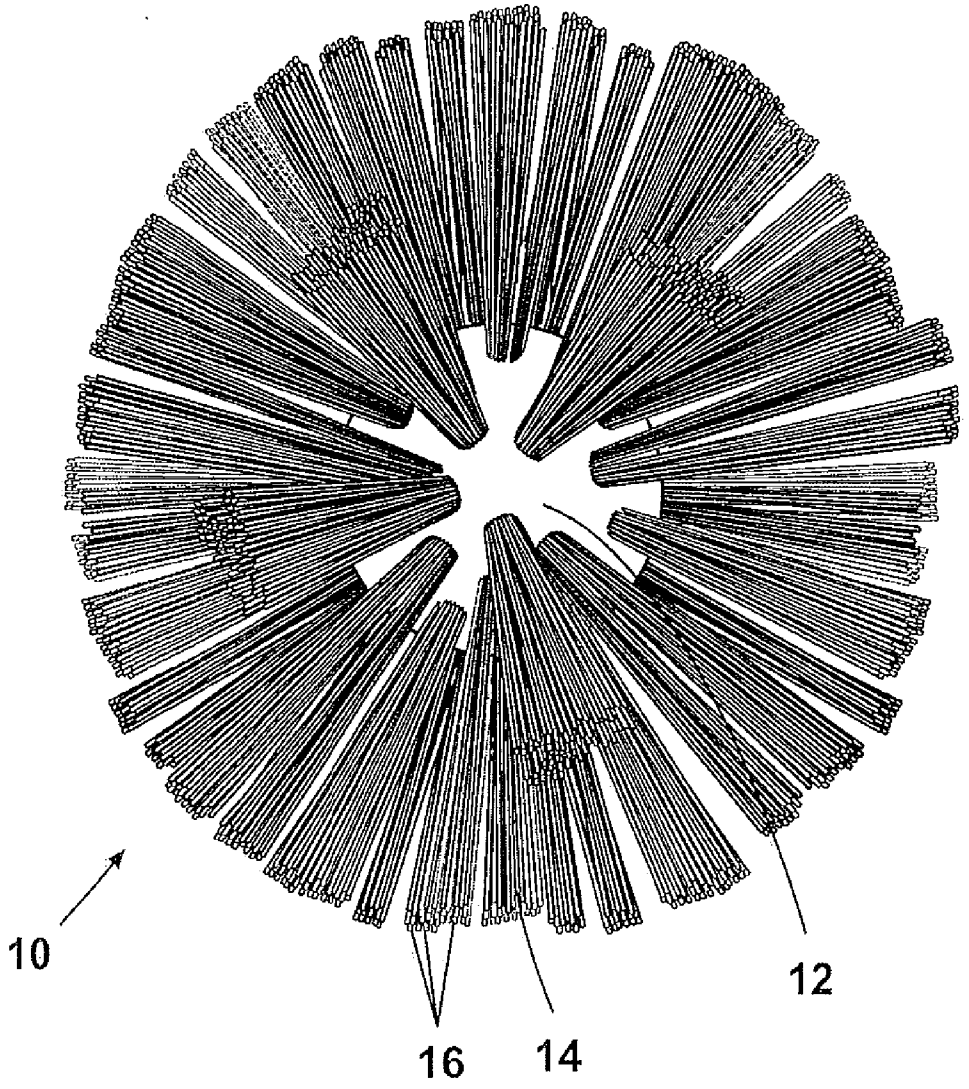


Fig. 1

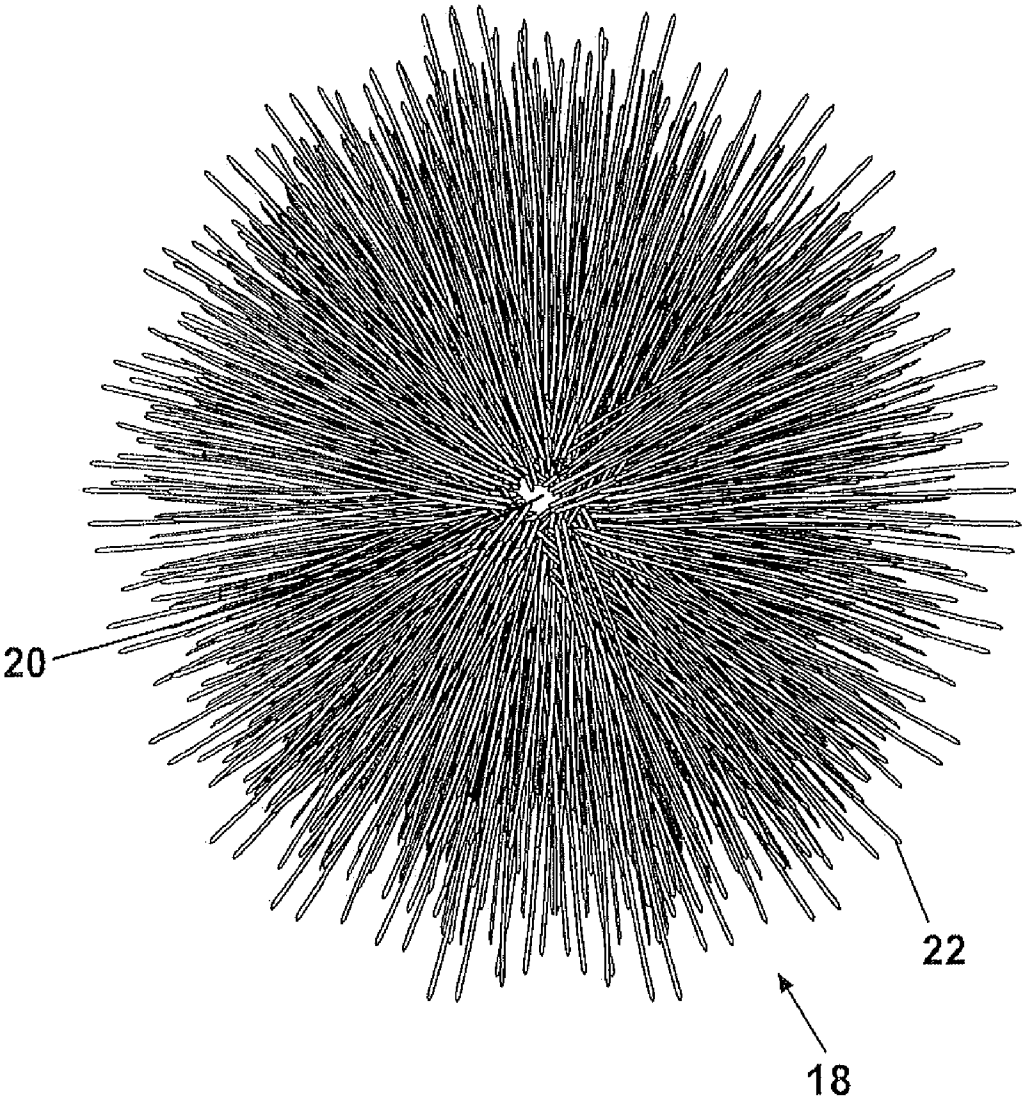


Fig. 2

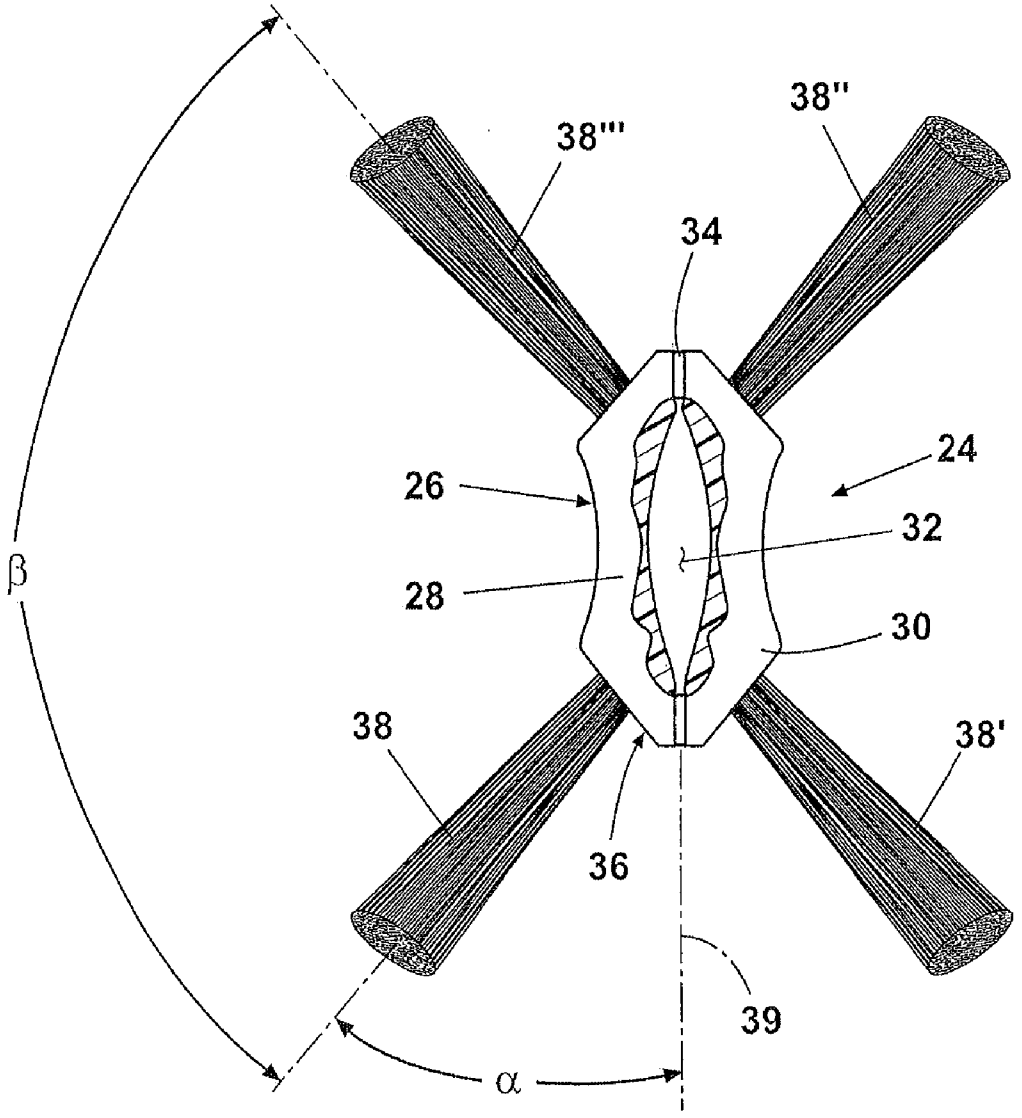


Fig. 3

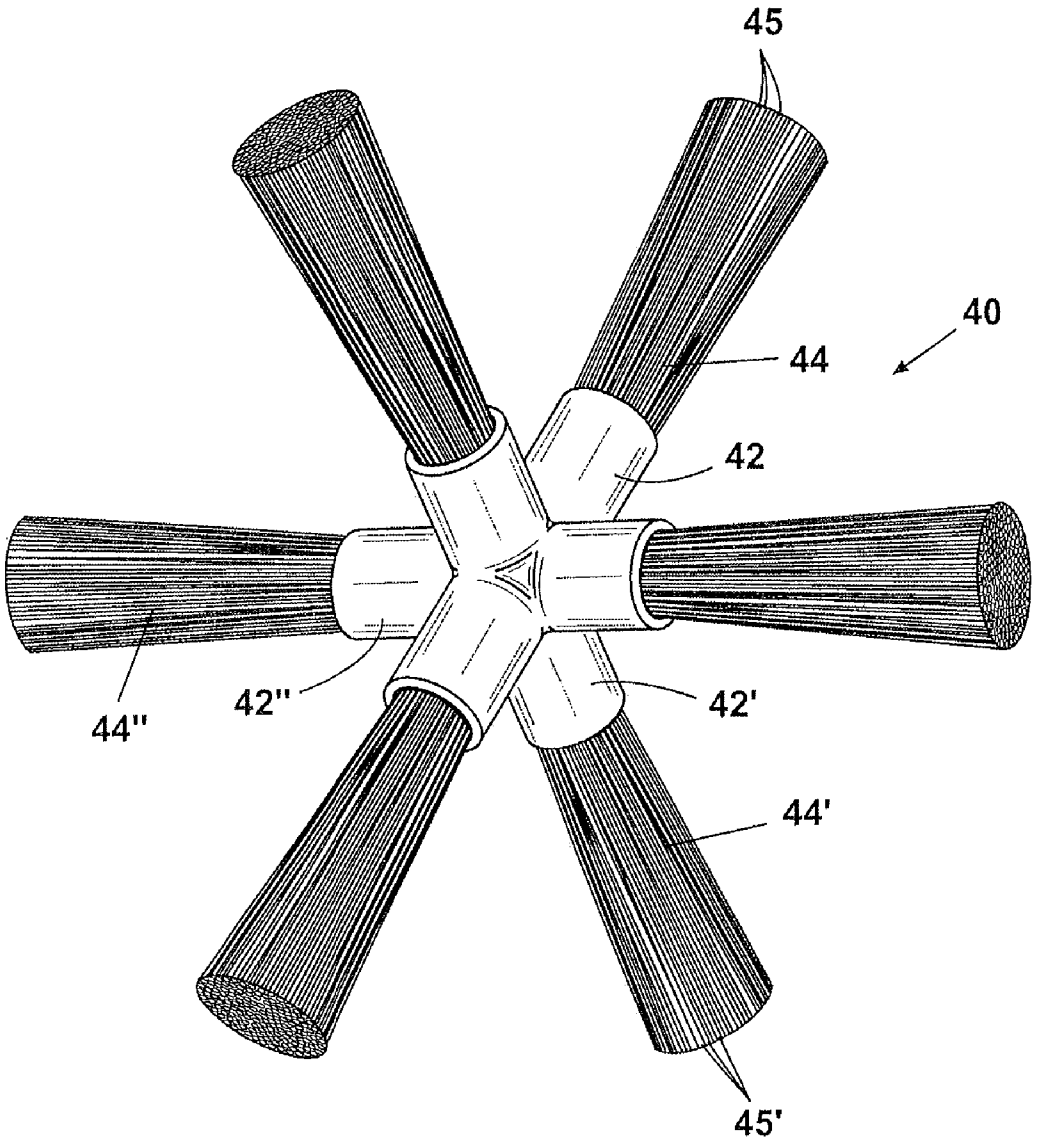


Fig. 4

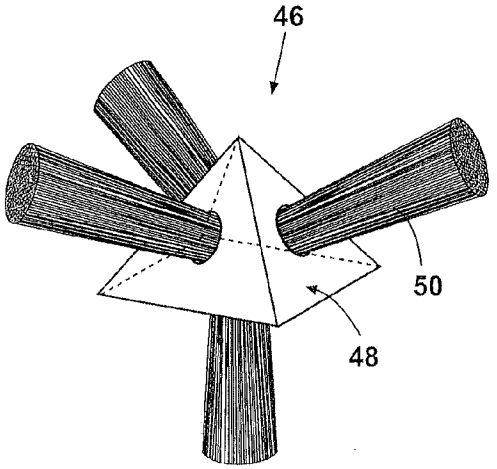


Fig. 5

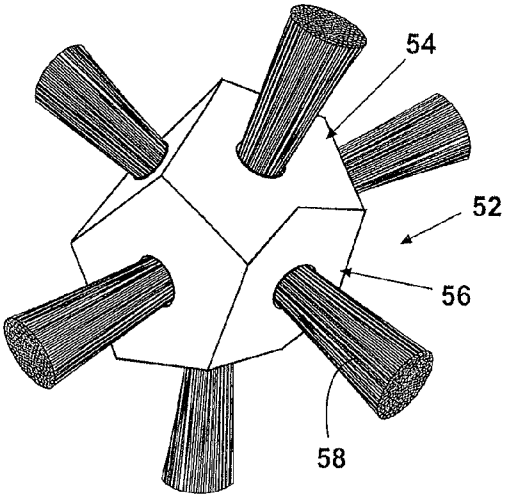


Fig. 6

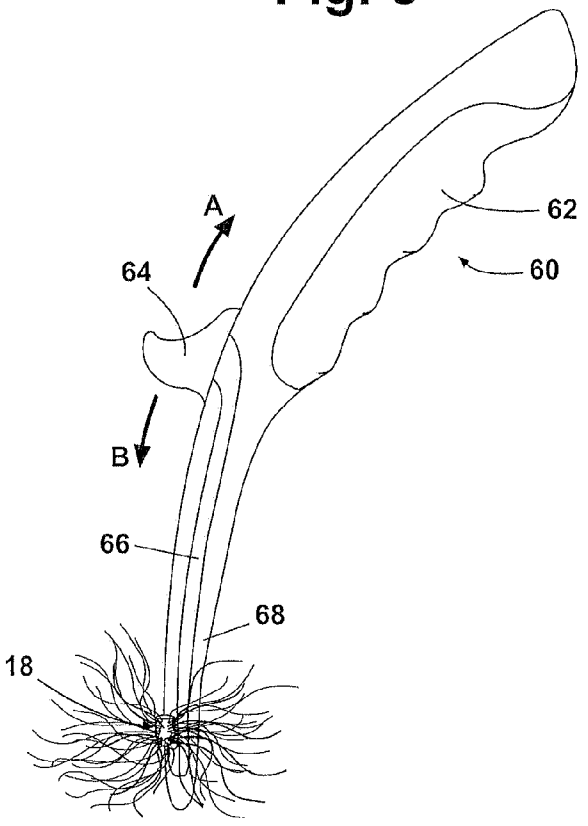


Fig. 7

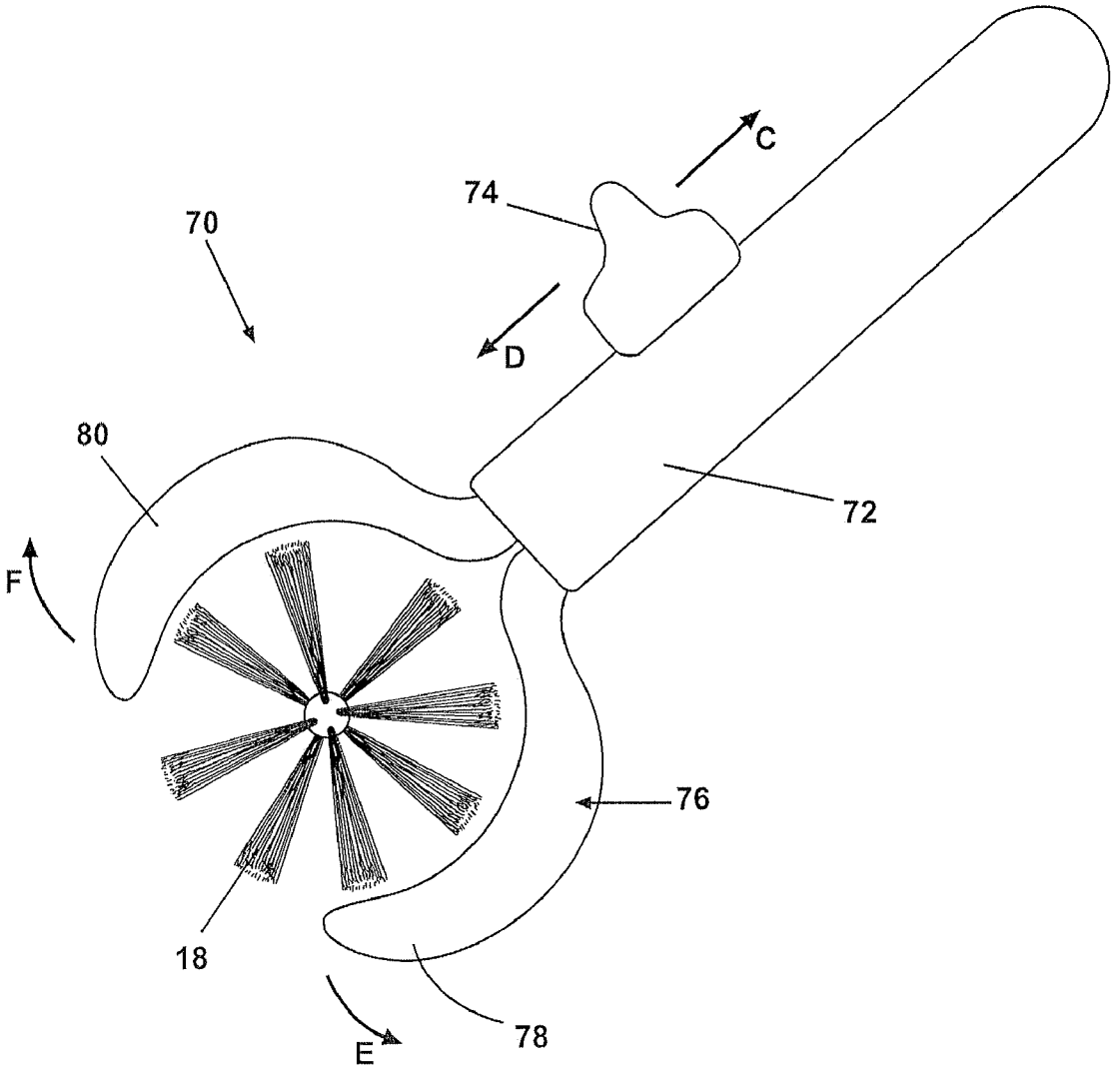


Fig. 8

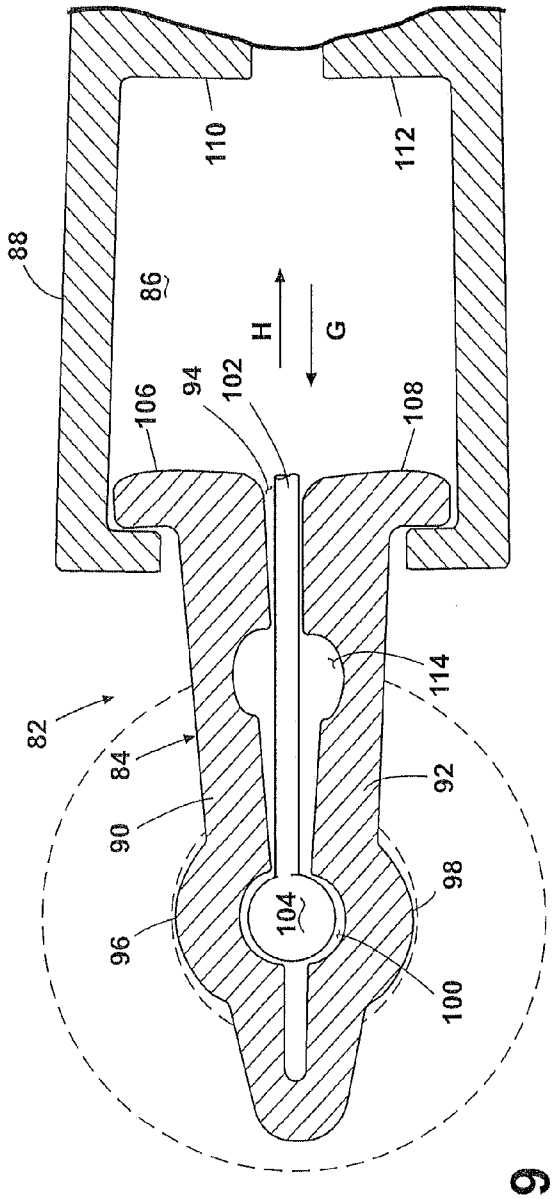

88
86
110
112
H
G
106
94
102
108
82
84
90
114
92
98
104
96
100

Fig. 9

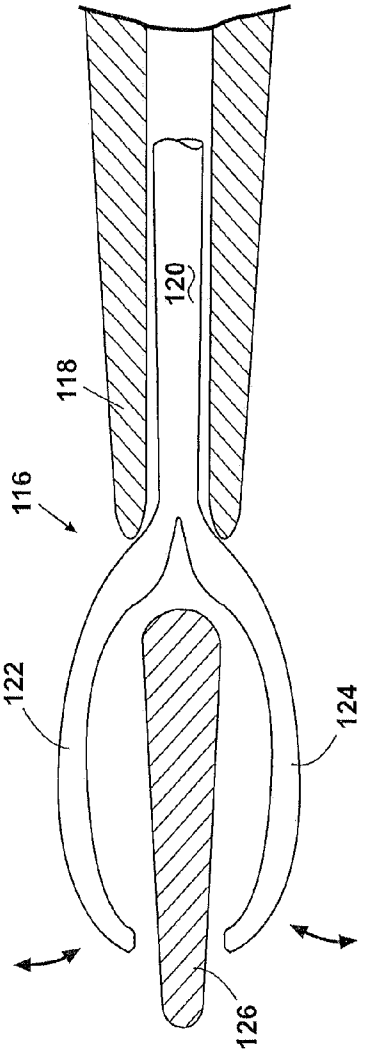

120
118
116
122
124
126

Fig. 10

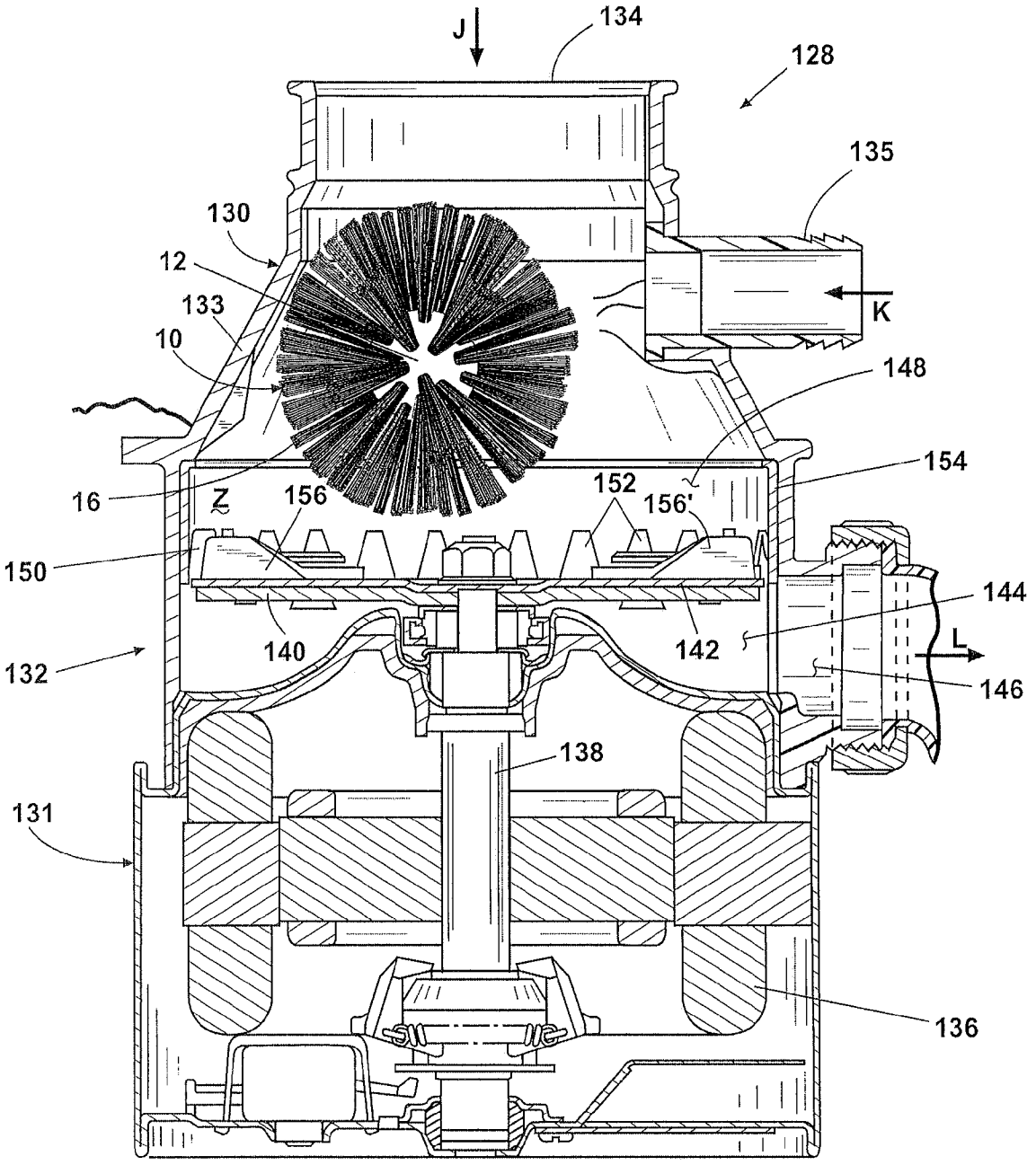

J
134
128
135
130
12
133
10
K
148
154
16
Z
156
152
156'
150
144
140
142
L
132
146
138
131
136

Fig. 11

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 Jan. 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. 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 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 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

[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 disposer while grinding, or can be removed after cleaning.

[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.

[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.

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.

[0011] FIG. **1** is a front perspective view of a scrub device of the present disclosure;

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

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

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

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

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

[0017] FIG. **7** is a front elevational view of a scrub device holding member;

[0018] FIG. **8** is a front elevational view of a scrub device extraction tool;

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

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

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

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.

[0023] Referring to FIG. **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 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 FIG. **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 disposer to clean the disposer.

[0024] Referring to FIG. **2**, in another embodiment a scrub device **18** is modified from the scrub device **10** of FIG. **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 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 quantity of random flexible strands **22** which are grouped together to form central core **20**.

[0025] Referring to FIG. **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 **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 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 bundles **38**, to promote random rotation of scrub device **24**, or to provide improved access to aperture **34**.

[0026] Referring to FIG. **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 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 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 FIG. **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, similar to bundles **44** extends from each of the triangular shaped faces **48**.

[0028] Referring to FIG. **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 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 FIG. **7**, any of the scrub devices previously 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** 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 FIG. **8**, an extraction tool **70** can be provided for 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 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 causing first and second claw arms **78**, **80** to displace toward each other to grasp the scrub device **18**.

[0031] Referring now to FIG. **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 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) 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 to be received in first cavity **100** is positioned as shown in FIG. **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 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 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 sec-

ond raised surfaces **96**, **98** elastically spring toward each other to thereafter reduce the frictional engagement of the scrub device.

[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.

[0034] Referring to FIG. **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 FIG. **10** which forces 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.

[0035] Referring generally to FIG. **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 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 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 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 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** and the ground food waste particles with the water in the form of a slurry moves outwardly as viewed in FIG. **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 (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 FIG. **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 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 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 **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.

1. A scrub device for insertion into a food waste disposer having a 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 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 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 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.

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.

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.

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.

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

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

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.

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

12. (canceled)

13. (canceled)

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.

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 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 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;

each of the body faces including an outwardly extending bundle;

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

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.

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

21-27. (canceled)

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

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 food grinding section.

* * * * *