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Scatterday et al.

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(54) **CLEANING HEAD FOR AN IN-FLOOR POOL CLEANING SYSTEM**

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(51) **Int. Cl.**

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E04H 4/16	(2006.01)
B05B 15/70	(2018.01)
B05B 15/74	(2018.01)

(52) **U.S. Cl.**

CPC ***E04H 4/169*** (2013.01); ***B05B 3/16*** (2013.01); ***B05B 15/70*** (2018.02); ***B05B 15/74*** (2018.02)

(58) **Field of Classification Search**

CPC .. E04H 4/169; B05B 3/14; B05B 3/16; B05B 15/70; B05B 15/72; B05B 15/74

USPC 4/490, 492, 496; 239/204–206

See application file for complete search history.

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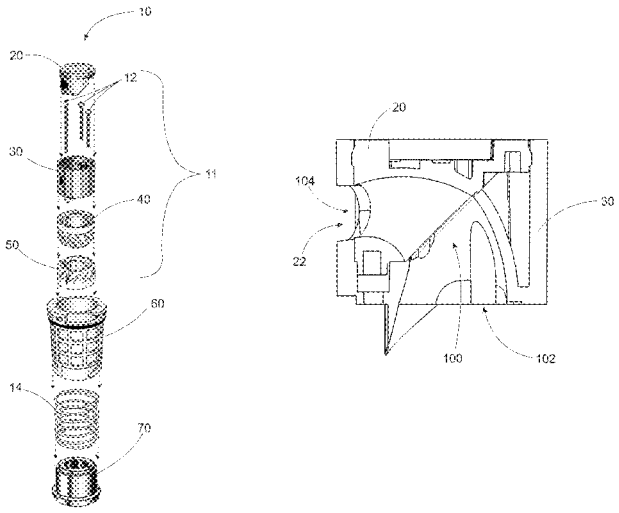
(57) **ABSTRACT**

A cleaning head for an in-floor pool cleaning system is provided. The cleaning head includes a sleeve having a passage and an insert extending through the passage of the sleeve. The insert includes a flow path and an aperture, wherein the flow path is a curved, such as a question mark shape, and exits through the aperture. The insert is moveable between a first position with the aperture retained with in the sleeve and a second position with the aperture extending beyond the sleeve. The flow path may include an overturn at the aperture. The insert includes a nozzle, a nozzle housing, an upper guide, a lower guide and a weight with the flow path extending through each component. The nozzle includes an angled inlet opening that corresponds to an angled outlet opening of the nozzle housing that engage each other when the nozzle is coupled within the nozzle housing.

18 Claims, 10 Drawing Sheets



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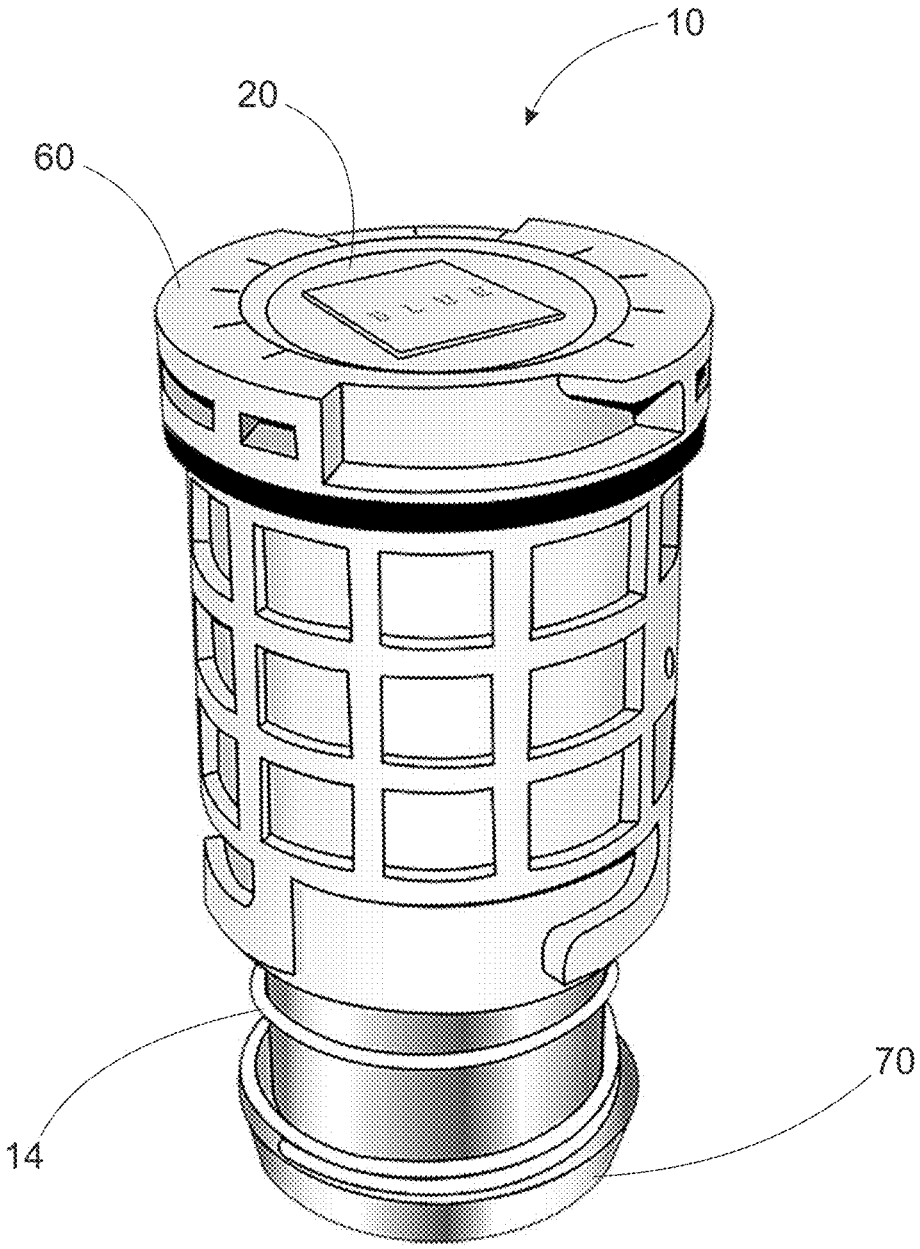

FIG. 1

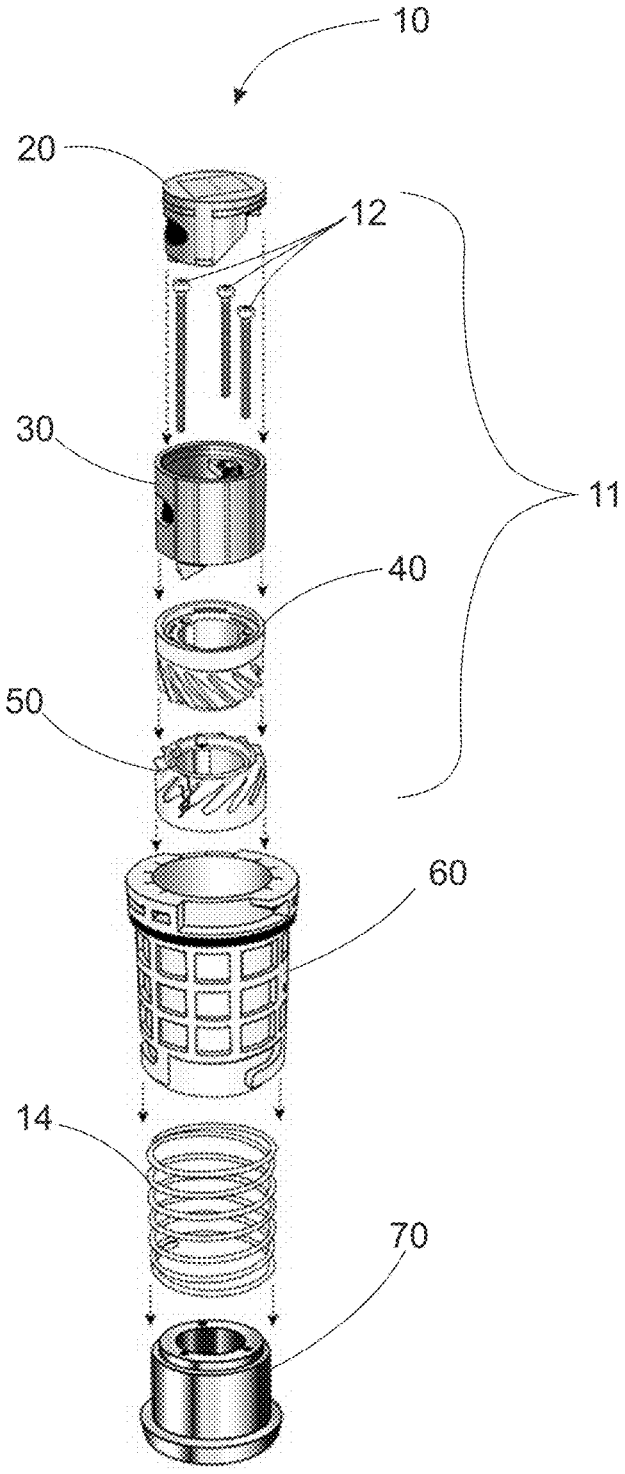

FIG. 2

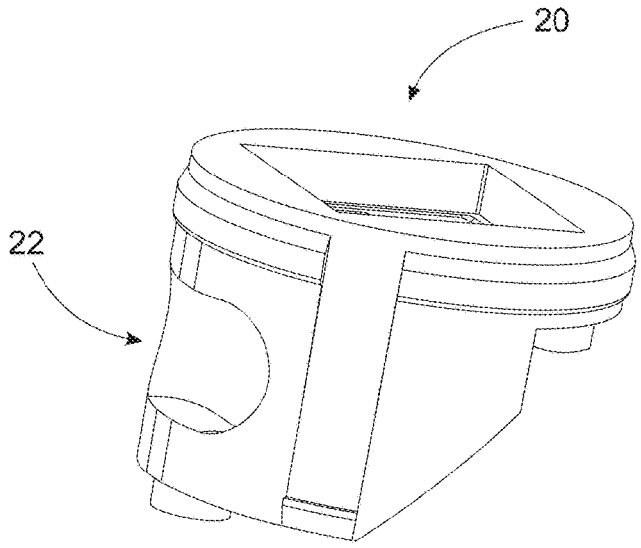

FIG. 3a

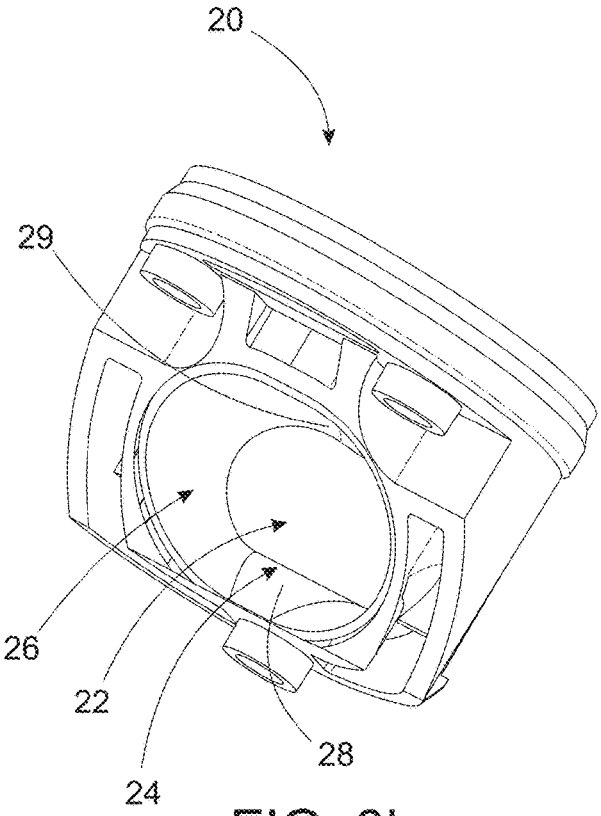

FIG. 3b

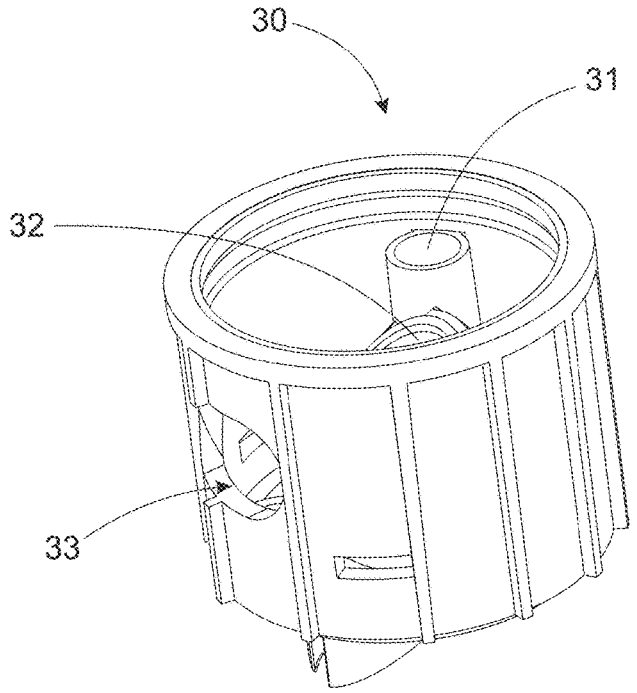

FIG. 4a

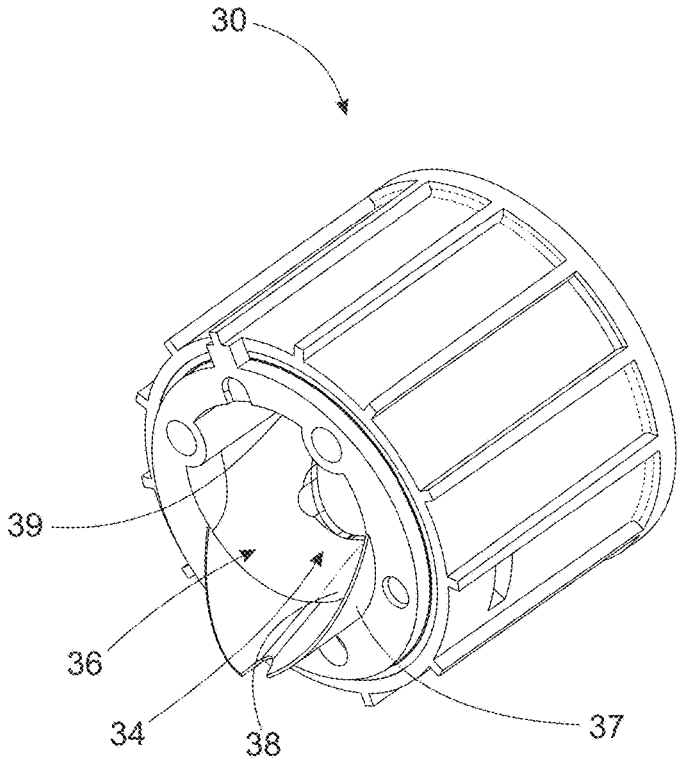

FIG. 4b

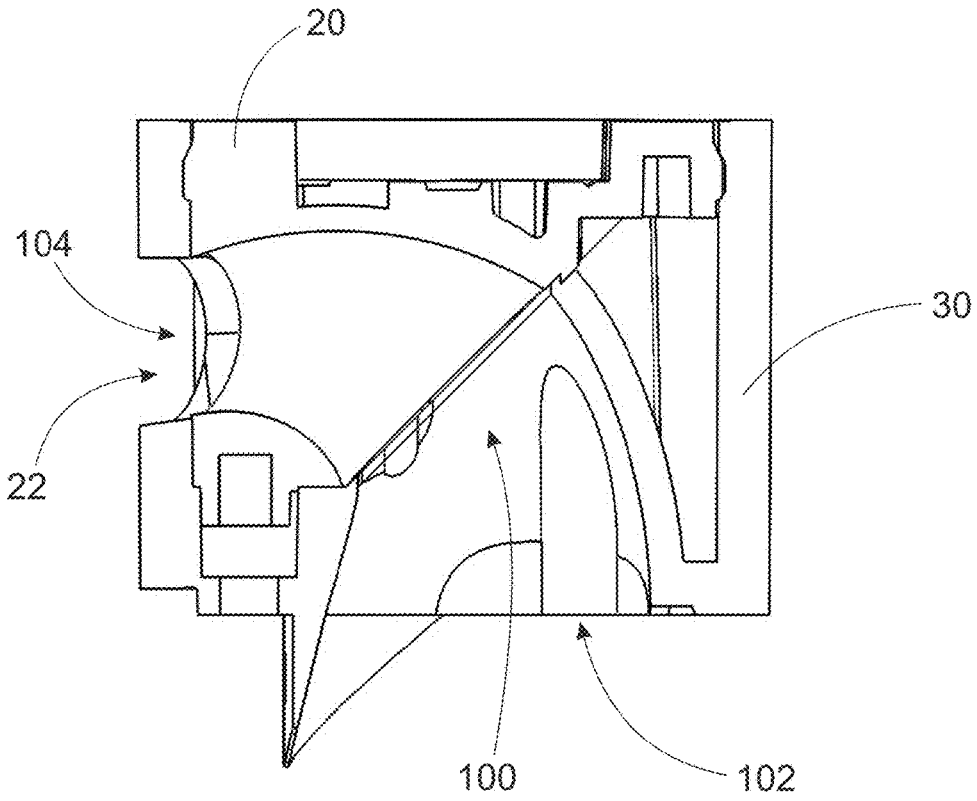

FIG. 5

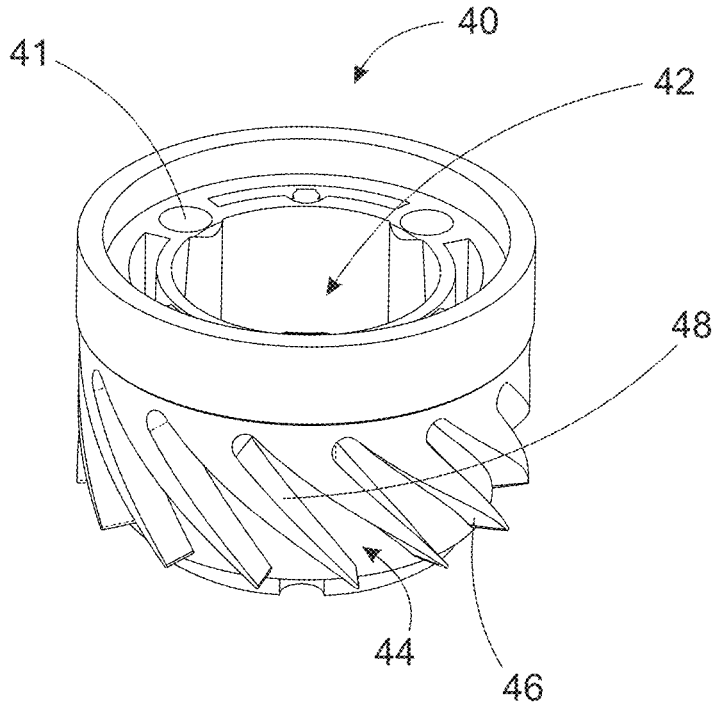

FIG. 6a

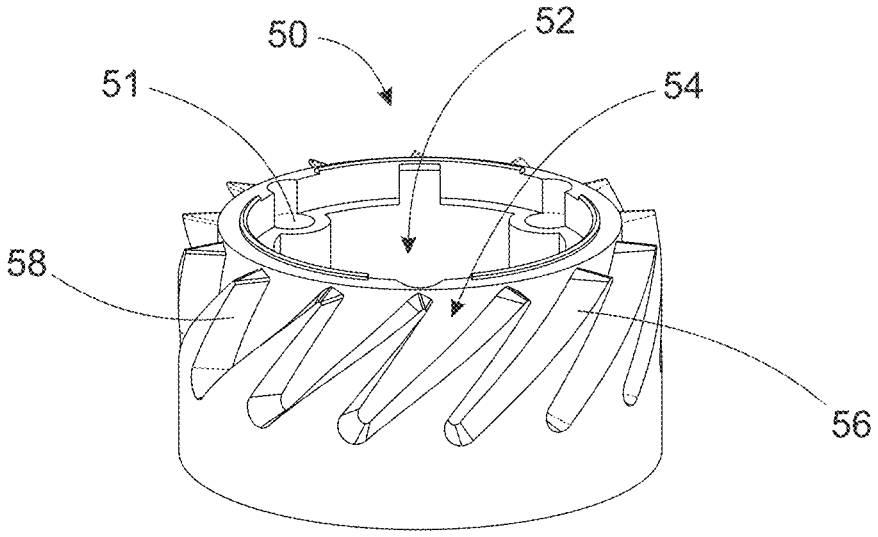

FIG. 6b

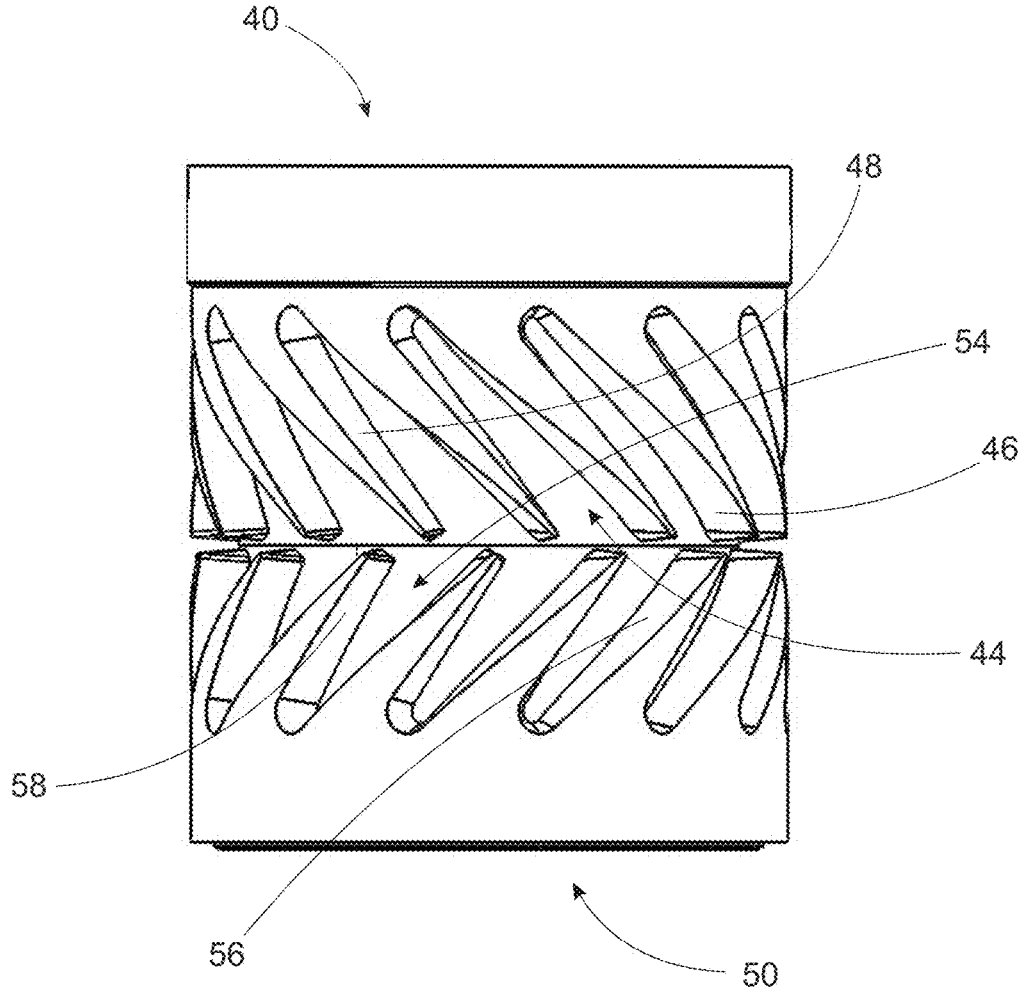

FIG. 6c

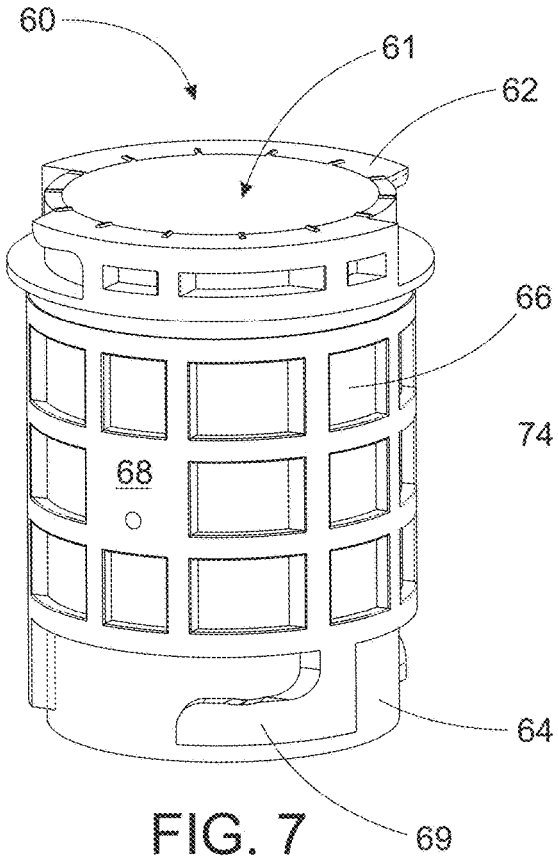

FIG. 7

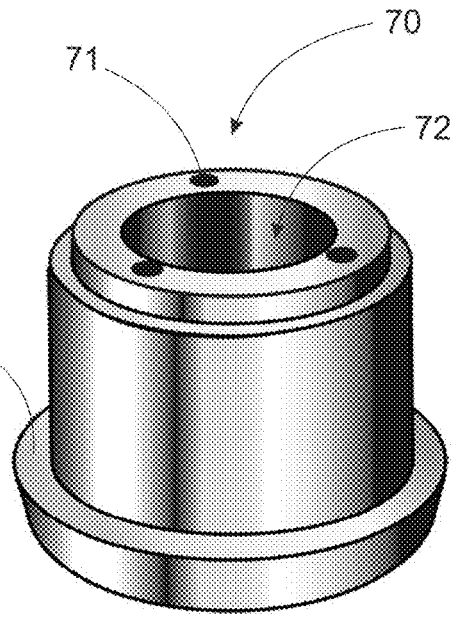

FIG. 8

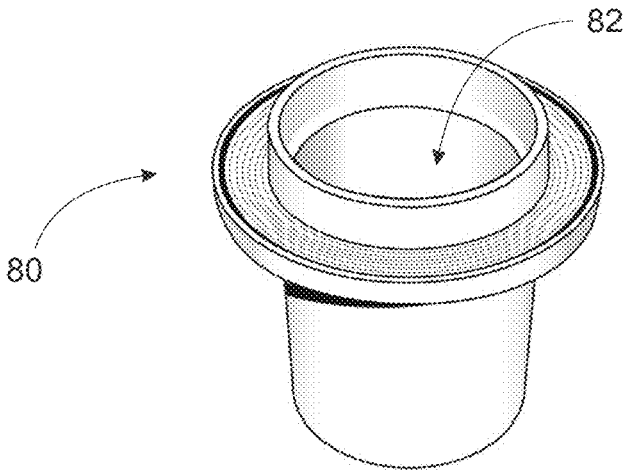

FIG. 9

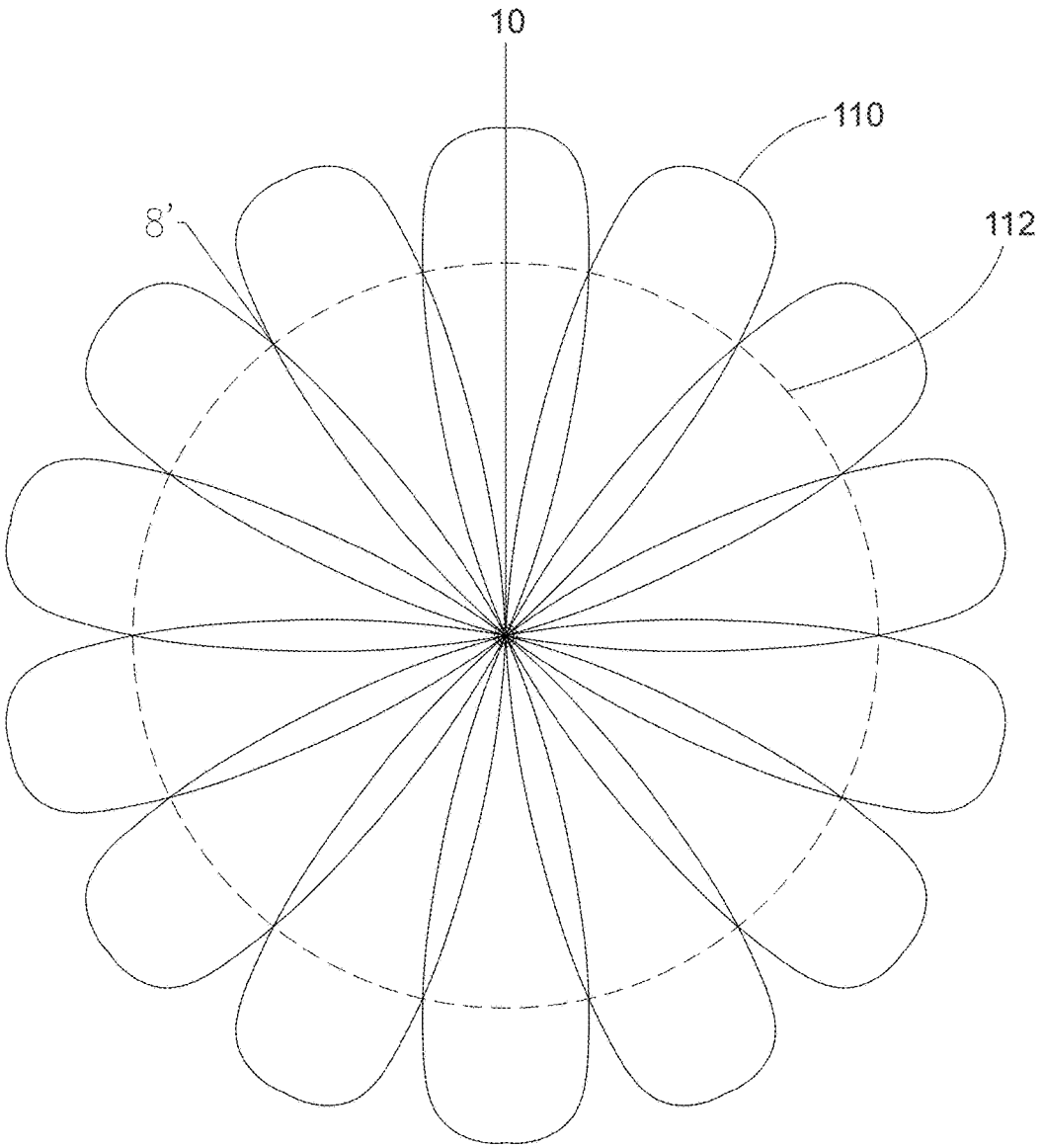

FIG. 10

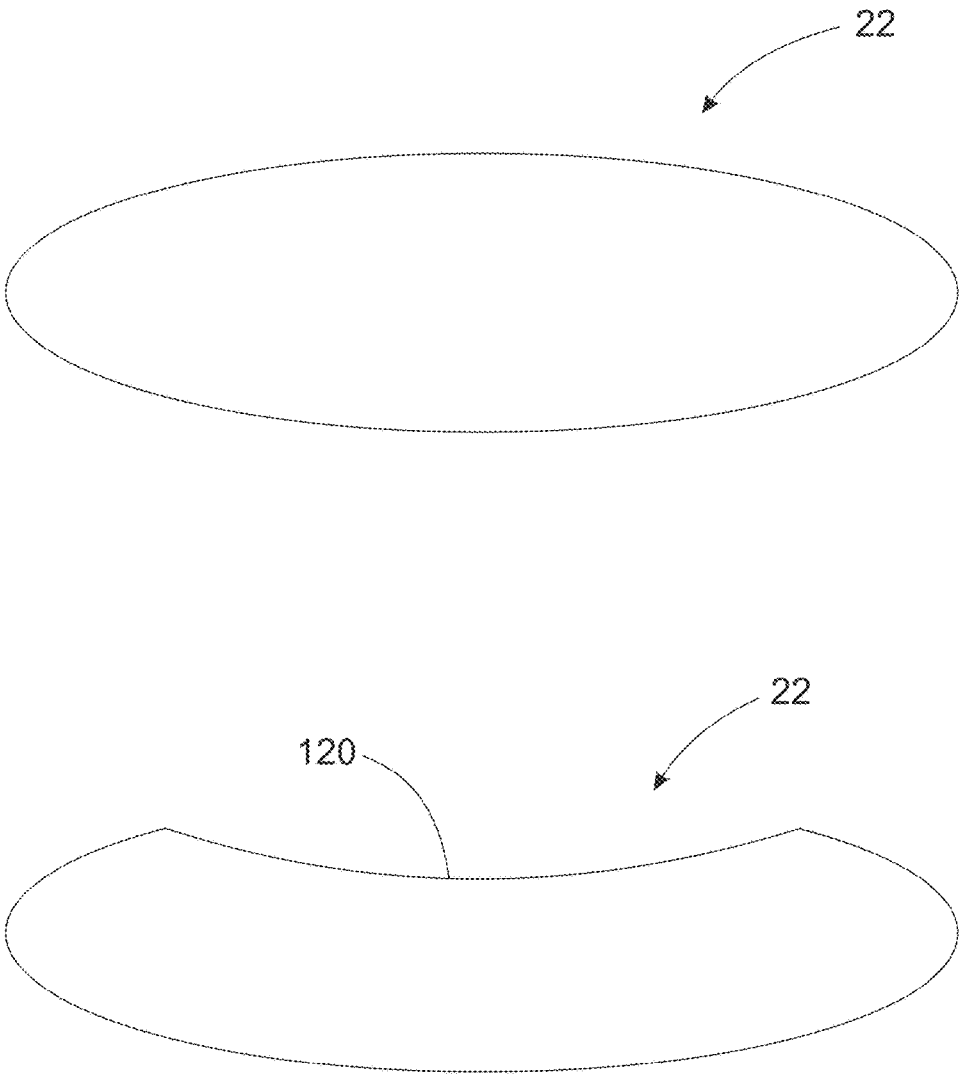

FIG. 11

CLEANING HEAD FOR AN IN-FLOOR POOL CLEANING SYSTEM

CROSS REFERENCE TO RELATED APPLICATION[S]

This application claims priority to U.S. Provisional Patent Application entitled "CLEANING HEAD FOR AN IN-FLOOR POOL CLEANING SYSTEM," Ser. No. 62/257,108, filed Nov. 18, 2015, the disclosure of which is hereby incorporated entirely herein by reference.

BACKGROUND OF THE INVENTION

Technical Field

This invention relates generally to in-floor pool cleaning systems and more particularly to heads for in-floor pool cleaning systems.

State of the Art

In-floor pool cleaning systems have been developed that clean the inner surfaces of a pool by using pressurized bursts of water from cleaning heads mounted in the floor, sides and/or steps of the pool to move debris (which includes dirt, leaves and other material in the pool) into one or more drains where vacuum pulls the debris into a filtering system. A pump, a distribution valve connected to the pump, and one or more cleaning heads connected to the distribution valve are used in a typical in-floor cleaning system. The pump delivers pressurized water into the distribution valve, which directs the pressurized water to successively control the operation of one or more cleaning heads at a time.

Cleaning heads are mounted in the floor, side or steps of a pool and are preferably flush with the pool surface. When pressurized water is diverted by the valve to a particular cleaning head (or group of cleaning heads), the pressurized water enters the insert and pushes the insert partially out of the sleeve so that the opening in the insert extends beyond the sleeve. The insert has an aperture through which pressurized water flows in order to push debris towards a drain. Conventional cleaning heads are limited in their effectiveness to move debris because of the flow of pressurized water through the cleaning head. Accordingly, there is a need for an improved cleaning head for in-floor pool cleaning systems.

DISCLOSURE OF THE INVENTION

The present invention relates to a cleaning head for use within an in-floor pool cleaning system. The cleaning head improves the cleaning ability of the cleaning head over existing cleaning heads.

An embodiment includes a cleaning head for an in-floor pool cleaning system, the cleaning head comprising: a sleeve having a passage; and an insert extending through the passage of the sleeve, the insert comprises a flow path and an aperture, wherein the flow path is curved flow path, and wherein the insert is moveable between a first position with the aperture retained within the sleeve and a second position with the aperture extending beyond the sleeve. The flow path may include an overturn at the aperture.

The insert may comprise a nozzle, a nozzle housing, an upper guide, a lower guide and a weight. The flow path extends through each of the nozzle, the nozzle housing, the upper guide, the lower guide and the weight. The nozzle comprises an inlet opening and an aperture, wherein the inlet opening is angled with respect to a top surface of the nozzle. The nozzle housing comprises an inlet opening and an outlet opening, wherein the outlet opening is angled with respect to a top surface of the nozzle housing. The angled inlet opening of the nozzle corresponds to the angled outlet opening of the nozzle housing and the engage each other when the nozzle is coupled within the nozzle housing.

Another embodiment includes a cleaning head for an in-floor pool cleaning system, the cleaning head comprising a sleeve having a passage; and an insert extending through the passage of the sleeve. The insert comprises a nozzle; a nozzle housing comprising an extension portion; an upper guide; a lower guide; a flow path; and an aperture, wherein the flow path is a curved flow path that exits the insert through the aperture, and wherein the insert is moveable between a first position with the aperture retained within the sleeve and a second position with the aperture extending beyond the sleeve; and wherein the extension portion of the nozzle housing extends into the upper guide when the nozzle housing is coupled to the upper guide, the extension portion forming a portion of the curved flow path.

The foregoing and other features and advantages of the present invention will be apparent from the following more detailed description of the particular embodiments of the invention, as illustrated in the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

A more complete understanding of the present invention may be derived by referring to the detailed description and claims when considered in connection with the Figures, wherein like reference numbers refer to similar items throughout the Figures, and:

FIG. **1** is a perspective view of a cleaning head for an in-floor pool cleaning system, in accordance with embodiments;

FIG. **2** is a perspective exploded view of a cleaning head for an in-floor pool cleaning system, in accordance with embodiments;

FIG. **3***a* is a top perspective view of a nozzle of a cleaning head, in accordance with embodiments;

FIG. **3***b* is a bottom perspective view of a nozzle of a cleaning head, in accordance with embodiments;

FIG. **4***a* is a top perspective view of a nozzle housing of a cleaning head, in accordance with embodiments;

FIG. **4***b* is a bottom perspective view of a nozzle housing of a cleaning head, in accordance with embodiments;

FIG. **5** is a section view of a nozzle coupled to a nozzle housing of a cleaning head, in accordance with embodiments;

FIG. **6***a* is a perspective view of an upper guide of a cleaning head, in accordance with embodiments;

FIG. **6***b* is a perspective view of a lower guide of a cleaning head, in accordance with embodiments;

FIG. **6***c* is a side view of an upper guide coupled to a lower guide of a cleaning head, in accordance with embodiments;

FIG. **7** is perspective view of a sleeve of a cleaning head, in accordance with embodiments;

FIG. **8** is a perspective view of a weight of a cleaning head, in accordance with embodiments;

FIG. **9** is a perspective view of a collar for use with a cleaning head; in accordance with embodiments;

FIG. **10** is a diagrammatic view of a throw path and cleaning area of a cleaning head, in accordance with embodiments; and

FIG. **11** is a diagram of various shapes of an aperture of a valve of a cleaning head, in accordance with embodiments.

DETAILED DESCRIPTION OF EMBODIMENTS OF THE INVENTION

As discussed above, embodiments of the present invention relate to a cleaning head for use within an in-floor pool cleaning system. The cleaning head improves the cleaning ability of the cleaning head over existing cleaning heads.

Turning now to the drawings, where the purpose is to describe an embodiment of the invention and not limit same, FIGS. **1-9** show a cleaning head (or "head") **10** according to a preferred embodiment of the invention. Cleaning head **10** generally comprises three components: a sleeve **60**, an insert **11** and a biasing element **14**. The function of the sleeve **60** is to mount into the interior **82** of a collar **80**, shown in FIG. **9**, which is already mounted in the floor, side or steps of a pool and to retain the insert **11**. Any suitable structure for this function may be used.

Sleeve **60** includes a top (or first end) **62**, bottom (or second end) **64** and a generally cylindrical body **66** with an outer wall **68**. A passage **61** is defined within the body **66**. Passage **61** allows for insert **11** to move within passage **61**, such as, but not limited to sliding within passage **61** of sleeve **60**. As shown, the outer wall **68** includes mounting structures **69** that are known as "bayonet-style" mounting structures. These secure the sleeve **60** into a cavity under (or behind) the surface of a pool, preferably within the interior **82** of collar **80**, and any suitable mounting structure may be used.

The purpose of collar **80** is to be positioned beneath the surface of the pool and to receive sleeve **60** with insert **11** mounted therein. Sleeve **60** can be removably mounted in collar **80** by a tool. Collar **80** and sleeve **60** can have any suitable structure for releasably connecting to one another and many such structures are known in the art.

Insert **11** includes a nozzle **20**, a nozzle housing **30**, an upper guide **40** and a lower guide **50**. The insert may be coupled to a weight **70** by use of connectors **12**, through upper guide mounting holes **41**, lower mounting holes **51**, and connector receiving recesses **71** of weight **70**. The function of insert **11** is to direct pressurized water to move debris to an area where it can be filtered from the water. As shown, each component may be cylindrical.

Nozzle **20** includes an aperture **22** and a flow path **24**. Further, nozzle **20** includes inlet opening **26**, wherein the inlet opening **26** is at an angle with respect to a top surface of the nozzle **20**. In embodiments, and without limitation, the inlet opening **26** may be at a 45 degree angle with respect to the top surface of the nozzle **20**. The flow path **24** may include an inner surface **28** and an outer surface **29**. The inner surface **28** and outer surface **29** each have a curved shape.

Nozzle housing **30** includes an inlet opening **36** and a flow path **34**. Further, nozzle housing **30** includes outlet opening **32**, wherein the outlet opening **32** is at an angle with respect to a top surface of the nozzle housing **30**. In embodiments, and without limitation, the outlet opening **32** may be at a 45 degree angle with respect to the top surface of the nozzle **30**. The flow path **34** may include an inner surface **38** and an outer surface **39**. The inner surface **38** and outer surface **39** each have a curved shape. The nozzle housing **30** includes an extension portion **37** that extends into the upper guide **40** when the nozzle housing **30** is coupled to the upper guide **40**. The extension **37** begins the curved shape of the inner surface **38**. Nozzle housing **30** further includes a side aperture **33** through which water may be emitted from the nozzle **30**.

The nozzle **20** may be coupled to the nozzle housing **30**, wherein the inlet opening **26** of the nozzle engages the outlet opening **32** of the nozzle housing **30**. The angle of the inlet opening **26** of the nozzle **20** corresponds to the angle of the outlet opening **32** of the nozzle housing **30**. The perimeter of the inlet opening **26** of the nozzle **20** may be the same size and shape as the perimeter of the outlet opening **32** of the nozzle housing **30**. In this way, when the nozzle **20** is coupled to the nozzle housing **30**, a continuous flow path is created between flow path **34** and flow path **24**. The angle of the inlet opening **26** of the nozzle **20** and the outlet opening **32** of the nozzle housing **30** ensure that the flow path **34** is properly aligned with the flow path **24**. Proper alignment of the flow paths **34** and **24** include the inner surface **38** of flow path **34** connected to the inner surface **28** of flow path **24** and the outer surface **39** of flow path **34** connected to the outer surface **29** of flow path **24**. The flow paths **34/24** provide a combined flow path **100** with an inlet **102** and an outlet **104**. The outlet **104**. The flow path **100** may be curved in order to reduce turbulence through the flow path **100** to create more laminar flow of water. For example and without limitation, flow path **100** may include two curves, such as a question mark shape, a hook shape, and the like. The combined flow path **100** exits through aperture **22** that is aligned with opening **31** of the nozzle housing **30** to allow water flowing through the flow path **100** to exit the aperture **22** without being impeded by the nozzle housing **30**.

The upper guide **40** may include a flow path **42** extending through the upper guide **40**, wherein coupling the nozzle housing **30** to the upper guide **40** extends the flow path **100** through the upper guide **40**. The upper guide **40** may include grooves **44** wherein each groove **44** includes a first surface **46** and a second surface **48** on either side of the groove **44**. The first and second surfaces **46** and **48** are helical in shape and twist as they extend around an outer surface of the upper guide **40**.

The lower guide **50** may include a flow path **52** extending through the lower guide **50**, wherein coupling the upper guide **40** to the lower guide **50** extends the flow path **100** through the lower guide **50**. The lower guide **50** may include grooves **54** wherein each groove **54** includes a first surface **56** and a second surface **58** on either side of the groove **54**. The first and second surfaces **56** and **58** are helical in shape and twist as they extend around an outer surface of the lower guide **50**.

The purpose of grooves **44** and **54**, as shown in FIG. **6***c* is to help index the insert **11**. When the insert **11** is coupled within the sleeve **60**, as shown in FIG. **1**, one or more pins (not shown) may be coupled to the sleeve **60** within the passage **61**. Each pin engages the grooves **44** and **54** on the outer surface of the upper and lower guides **40** and **50** respectively as the insert **11** moves from one or more of its first position retracted within the sleeve **60** to its second position extended from the sleeve **60**, or its second position to its first position. In this manner, the insert **11**, and hence aperture **22**, sequentially rotates and the aperture **22**, releases pressurized water to different locations on the pool surface as it rotates to different positions. The insert **11** moving from its first position to its second position and then from its second position to its first position includes one movement cycle, in one movement cycle, the pin may move from one groove **44** to another groove **54** and then back to a second groove **44** adjacent the first groove **44** at the beginning of the movement cycle. The angle of the grooves produces the indexing, while the helical twisting shape of the grooves operates to create more than one point of contact, reduces

wear, reduces friction and provides a more positive advancement of the rotation of the insert **11**.

The weight **70** includes a flow path **72**, wherein coupling the lower guide **50** to the weight **70** extends the flow path **100** through the weight **70**. Weight **70** may include a lip **74** that has a larger radius that the outer surface of the weight **70**. The outer surface of the weight **70** is a size and shape to slide within the sleeve **60**. The lip **74** is of a size to engage the bottom surface of the second side **64** of the sleeve **60** to prevent the insert **11** from sliding completely out of the sleeve **60** when pressurized water flows through flow path **100**. Insert **11** has a first position (shown in FIG. **1**) in which it is retained within sleeve **60** and the aperture **22** does not extend beyond the sleeve **60**. Insert **11** has a second position in which it extends partially beyond the tope surface of the sleeve **60** and aperture **22** extends beyond the top surface of the sleeve **60**.

The biasing element **14** may be a conical spring. The purpose of biasing element **14** is to bias insert **11** towards its first position and any structure or device suitable for this purpose may be used. Conical spring **14** is configured to fit over the outer surface **76** of the weight and engage each the lip **74** of the weight and a bottom surface of the sleeve **60**. The biasing element **14** is partially loaded or compressed in order to a bias the insert **11** toward the first position. The weight **70** operates as another biasing element by allowing gravity to act on the weight **70**. The pressurized water flowing through the flow path **100** that extends through the insert **11** is of a sufficient force to overcome the combined biasing force of the weight **70** and the force of the biasing element **14**. One advantage of using a conical spring biasing element **14**, as opposed to a standard, right cylindrical spring used in prior art heads is that the travel distance of the spring is less to create a suitable biasing force. Therefore, the insert **11** is smaller, thus requiring less material. A sleeve and insert according to the invention however, can be designed to retrofit existing collars.

Referring to FIG. **10**, when pressurized water is diverted from the valve to a pipe leading to a cleaning head **10** according to the invention, the pressurized water enters the bottom of the cleaning head where it flows through flow path **100** and the force of the pressurized water overcomes the biasing force of element **14** and weight **70** and moves the insert **11** from its first position to its second position in which the aperture **22** extends beyond sleeve **60**. Pressurized water then escapes from aperture **22** and provides a throw **110**, wherein the throw **110** is the distance that the pressurized stream of water flows along a bottom surface of a pool. As the cleaning head indexes, the throw at each indexed position overlaps to create several petals of throws **110**, wherein a circle **112** is created through connecting the intersecting portions of the throw **110**. The radius of the circle **112** provides the radius that the cleaning head **10** can move debris and becomes the cleaning area.

The flow of water through the cleaning head **10** can be affected by various components. For example, and without limitation, the flow of water through the cleaning head **10** can be affected by the aperture **22**. The aperture **22** may be varied in size and in shape. As shown in FIG. **11**, the shape of the aperture **22** may be a race track shape or a race track shape with a turned portion **120** on the upper side of the race track shape. The size and shape of the aperture **22** may provide for different velocity of the flow leaving the aperture **22**, the direction of flow leaving the aperture **22** and the concentration of volume of flow leaving the aperture **22**.

Additionally, the flow path **100** is in the shape of a curved shape, like a question mark and the cross-sectional area of the flow path decreases as it progresses uniformly through the insert **11**. The decreased area provides continuous acceleration of the water flowing through the flow path. The shape reduces turbulence flowing through the flow path and provides a focused cleaning path when the flow exits the aperture **22**. Additionally, the flow path **100** includes an overturn at outlet **104**. The overturn may be a 4 degree down turn. This overturn assists the spread of the flow by slightly bringing down the flow to spread the flow pattern and reduce the drift of the flow. Drift of the flow is how the flow dissipates the further it moves from the nozzle **20**. The longer the distance before drift occurs, the better and greater the cleaning area. This occurs by forcing the flow exiting the nozzle toward the pool surface to hug the contour of the pool surface.

The components defining any cleaning head for an in-floor pool cleaning system may be formed of any of many different types of materials or combinations thereof that can readily be formed into shaped objects provided that the components selected are consistent with the intended operation of a cleaning head for an in-floor pool cleaning system. For example, the components may be formed of: rubbers (synthetic and/or natural) and/or other like materials; glasses (such as fiberglass) carbon-fiber, aramid-fiber, any combination thereof, and/or other like materials; polymers such as thermoplastics (such as ABS, Fluoropolymers, Polyacetal, Polyamide; Polycarbonate, Polyethylene, Polysulfone, and/or the like), thermosets (such as Epoxy, Phenolic Resin, Polyimide, Polyurethane, Silicone, and/or the like), any combination thereof, and/or other like materials; composites and/or other like materials; metals, such as zinc, magnesium, titanium, copper, iron, steel, carbon steel, alloy steel, tool steel, stainless steel, aluminum, any combination thereof, and/or other like materials; alloys, such as aluminum alloy, titanium alloy, magnesium alloy, copper alloy, any combination thereof, and/or other like materials; any other suitable material; and/or any combination thereof.

Furthermore, the components defining any cleaning head for an in-floor pool cleaning system may be purchased pre-manufactured or manufactured separately and then assembled together. However, any or all of the components may be manufactured simultaneously and integrally joined with one another. Manufacture of these components separately or simultaneously may involve extrusion, pultrusion, vacuum forming, injection molding, blow molding, resin transfer molding, casting, forging, cold rolling, milling, drilling, reaming, turning, grinding, stamping, cutting, bending, welding, soldering, hardening, riveting, punching, plating, and/or the like. If any of the components are manufactured separately, they may then be coupled with one another in any manner, such as with adhesive, a weld, a fastener (e.g. a bolt, a nut, a screw, a nail, a rivet, a pin, and/or the like), wiring, any combination thereof, and/or the like for example, depending on, among other considerations, the particular material forming the components. Other possible steps might include sand blasting, polishing, powder coating, zinc plating, anodizing, hard anodizing, and/or painting the components for example.

The embodiments and examples set forth herein were presented in order to best explain the present invention and its practical application and to thereby enable those of ordinary skill in the art to make and use the invention. However, those of ordinary skill in the art will recognize that the foregoing description and examples have been presented for the purposes of illustration and example only. The description as set forth is not intended to be exhaustive or to limit the invention to the precise form disclosed. Many

modifications and variations are possible in light of the teachings above without departing from the spirit and scope of the forthcoming claims.

The invention claimed is:

1. A cleaning head for an in-floor pool cleaning system, the cleaning head comprising:

a sleeve having a passage; and

an insert extending through the passage of the sleeve, the insert comprises a flow path and an aperture, wherein the flow path is a curved flow path that exits the insert through the aperture, wherein the flow path includes an overturn at the aperture, and wherein the insert is moveable between a first position with the aperture retained within the sleeve and a second position with the aperture extending beyond the sleeve.

2. The cleaning head of claim **1**, wherein the insert comprises:

a nozzle;

a nozzle housing;

an upper guide further comprising a plurality of grooves, each of the plurality of grooves of the upper guide having a first and second surface on either side of the groove, wherein each of the first and second surfaces are helical in shape and twist as they extend in a first direction around an outer surface of the upper guide;

a lower guide further comprising a plurality of grooves, each of the plurality of grooves of the lower guide having a first and second surface on either side of the groove, wherein each of the first and second surfaces are helical in shape and twist as they extend in a second direction around an outer surface of the lower guide;

at least one pin coupled to the sleeve within the passage; and

a weight.

3. The cleaning head of claim **2**, wherein the flow path extends through the nozzle, the nozzle housing, the upper guide, the lower guide and the weight, wherein the at least one pin engages the grooves on the outer surface of the upper and lower guides as the insert moves from one or more of its first position retracted within the sleeve to its second position extended from the sleeve, or its second position to its first position, thereby sequentially rotating the aperture such that the aperture releases pressurized water flowing through the flow path to different locations on the surface of a pool as it rotates to different positions when the insert is coupled within the sleeve to a water supply as the water supply is successively pressurized and depressurized.

4. The cleaning head of claim **2**, wherein the nozzle comprises an inlet opening and the aperture of the insert, wherein the inlet opening is angled with respect to a top surface of the nozzle.

5. The cleaning head of claim **4**, wherein the nozzle housing comprises an inlet opening and an outlet opening, wherein the outlet opening is angled with respect to a top surface of the nozzle housing.

6. The cleaning head of claim **5**, wherein the angled inlet opening of the nozzle corresponds to the angled outlet opening of the nozzle housing and the angled inlet opening of the nozzle and the angled outlet opening of the nozzle housing engage each other when the nozzle is coupled within the nozzle housing.

7. The cleaning head of claim **2**, further comprising a biasing element to bias the insert toward the first position.

8. The cleaning head of claim **7**, wherein the biasing element couples over an outer surface of the weight and engages a lip of the weight and engages a bottom surface of the sleeve.

9. The cleaning head of claim **1**, wherein the curved flow path is a question mark shaped flow path.

10. A cleaning head for an in-floor pool cleaning system, the cleaning head comprising:

a sleeve having a passage; and

an insert extending through the passage of the sleeve, the insert comprising:

a nozzle;

a nozzle housing comprising an extension portion;

an upper guide further comprising a plurality of grooves, each of the plurality of grooves of the upper guide having a first and second surface on either side of the groove, wherein each of the first and second surfaces are helical in shape and twist as they extend in a first direction around an outer surface of the upper guide;

a lower guide further comprising a plurality of grooves, each of the plurality of grooves of the lower guide having a first and second surface on either side of the groove, wherein each of the first and second surfaces are helical in shape and twist as they extend in a second direction around an outer surface of the lower guide;

a flow path; and

an aperture, wherein the flow path is a curved flow path that exits the insert through the aperture, wherein the flow path includes an overturn at the aperture, and wherein the insert is moveable between a first position with the aperture retained within the sleeve and a second position with the aperture extending beyond the sleeve; and

wherein the extension portion of the nozzle housing extends into the upper guide when the nozzle housing is coupled to the upper guide, the extension portion forming a portion of the curved flow path.

11. The cleaning head of claim **10**, wherein the insert further comprises:

at least one pin coupled to the sleeve within the passage; and

a weight.

12. The cleaning head of claim **11**, wherein the flow path extends through the nozzle, the nozzle housing, the upper guide, the lower guide and the weight, wherein the at least one pin engages the grooves on the outer surface of the upper and lower guides as the insert moves from one or more of its first position retracted within the sleeve to its second position extended from the sleeve, or its second position to its first position, thereby sequentially rotating the aperture such that the aperture releases pressurized water flowing through the flow path to different locations on the surface of a pool as it rotates to different positions when the insert is coupled within the sleeve to a water supply as the water supply is successively pressurized and depressurized.

13. The cleaning head of claim **11**, wherein the nozzle comprises an inlet opening and the aperture of the insert, wherein the inlet opening is angled with respect to a top surface of the nozzle.

14. The cleaning head of claim **13**, wherein the nozzle housing comprises an inlet opening and an outlet opening, wherein the outlet opening is angled with respect to a top surface of the nozzle housing.

15. The cleaning head of claim **14**, wherein the angled inlet opening of the nozzle corresponds to the angled outlet opening of the nozzle housing and the angled inlet opening of the nozzle and the angled outlet opening of the nozzle housing engage each other when the nozzle is coupled within the nozzle housing.

16. The cleaning head of claim 11, further comprising a biasing element to bias the insert toward the first position.

17. The cleaning head of claim 16, wherein the biasing element couples over an outer surface of the weight and engages a lip of the weight and engages a bottom surface of the sleeve.

18. The cleaning head of claim 10, wherein the curved flow path is a question mark shaped flow path.

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